PP12684/8/2008
Vol. 1 Issue 11. Oct 2014

MALAYSIAN JOURNAL *of* PHARMACY

In this issue:

Supplement

Proceedings of the 25th FAPA Congress 2014

A Publication of the Malaysian Pharmaceutical Society

MALAYSIAN JOURNAL OF PHARMACY
Vol . 1. Issue 11

Malaysian Journal of Pharmacy
Vol.1 Issue 11, October 2014

The Official Journal of the Malaysian Pharmaceutical Society

Publisher: Malaysian Pharmaceutical Society
16-2 Jalan OP 1/5, 1-Puchong Business Park
Off Jalan Puchong
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Table of contents

Editorial

WORKING TOGETHER FOR A ROBUST AND RELEVANT RESEARCH

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Pharmacy research and practice in Malaysia has never been as exciting. The Malaysian Pharmaceutical Society has co-organized the National MPS Scientific Conference since 2001, the National Research & Development Conference for eight years running and various conferences at state level. Each of the conference highlighted hundreds of researches produced throughout the country covering wide range of themes in pharmacy. This reflects the rapid growth of research and interest in scientific endeavour in the country.

An interesting observation in the conferences are the increasing researches conducted in pharmacy practice setting by practitioners. Whilst this is an encouraging trend, researchers need to be aware of the technical progress made in the field that has push forward the sophistication in study methods and design. For example, it is no longer sufficient to infer from observational study that did not consider confounding factors and biasness in their analysis. In fact, publication are now required to adhere to reporting guidelines specific to its study design e.g. CONSORT for clinical trial (1), PRISMA for systematic review (2), CHEERS for economic evaluation (3). This reflects greater understanding by scientific community on the methods limitation and potential risk to its internal validity, and the desire to increase generalizability of the results.

In spite of the interest shown by Malaysian researchers and practitioners in disseminating their research in conference, the same cannot be said for publishing their research in peer reviewed journal. This is a gross missed opportunity as such publication would allow dissemination of local pharmacy research to both international and local audience. Hence it is not surprising to observe researchers flogging a dead horse in local conference. In contrast to conference that only provides brief and limited exposure of the evidence, journal publication is a time tested archive that allow research to be shared over and over again. Thus, allowing future research and policy to be better informed, and equipped.

However, local researchers faced many obstacles in publishing their studies. One of the most common is the lack of appeal of the research topic as they are frequently limited to specific pharmacy setting/service. Thus, local researchers need to come out from their silo and expand their research scope to wider audience in health care. Many research problems are also unique to Malaysia setting and might lack appeal to journal based in developed countries. Dispensing separation for example, is a foregone conclusion in many countries with some already moving into empowering prescribing role to pharmacist(4) but the issue remain wanting in Malaysia(5). The issues of Government Sales Taxon drugs, impact of health care reform to pharmacy and continuous point development requirement for pharmacist are some local issues that highly relevant and pharmacist demand their voice to be heard and the issues to be systematically explored.

Hence, the Malaysian Pharmacy Journal (MJP) has taken a significant step forward to allow a proper discourse of pertinent issues by introducing letter to editor section that would allow intellectual discussion of recently published studies in the journal or current issue in pharmacy. MJP has also revised the reporting format to conform to international guidelines and is working to list the journal in international indexing service. MJP is committed to

foster local pharmacy research and encourage collaborative research between academic and practitioners to improve technical rigor in the researchwhilst at the same time ensuring the research remain relevant to practice.

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Cost-Effectiveness Analysis of a Behavioral Risk Factor Reduction Program at a Worksite: Experience From a Public University in Malaysia

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ABSTRACT

Objectives: The objectives of this study were to determine the cost of a behavioral risk factor reduction program at the worksite and to compare the cost-effectiveness of the program with a control group. *Methodology*: This was a quasi-experimental study conducted among employees of Universiti Sains Malaysia. The program targeted five primary risk factors (RF). Participants in the intervention program were subjected to schedule individualized counseling and seminars during the 6-month follow-up. Participants in the control group underwent health screening. Cost-effectiveness analysis was conducted from the payer's perspective to determine the cost of 1% increase in proportion of participants who reach ideal targets for the RF. One-way sensitivity analysis was also conducted. *Results*: A total 136 participants were recruited in this study. At 6-month follow-up, significantly higher proportion of participants in the intervention group reached target for fruit and vegetable intake ($P < 0.001$) and physical activity ($P = 0.017$). The costs of the intervention program and control group were estimated to be MYR304.52 (USD92.28) and MYR169.90 (USD51.48) per participant respectively. The incremental cost-effectiveness ratio (ICER) of all the RF were lower than the World Health Organization recommendation based on the CHOICE analyses for relative cost-effectiveness of an intervention. Body mass index and alcohol consumption reported negative ICER which indicated control dominant. Sensitivity analyses showed that ICER was reported to be most sensitive to the change in participants' salary. *Conclusion*: The proposed health promotion program was shown to be cost-effective in modifying most of the behavioral RF.

Keywords: behavioural, cost-effectiveness analysis, risk factors

BACKGROUND

Over the years, the life expectancy of the Malaysian population has increased and coupled with the adoption of western lifestyle, the prevalence of cardiovascular risk factors has also increased[1-2]. This increased resulted in an increased in the prevalence of cardiovascular (CV) and its related diseases[3]. Cardiovascular and its related diseases required long-term medical treatment.

Modification of risk factors (RFs) is crucial in order to curb the rise of CV disease. In Malaysia, numerous CV prevention program has been initiated by various parties. These included the individualized and community-wide strategies. Community-wide strategies are widely used but its effectiveness is questionable. Individualized counseling on RF modification provides personalized information to individuals and is believed to produce better outcome. However, the implementation in real world scenario of such a program is questionable because individualized health promotion program is time, manpower and resources consuming.

This health promotion program incorporated both behavioral and educational aspects of lifestyle modification strategies, with an emphasis on the five modifiable RF. The aim of the health promotion program was to correct an array of cardiovascular risk factor behaviors simultaneously. The emphasis of this program was empowerment, which aimed to help participants to develop the knowledge, skills,

attitude and self-awareness required to take up the responsibility for their own health. The intervention program included stage-matched motivational and behavioral strategies based on the Transtheoretical Model (TTM). These were applied to the five modifiable RFs, namely smoking, unhealthy diet, excessive alcohol consumption, physical inactivity, and obesity and being overweight. It was assumed that changes to a primary RF will bring positive changes to the secondary RF.

In Malaysia, public healthcare sector was heavily subsidized by the government. The rise in CV and its related diseases has dramatic impact on healthcare expenses as well as employees' absenteeism from work. With the limited resources for healthcare, priority setting is important to identify the treatment (intervention) which gives maximum health gain within a limited budget. Thus evaluation of cost and benefit of a health promotion program can support decision-makers in effective budget deployment. Moreover, the cost-effectiveness analysis of the health promotion program provided an insight on the affordability of this program.

The objective of this study was to compare the cost-effectiveness of a behavioral RF reduction program at the worksite versus health screening alone in achieving the ideal target for five primary cardiovascular risk factors.

METHODOLOGY

This was a quasi-experimental study carried out from October 2009 to July 2010 at Universiti Sains Malaysia (USM). Participants for the intervention and control group were recruited among the employees of Engineering Campus and main campus of USM respectively.

This prospective lifestyle interventional study targeted five primary RF namely smoking, excessive alcohol consumption, physical inactivity, inadequate fruit and vegetable intake and overweight/obesity. Participants in the intervention group were required to attend scheduled individualized counseling and seminars during the 6-month follow-up. Individualized counseling was based on a standardized and validated (using Delphi method) counseling protocol. The frequencies of the individualized counseling sessions were bimonthly for the first month and monthly thereafter. Two seminars were held during the 6-month program targeted on the two main RF i.e. physical inactivity and unhealthy diet. The health educator was trained on providing counseling on RF management based on the TTM and motivational interviewing principles. Control group participants underwent health screening and the results of this health screening were mailed to them within one week. No involuntary changes were made to their lifestyle. Figure 1 display the flow of the study.

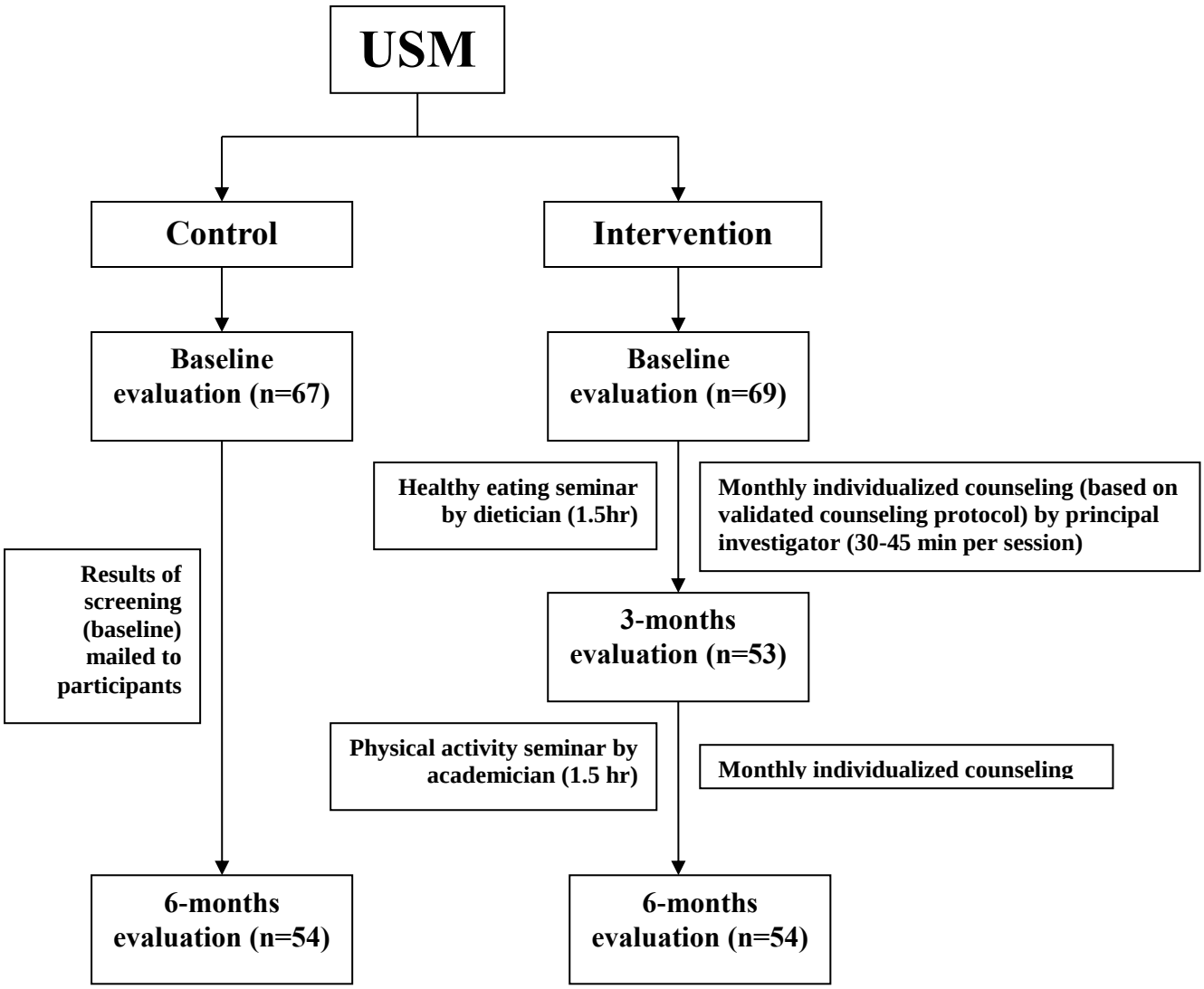

Figure 1: Flow of the study

Participants for both the intervention and control group fulfilled pre-set inclusion and exclusion criteria prior to enrollment into the study. The inclusion criteria were no previous CV disease/events and not currently on medication for treatment of hypertension, diabetes or dyslipidemia. Participants should have at least one cardiovascular risk factor. Employees who were pregnant, history of severe renal or liver disease and who were currently enrolled in any other lifestyle changes program were excluded from this study.

Data on current RF status were collected using the WHO STEPS instrument for chronic disease risk factors surveillance questionnaires[4]. Behavioral RF status was self-reported. The same instruments and measurements were used throughout the study to reduce variability between the instruments and measurements made for the various obesity indexes. Physical measurements made included height, weight and waist circumference (WC). Height and weight were measured using a stadiometer. Waist circumference was measured using a fiberglass measuring tape taken between the inferior margin of the last rib and the crest of the ilium in a horizontal plane. Hip circumference measurement was taken around the pelvis at the point of maximal protrusion of the buttocks while patient stand with feet 25 cm to 30 cm apart with weight evenly distributed[5].

Cost-effectiveness analysis was conducted from the perspective of the university, as payer of healthcare for its employees. Both direct and absenteeism costs were included in the costing analysis. Research-related costs were excluded from the analysis. These included cost for awareness program and incentives paid to the participants. Costs of hospital admission and medications were also excluded in the analysis because analysis was done until the day the participants were admitted for any CV events or started on medications. Micro-costing was carried out wherever possible. In cases where micro-costing cannot be done, expert opinion of panel or the closet estimates were used[6].

Resource consumed in health and productivity sector were accounted in the cost as follows (Table 1). The costs of the building (or space) and equipment used during the intervention were annuitized over the useful life of the building (or space) and equipment which was estimated to be between 5 and 20 years at a 5% discount rate. It was assumed that there was no resale value for the equipment after the useful life of the equipment. The estimated 'equivalent annual cost' (EAC) was derived by taking into account the depreciation aspect and the opportunity cost aspect of the capital cost. The costs and outcomes of the intervention program were not discounted because only 6-month outcomes were taken into consideration during analysis.

Table 1. Resource consumed for the behavioral risk factor reduction program at the worksite.

Measure	Cost	Data source
Activity 1: Counseling by health educator		
Counseling and screening by health educator	Duration of counseling and screening	Detail recorded during study period.
	Salary of health educator (pharmacist)	Based on Ministry of Health starting salary (excluding allowances) for pharmacist (Grade P1T4).
Space for counseling	Building cost	Data obtained from university's Development Department. The cost was reported as cost per square feet.
	Useful life years	Estimated to be 20 years.
	Discount rate	Estimated to be 5%.
	Annual maintenance	Data obtained from Faber Medi Serve cleansing and linen services for Duchess of Kent Hospital, Sandakan, Sabah. The cost was divided by two (assuming cost of cleansing and linen services were equally distributed). The cost was reported as cost per square feet.
	Utilities	Data obtained from monthly electricity bill for Duchess of Kent Hospital, Sandakan, Sabah. The cost was reported as cost per square feet.
Equipment	Purchase price for electronic blood pressure machine, measuring tape, laptop, printer, tables and chairs	Actual acquisition price.
	Purchase price for table, chair	Government tender price.
	Resale value	Assume to be nil at the end of useful life years.
	Useful life years	5 years except for table (10 years)
	Discount rate	5%.
Counseling material	Road to healthy heart booklet	Actual printing cost.
	Stationeries (papers and pens)	Actual acquisition price.
	Printing of forms	Actual printing cost.
Laboratory tests	Fasting blood glucose and full lipid profile	Average price quoted by Pro Medic Laboratory Sdn. Bhd.
Others	Toner for printer	Actual acquisition price.
Activity 2: Seminars		
Space	Seminar room, utility, one tea break, audio-visual equipment, tables and chairs	Price quoted by USAINS Group of Companies for conducting seminar.

Honorarium for speakers	Two speakers	Actual amount paid.
Activity 3: Training of health educator		
Space	Seminar room, utility, one tea break, audio-visual equipment, tables and chairs	Price quoted by USAINS Group of Companies for conducting seminar.
Honorarium	Five speakers	Actual amount paid.
Traveling expenses for speaker	Taxi fare for airport transfer and air fare	Actual amount paid.
Activity 4: Loss of productivity		
Loss of productivity	Absenteeism from work	Number of days absent from work and salary of the administrative clerk.

The costs of the intervention and control group were summed based on the following equation.

Average total cost per participant = Average variable cost + Average fixed cost

Average variable cost $= \sum$ cost of program per participant$_i$ / number of participants

$= (\sum$ cost of counseling$_i$ / number of participants) + counseling material + [$\sum$ (laboratory charges x number of test$_i$) / number of participants)] + [$\sum$ (participant daily salary x days of medical sick leave$_i$) / number of participants)]

$= [\sum$ (cost of health educator per minute + cost of space per minute + cost of maintenance per minute + cost of electricity per minute + cost of equipment per minute) x duration of counseling$_i$/ number of participants] + counseling material + [$\sum$ (laboratory charges x number of test$_i$) / number of participants)] + [$\sum$ (participant daily salary x days of medical sick leave$_i$) / number of participants)]

Average fixed cost $= \sum$ (cost for stationeries + printing charges + seminars + training) / number of participants

One-way sensitivity analysis was conducted by varying the cost of three parameters to test the robustness of the results obtained. These parameters were the salary of health educators, the salary of the participants and cost of renting of seminar room. These parameters were chosen due to the estimated costs used in the initial evaluation. In this study, the intervention was conducted by a pharmacist. However, other healthcare professionals who frequently conduct such programs are medical officers, dieticians or nurses. Therefore, the health educator's salary was varied between the highest and the lowest salary of these professions, based on the starting salary as quoted by the Public Service Department, Malaysia. Secondly, the cost of the medical sick leave of the base case analysis was calculated based on the salary of an administrative clerk, which was the occupation of the majority of the participants. However, there were participants of other occupation groups in this program. Therefore, the highest and the lowest salary of these professions were used in the sensitivity analysis. Finally, the cost of the seminar room and tea break can vary depending on the place occupied and the food ordered.

The primary outcome measure was to examine the intervention effects in terms of the prevalence of individuals meeting healthy lifestyle recommendations after intervention. Given that there are four primary outcome measures, a range of sample-size estimates based on the intervention effects obtained from previous studies was calculated. The required sample size was calculated using the

formula for finding the sample size for studies about proportions in two groups assuming a Type I error of 0.05 and a power of 80%[7].

It was assumed that the achievement of fruit and vegetable intake in the intervention group was 33.0% as compared with 13.0% in the control group; physical activity was 90.0% in the intervention group as compared with 71.0% in the control group[7]; smoking cessation rates were 17.0% for the intervention group as compared with 2.3% in the control group[8] and a higher compliance with recommendations for the control group (30.0% vs 26.0%) was reported for alcohol consumption[7]**.** After taking into considerations a 20% drop-out rate, the required sample size was between 58 and 118 in each group.

Pre-determined criterion to define whether a change has successfully reach its target or not, were based on the targets adopted from the Malaysian clinical practice guidelines[5, 9-14]. The outcome measure for this study was the cost per 1% increase in proportion of participants who reach the ideal targets for the RF. Approval from the Joint Ethics Committee of the School of Pharmaceutical Sciences, USM-Lam Wah Ee Hospital was obtained prior to the commencement of the study.

All data were analyzed using statistical software SPSS package version-16. A two-tailed P-value < 0.05 was considered statistically significant. Baseline sociodemographic and RF characteristics between intervention and control groups were reported using simple descriptive statistics. Continuous variables were expressed in mean and standard deviation or median and inter-quartile range for continuous variables. Discrete variables were expressed in proportion. Differences in the proportion of participants reaching target for each RF were compared using chi square test (or Fisher exact test).

RESULTS

A total 136 participants were recruited into the study with 69 participants (50.7%) in the intervention group and 67 participants (49.3%) in the control group. At 6-month follow-up, 78.3% (n = 54) and 91.1% (n = 61) of the participants completed final evaluation. Majority of the participants were female and of Malay ethnic origin. The mean age was 36.92 (SD = 9.14) years. There was no significant difference between intervention and control group in terms of sex and ethnicity.

The RFs were categorized into reaching target and not reaching target and were compared between intervention and control groups (Table 2). At baseline, there was no significant difference in the proportion of participants reaching the target for any of the RF. However, at 6-month follow-up, significantly higher proportion of participants in the intervention group reached the target for fruit and vegetable intake (P < 0.001) and physical activity (P = 0.017).

A total of 69 participants in the intervention group were entered into the analyses. The cost of the intervention program was estimated to be MYR304.52 (USD92.28) per participant.

Table 2. Comparison of proportion of participants reaching risk factors target

Risk factor	Group	Baseline (n, %)		P-value	3-month (n, %)		P-value	6-month (n, %)		P-value
		Yes	No		Yes	No		Yes	No	
Smoking	Int	65 (94.2)	4 (5.8)	0.743[b]	50 (94.3)	3 (5.7)	-	52 (96.3)	2 (3.7)	0.683[b]
	Control	62 (92.5)	5 (7.5)					57 (93.4)	4 (6.6)	
Alcohol consumption	Int	67 (97.1)	2 (2.9)	1.000[b]	51 (96.2)	2 (3.8)	-	52 (96.3)	2 (3.7)	0.218[b]
	Control	66 (98.5)	1 (1.5)					61 (100.0)	0 (0)	
Fruit and vegetable intake	Int	3 (4.3)	66 (95.7)	0.322[b]	11 (20.8)	42 (79.2)	-	19 (35.2)	35 (64.8)	<0.001[a]
	Control	6 (9.0)	61 (91.0)					5 (8.2)	56 (91.8)	
Physical activity	Int	13 (18.8)	56 (81.2)	0.096[a]	13 (24.5)	40 (75.5)	-	13 (24.5)	40 (75.5)	0.017[a]
	Control	6 (9.0)	61 (91.0)					5 (8.2)	56 (91.8)	
Body mass index	Int	23 (33.3)	46 (66.7)	0.308[a]	18 (34.0)	35 (66.0)	-	20 (37.0)	34 (63.0)	0.503[a]
	Control	17 (25.4)	50 (74.6)					18 (31.0)	40 (69.0)	
Waist circumference	Int	33 (47.8)	36 (52.2)	0.081[a]	35 (66.0)	18 (34.0)	-	29 (54.7)	24 (45.3)	0.089[a]
	Control	42 (62.7)	25 (37.3)					31 (53.4)	27 (46.6)	
Waist-hip ratio	Int	53 (76.8)	16 (23.2)	0.747[a]	48 (90.6)	5 (9.4)	-	47 (88.7)	6 (11.3)	0.181[a]
	Control	53 (79.1)	14 (20.9)					46 (79.3)	12 (20.7)	

α value = 0.05; [a] chi square; [b] Fisher Exact test; Int = intervention;

Similar estimation and calculation was used to calculate the cost of the control group. The time spent on screening for baseline and 6-month evaluation was taken into consideration of cost calculation. Since no active intervention was provided to the control group, laptop and printer were considered not utilized by this group of participant. They were also not provided with the counseling material and therefore its cost was excluded from this analysis for the control group. It was estimated that the screening of the control group used up one ream of A4 paper and one pen with a total cost of MYR18.50. The printing cost over the 6-month was MYR356.00 (108 pages for 66 participants at MYR0.05 per page). The cost of seminars and training of health educator was also excluded from this analysis. Initially there were 67 participants in the control group. However, three of the participants were transferred to another institution and data on their medical sick leave and 6-month evaluation were not available. Therefore, they were excluded from these analyses giving a total of 64 participants in the control group. The cost of screening for the control group was estimated to be MYR169.90 (USD51.48) per participant. Therefore, the differences in cost between intervention and control group participant was MYR134.62 (USD40.79) per participant.

Cost-effectiveness Analysis of Proportion of Participants Reaching Risk Factors Target

The summary of the cost-effectiveness ratio (CER) and incremental cost-effectiveness ratio (ICER) for the proportion of participants reaching target for each RF was presented in Table 3. Cost-effectiveness ratio provides information on the cost of 1% increase in the proportion of participants reaching target for each RF. It can be seen that within the intervention group, alcohol consumption worsen with a negative CER. Similarly, three RFs (fruit and vegetable intake, physical activity and WC) produced negative CER for the control group.

Table 3. Cost-effectiveness ratio and incremental cost-effectiveness ratio for proportion of participants reaching target for each risk factor

	Intervention				Control				
	Baseline (a) (%)	**6-month (b) (%)**	**(b) – (a)**	**CER**	**Baseline (a) (%)**	**6-month (b) (%)**	**(b) – (a)**	**CER**	**ICER**
Smoking	94.2	96.3	2.1	14,500.95	92.5	93.4	0.9	18,877.78	11,218.33
Alcohol consumption	97.1	96.3	-0.8	-38,065.00	98.5	100.0	1.5	11,326.67	CD
Fruit and vegetable intake	4.3	35.2	30.9	985.50	9.0	8.2	-0.8	-21,237.50	424.67
Physical activity	18.8	24.5	5.7	5342.46	9.0	8.2	-0.8	-21,237.50	2071.08
Body mass index	33.3	37.0	3.7	8230.27	25.4	31.0	5.6	3033.93	CD
Waist circumference	47.8	54.7	6.9	4413.33	62.7	53.4	-9.3	-1826.88	830.99
Waist-hip ratio	76.8	88.7	11.9	2558.99	79.1	79.3	0.2	84,950.00	1150.60

CD = control dominant; CER = cost-effectiveness ratio; ICER = incremental cost-effectiveness ratio

Incremental cost-effectiveness ratio is defined as the ratio of change in cost of an intervention as compared to the control group to the change in outcomes between the two groups[15]. A negative ratio indicated that the control group was dominant in increasing the proportion of participants reaching target. This was seen with body mass index (BMI) and alcohol consumption.

Sensitivity analyses were conducted to test the robustness of the cost-effectiveness model. Three parameters were varied between their maximum and minimum values. These were the salary of the health educator, salary of participants for productivity cost estimation and cost of conducting seminars.

The cost per participant for the intervention and control groups was recalculated based on the variation of the pre-set parameters in the sensitivity analysis. The incremental costs vary from -MYR79.57 (USD24.11) (cost per participant in the control group higher than intervention group) to MYR144.49 (USD43.78). This was summarized in Table 4.

Table 4. Cost of the program (intervention and control) during sensitivity analysis

	Cost of program / per participant (Intervention) (MYR)	**Cost of program per participant (Control) (MYR)**	**Incremental cost (intervention – control) (MYR)**
Base case analysis	304.52	169.90	134.62
Sensitivity analysis 1: health educator salary maximum	308.47	171.02	137.45
Sensitivity analysis 2: health educator salary minimum	288.36	165.28	123.08
Sensitivity analysis 3: participant salary maximum (for estimation of absenteeism)	482.76	562.33	-79.57
Sensitivity analysis 4: participant salary minimum (for estimation of absenteeism)	296.33	151.84	144.49
Sensitivity analysis 5: seminar cost maximum	314.53	169.90	144.63

Sensitivity analysis 6: seminar cost minimum	294.53	169.90	124.63

Cost-effectiveness ratio and ICER were calculated for each RF and for each of the parameters which was included in the sensitivity analysis. Subsequently, the percentage change from the base case analysis in the ICER was calculated.

The sensitivity of the change in parameters varied. Although the cost of the health educator made up of 18% of the total cost of the program, varying this cost to the medical officer's salary did not affect the results as much as varying it to the salary of the staff nurse. Hence employing staff nurse to conduct the intervention is more cost-effective. Secondly, varying the cost of the rental for the seminar room did not have much effect on the ICER. In contrast, varying the participants' salary between the minimum (salary of general worker) and maximum (lecturer) have tremendous effect on the ICER. This salary was used to calculate the cost of medical sick leave taken by the participants. There was more than 150% change when the participants' salary was adjusted to the maximum, in favor of the intervention group. When the salary was adjusted to the minimum, the cost difference increased from base case analysis resulting in an increased in percentage change in ICER. This can be observed from the tornado diagram as presented in Figure 2.

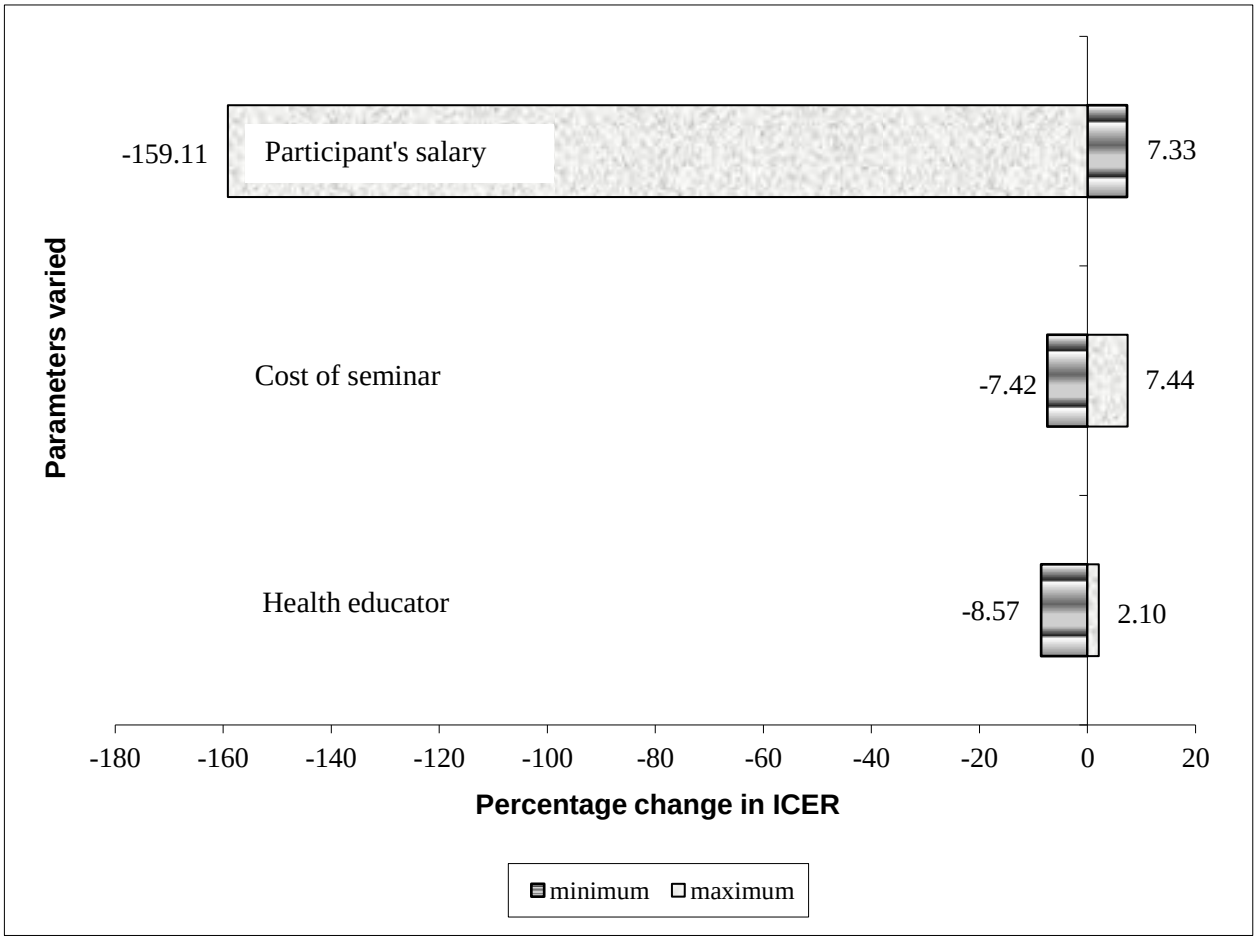

Figure 2: Tornado diagram of the percentage change in ICER for proportion of participants reaching RF target

Similarly, ICER was recalculated by varying the two main outcomes, namely physical activity and adequate fruit and vegetable intake. It was found that by varying proportion of participants achieving target RF, the ICER achieved was still less than MYR30,000.

Discussion

The aim of this study was to conduct cost-effectiveness analysis on the effect of a worksite health promotion program on achieving RF targets. Significant improvement of the intervention on the proportion of participants reaching the targets was found in fruit and vegetable intake and physical activity. Most of the studies reviewed reported significant higher proportion of participants in the intervention groups meeting the target for physical activity and fruit and vegetable intake except for studies reported by Jimmy et al. (2005) (physical activity) and Hardcastle et al. (2008) (fruit and vegetable intake)[7, 16-19].

The effect of health promotion program on the prevalence of smoking was not consistent. Our study reported no significant difference between the two groups. This was supported by studies reported elsewhere[18, 20-24]. However, the numbers of smokers might be too small to detect any differences during analyses.

The intervention program was more costly than the control, with a differential cost of MYR134.62 (USD40.79) per participant in six months. The differential costs between health promotion program and screening along differed widely in existing studies, depending on the duration, intensity and type of intervention. It ranged from USD41.09 to EUR430 (USD612.42)[25-27].

It is not feasible to compare the CER and ICER calculated from this study to the studies reported elsewhere. Most of the studies had modeled the effect of the intervention to final outcomes such as life-years gained and quality-adjusted life years.

The ICER of the various obesity indexes produced different results. The disproportionate achievement of target RF between BMI, WC and waist-hip ratio (WHR) between intervention and control group was unexpected and was not supported by the studies reviewed. A reduction in body weight is frequently reported to correspond with reduction in abdominal obesity (reported as WC and WHR)[28-30]. The only exception was a study by Hassan et al. (2011) which reported a significant reduction in WC and hip circumference but not BMI after a 6-month program targeted on diet and individualized physical activity[31].

Despite the negative ICER for alcohol consumption, the number of participants who achieved targets for alcohol consumption was too small to make any general conclusion on the effect of the program.

The other RF consistently showed positive ICER for both the outcomes. The calculated ICER were much lower than the World Health Organization recommendation based on the CHOICE analyses for relative cost-effectiveness of an intervention, whereby an ICER of less than MYR30,000 (USD9090.91) is considered cost-effectiveness for public policy intervention in Malaysia[32].

A review of the literature found numerous economic evaluation which reported positive results from the intervention (including worksite intervention). Smoking cessation program which utilized remuneration or nicotine-replacement therapy was more cost-effective than usual counseling alone[33]. Sevick et al. (2000) reported the cost-effectiveness of lifestyle intervention as compared with structured program in terms of physical activity, BP and weight[34]. In 2007, Sevick et al (2007) reported that it was more cost effective to use printed letters than phone to improve physical activity level[35]. However, other studies also reported no superiority of intervention on the economic outcomes on the RFs[27, 36]. Almost all of the economic evaluation of worksite intervention program reported in reduction in absenteeism[27, 37-38].

The sensitivity analyses showed that the ICER was most resistant to change in the cost of seminar (both minimizing and maximizing the cost) and also maximizing the salary of the health educator. In contrast, the ICER was most sensitive to the participant's salary, whereby the maximum possible salary resulted in approximately 150% change in ICER as compared to the base case model. These results showed that it is possible to further improve the incremental cost of CER by utilizing a staff

nurse trained in conducting this program. Training should be emphasizing in order to ensure standardization of counseling given. More importantly, the sensitivity analyses results also showed that salary of the participants greatly impact the ICER. The participants' salary in the base model was based on the salary of an administrative clerk. This salary was used to calculate the cost of medical sick leave. This can be explained by the fact that the number of medical sick leave days taken by the participants in the intervention group (n = 1.03 days) was lower than the control group (n = 2.27 days) even though this difference did not reach statistical significance (Mann-Whitney test, P = 0.175). A public university consisted of several positions with different salary scheme. If this program is conducted in a large scale, involving large number of participants, it is expected to be more cost-effective.

The results from this analysis have to be taken with some caution. This study looked into the intermediate outcomes related to the individual RF. Despite not addressing the mortality and morbidity over lifetime, these intermediate outcomes (behavioral changes) were deemed clinically relevant. Numerous studies have reported the correlation between these intermediate outcomes and mortality and morbidity[15]. Furthermore, the behavioral RF status was self-reported and is subjected to recall bias. Moreover, participation in the program is voluntary and non-random. Therefore, it was expected participants with higher intention to change was enrolled in the program.

CONCLUSIONS

In conclusion, this program was shown to be cost-effective in modifying most of the behavioral RF, most notable physical activity and fruit and vegetable intake. Cost-effectiveness of the program would be increased with recruitment of high-risk individuals with higher baseline risk. Secondly, by recruiting a higher number of participants into the program, the cost of the intervention can be reduced. As such it is recommended that this program be extended throughout the worksite particularly targeted at high-risk individuals.

CONFLICT OF INTEREST

The authors declared no conflict of interest in conducting and writing this research.

ACKNOWLEDGEMENT

I would like to thank the staff from the Health Unit of Engineering Campus, USM for their continuous support during the course of this study. This research was financially supported by Universiti Sains Malaysia Research University [1001/PFARMASI/813018]; and Healthy Campus Grant 2008.

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Formulation and Stability of Extemporaneously Prepared Morphine Oral Suspension

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ABSTRACT

Morphine taken by mouth is an effective analgesic for most people with moderate or severe cancer pain. Hospital pharmacists commonly prepare morphine oral liquid extemporaneously for cancer patients who require tube feeding or have difficulties in swallowing because it is not available commercially in Malaysia. This study aims to provide the physical, chemical and microbiological stability data to determine the shelf-life and storage condition for the extemporaneous preparation of morphine oral suspension (10mg/5ml) using X-Temp Oral Suspension System. The samples were divided into 2 groups and were stored at 4ºC (refrigeration) and 30ºC / 75%RH (room temperature) protected from light for 12 months. The physical, chemical and microbiological stability were examined at the interval of months 0, 1, 2, 3, 4, 5, 6, 9 and 12. The content of morphine was determined using HPLC-UV method. The content of morphine remained above 95% of the original concentration throughout the study period. The colour, clarity and odour remained fairly unchanged throughout the study period and the pH values were steady at around pH 4. The extemporaneous preparation was not susceptible to microbial contamination. The results from the stability studies confirmed that the new formulation of morphine oral suspension is stable for up to 12 months when packed in HDPE bottles with polypropylene caps and stored at both 4ºC and 30ºC / 75%RH.

INTRODUCTION

Morphine is an opioid analgesic used to relieve severe, acute pain or moderate to severe, chronic pain for patients with cancer, myocardial infarction and surgery (1,2). Morphine taken by mouth is an effective analgesic for cancer pain and is considered the drug of first choice for relieving moderate to severe pain (3). Moderate to severe pain in cancer is common and affects 70 to 80% of patients with advanced disease (3). Morphine has remained the first choice for reasons of familiarity, availability and cost rather than proven superiority (3).

According to the World Health Organization (WHO), morphine is given orally as an aqueous morphine solution or as standard immediate-release tablet every four hours by the clock (4). Modified-release tablets or capsules are available in both 12 hour and 24 hour release patterns and should be swallowed whole (5). The effective dose may vary from as little as 5mg to more than 1000mg partly because of individual variations in systemic bioavailability (4). Immediate-release formulations (tablet or aqueous solution) are much more flexible than long-acting preparations, both in the dose titration period and when the pain is poorly controlled (3). When compared to immediate- and modified-release morphine tablets, morphine oral solution has an earlier onset and is easier to take and more convenient for dose titration (6).

The lack of commercially available oral liquid dosage form is an on-going problem for health care providers in many practice settings. The pharmacist, both in community and hospital pharmacy practice, is often challenged with the preparation of a liquid dosage form not available for paediatric

patients, those adults unable to swallow tablets or capsules and patients who must receive medications via nasogastric or gastrostomy tubes (7).

When there is a need to undertake extemporaneous preparation, the accountable pharmacist must choose a validated formula with supporting stability data (8,9). However, when the stability data and validated formulations are not available, further research should be carried out to validate the formulations used in practice whenever possible and then the formulations should be standardized among all the hospitals (9).

Morphine oral liquid is preferred in cancer patients who require tube feeding or have difficulties in swallowing (6). Many hospital pharmacists have to prepare morphine oral liquid extemporaneously because it is not available commercially (9). In Malaysia, pharmacists in major hospital are tasked to prepare morphine oral liquids on a weekly basis to supply them to outpatient departments, satellite pharmacies and wards. Therefore, it is ideal that the morphine oral liquid has longer shelf-life to meet the clinical requirements of the outpatients who are taking this medicine and also to minimize wastage due to short expiry.

Extemporaneous preparation remains one of the highest risks preparative activities carried out in the pharmacy, as the risks of unlicensed medicines are combined with inherent risks associated with the pharmaceutical compounding process (8). Formulation failure can occur when a formulation has not been adequately validated, potentially resulting in either under- or overdose and associated toxicity or therapeutic failure (8). The causes of formulation failure are numerous and can be complex, including physical incompatibilities, drug/excipient binding issue and drug degradation (8). Generally, as the complexity of the formulation increases so does the risk of problems occurring. Therefore, the formulation of the extemporaneous preparation should be designed as simple as possible for these reasons (8).

According to the USP36-NF31 Chapter <795>, Pharmaceutical Compounding – Nonsterile Preparations (10), an extemporaneous oral liquid has a beyond-use date (BUD) of not more than 14 days shelf-life when stored at controlled cold temperatures if no stability information or supporting data is available. This study will provide the stability data needed to determine the shelf-life and storage condition for the extemporaneous preparation of morphine oral liquid. The results from the stability studies are important to validate the formulation and to confirm that the extemporaneous preparation remains stable and efficacious during the course of their use.

An oral formulation can be prepared from morphine sulfate or hydrochloride salt (4,5). Morphine hydrochloride is a colourless, white or almost white, crystalline powder. It is efflorescent in a dry atmosphere. It is soluble in water, slightly soluble in alcohol and practically insoluble in toluene (2).

Oral liquids are usually formulated as either a suspension or solution. Drugs in solution are more susceptible to chemical degradation than drugs in the solid state and this should be considered when preparing a solution (11). Extemporaneous preparation made from tablets contains excipients such as binders and disintegrating agents in addition to the active drug. Insoluble tablet excipients may compromise the product appearance of the suspension whereas soluble tablet excipients may reduce drug stability, for example, by altering the pH of the preparation (11).

When considering the suitability of an extemporaneous oral liquid, a number of factors, in addition to chemical stability of active pharmaceutical ingredient (API) need to be considered. This includes physical stability, microbial stability, palatability, excipient suitability (e.g. sugar free for diabetic patients), interactions with packaging materials, accurate compounding procedures including calculations and cost (12).

Since sourcing of API for morphine hydrochloride is possible, pure drug substance is preferred over commercially available tablet for compounding of oral liquids. The use of commercially available suspending base is encouraged and is considered an excellent choice for making the extemporaneous

preparations as simple for the inexperienced pharmacist making one-off preparations (13). Commercial vehicles are considered a convenient choice since many practice settings may not stock a wide variety of excipients and many of the stability studies in the literature on oral liquids prepared extemporaneously utilize these commercial vehicles (12).

MATERIALS AND METHODS

Formulation and Study Design

The extemporaneous preparation of morphine oral suspension (10mg/5ml) was prepared by the pharmacy department of Universiti Kebangsaan Malaysia Medical Centre (UKMMC). The API of morphine hydrochloride BP, PhEur. was sourced from Johnson Matthey / Macfarlan Smith Limited, United Kingdom and the commercial vehicle, X-Temp Oral Suspension System was supplied by Pharm-D Sdn Bhd, Malaysia (**Figure 1**).

Figure 1: Master formula for morphine oral suspension

Ingredient	Amount
Morphine HCl Powder	10g
X-Temp Oral Suspension System	qs ad 5000ml

The commercial vehicle chosen contains specialized suspending system formulated to assist in extemporaneous preparation of oral liquid, non-soluble (suspended), aqueous dosage form and is an orange flavoured, sweetened, sugar-free vehicle containing suitable preservatives. The morphine oral suspension was packed into 100ml semi-transparent high-density polyethylene (HDPE) bottles and was fitted with white polypropylene screw caps.

Fifty-five bottles of morphine oral suspension were divided into 2 groups and one group was stored at 4 ± 2ºC (refrigeration) and the other was stored at 30 ± 2ºC / 75%RH ± 5%RH (room temperature) in the absence of light.

Drug product stability encompasses chemical, physical, microbiological, therapeutic and toxicological stability not only of the drug substance, but when taking into account of the excipients, also the drug product (14). Stability studies should be performed for desired drug concentration and in real storage conditions (storage temperature, duration and type of container). The physical stability is assessed from changes in appearance, colour or odour, while the chemical stability is determined using an adequate analytical method for drug quantification (10). Microbiological stability should be conducted in extemporaneous oral formulations containing no or insufficient preservatives and be stored at room temperature over an extended period (10,15). This study focuses on the physical, chemical and microbiological stabilities and to confirm that the new formulation for the morphine oral suspension is suitable and stable.

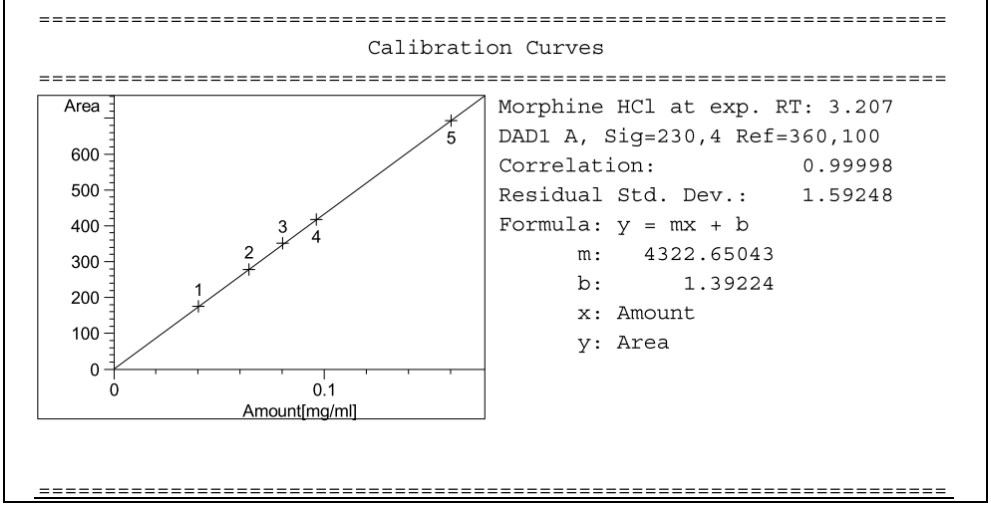
Analytical Method and Equipment

The content of morphine hydrochloride in the oral suspension was assayed by high-performance liquid chromatography (HPLC) method with reference to the British Pharmacopoeia and the content of morphine hydrochloride was set at 90 to 110% of the stated amount (16). The HPLC method for the analysis of morphine in this study was validated in a previous short-term stability study of extemporaneously prepared morphine oral suspension using the above formulation. The evaluation of the analytical method validation includes linearity, accuracy and system suitability (**Table 1**). A range performed on the HPLC system has confirmed the linearity of the method ($R^2 = 0.99998$) (**Figure 2**).

Table 1: Results of analytical method validation

Test Parameter	Validation Results	Acceptance Limits
Linearity & Range		
	R^2 = 0.99998 Intercept = 0.40% of the response of 100% (working) concentration	R^2: Not less than 0.999 Intercept: NMT 2% of the response of 100% (working) concentration
Accuracy		
Spiking of placebo 9 determination (3 replicates / 3 concentration)	99.3%, 99.6%, 99.7%, 98.1%, 99.0%, 98.7%, 100.4%, 101.1%, 100.8%	% recovery: 98 - 102% of label or mean from precision
System Suitability		
System Precision	RSD of detector response = 0.07%	RSD of detector response: NMT 2%
	RSD of retention time = 0.08%	RSD of retention time: NMT 1%
Peak Performance		Analyte
	k' = 2.215	k': NLT 1.5
	Resolution = 18.167	Resolution: NLT 2
	USP tailing = 1.344	USP tailing: NMT 2
	N = 5939	N: NLT 2000

Figure 2: Calibration curve of the HPLC assay method



The content of morphine hydrochloride was measured by HPLC-UV method after the sample of extemporaneous preparation was made throughout the stability study period. Samples were removed from each individual bottle on months 0, 1, 2, 3, 4, 5, 6, 9 and 12. A working reference standard of morphine hydrochloride was obtained from Johnson Matthey / Macfarlan Smith Limited, United Kingdom.

The HPLC system used for the analysis was an Agilent 1200 RRLC instrument with binary pump SL, autosampler SL, DAD SL detector, Thermostat Column Compartment SL and chemstation. The chromatographic separation used was Zorbax Eclipse XDB-C18 (4.6mm ID x 100mm, 3.5µm). The DAD detector operated at 230nm. The mobile phase consisted of a mixture of 65 volumes of 0.005M sodium heptanesulfonate buffer adjusted to pH 2.6 with orthophosphoric acid 85%

and 35 volumes of methanol. The mobile phase was delivered at a flow rate of 1ml/min. Samples were filtered before HPLC analysis and the injection volume as 5µL.

Physicochemical Stability

The physical and chemical tests (such as visual appearance, odour, pH and morphine content) were assessed at time 0, 1, 2, 3, 4, 5, 6, 9 and 12 months during storage at both temperatures. The morphine oral suspensions were examined at each sample time for any change in appearance (colour and clarity) or odour. The pH was periodically checked during storage at for both temperatures using a pH meter. The extemporaneous preparation is considered stable if physical characteristics have remained fairly unchanged and assay of morphine hydrochloride has remained equal or above 90% of the original concentration during the storage period.

Microbiological Stability

Microbiological stability of the morphine oral suspension stored at 4ºC and 30ºC was studied at the interval of months 0, 1, 2, 3, 4, 5, 6, 9 and 12. The microbial limit test was designed according to the British Pharmacopoeia for non-sterile products to determine whether the total bacteria, total fungi and *Escherichia coli (E. coli)* in the extemporaneous preparation complies with the established specification for microbiological quality of this type of product (17).

RESULTS AND DISCUSSION

Physicochemical Stability

Morphine degrades in aqueous solutions with the formation of mainly pseudomorphine, to a lesser extent morphine-N-oxide and probably apomorphine and discolouration has been observed when degradation products are found in morphine solution (6,18,19). The results of the colour, clarity and odour of the morphine oral suspension remained fairly unchanged and no precipitation was observed in any of the samples throughout the 12 months at both storage conditions (**Table 2**). The orange taste and sweetness of the morphine oral suspension were quite the same throughout the stability study period. Morphine salts are sensitive to change in pH and morphine is liable to be precipitated out of solution at alkaline pH (2). Vermeire and Remon (1999) also concluded that the degradation of morphine is accelerated at higher pH of the solution, whereas temperature and light have only a minor influence on the degradation rate (18). The results from this study confirmed that the pH values of the morphine oral suspension remained fairly constant (pH3.984 – 4.082) at both temperatures (**Table 3**).

Table 2: Visual appearance and odour of morphine oral suspension

Time (Months)	4ºC			30ºC		
	Colour	Clarity	Odour	Colour	Clarity	Odour
0	Off white	Opaque	Orange	Off white	Opaque	Orange
1	Off white	Opaque	Orange	Off white	Opaque	Orange
2	Off white	Opaque	Orange	Off white	Opaque	Orange
3	Off white	Opaque	Orange	Off white	Opaque	Orange
4	Off white	Opaque	Orange	Off white	Opaque	Orange
5	Off white	Opaque	Orange	Off white	Opaque	Orange
6	Off white	Opaque	Orange	Off white	Opaque	Orange
9	Off white	Opaque	Orange	Off white	Opaque	Orange
12	Off white	Opaque	Orange	Off white	Opaque	Orange

Table 3: pH of morphine oral suspension		
Time (Months)	4ºC	30ºC
0	4.075	4.075
1	4.080	4.074
2	4.073	4.082
3	4.074	4.060
4	4.070	4.036
5	4.068	4.040
6	4.082	4.041
9	4.036	3.984
12	4.050	4.001

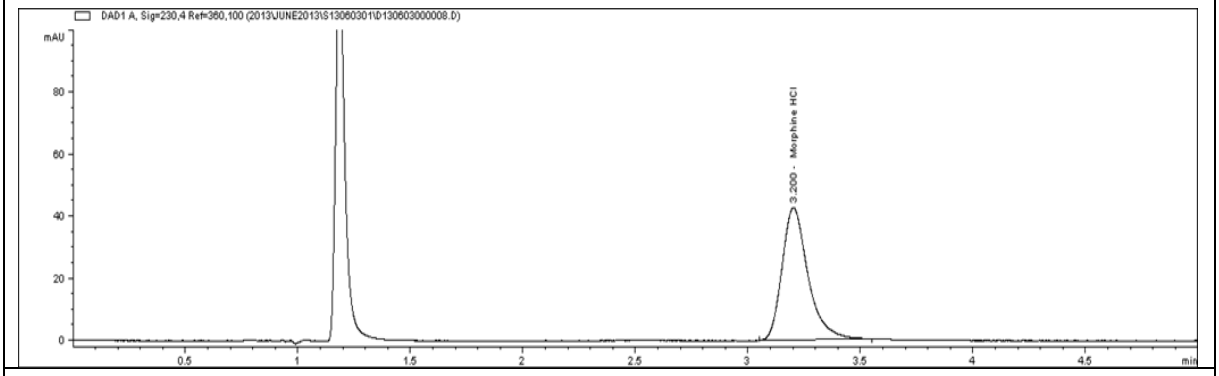
Table 4: Concentration of morphine oral suspension		
Time (Months)	4ºC	30ºC
0	102.8%	102.8%
1	97.0%	97.0%
2	99.3%	101.0%
3	95.1%	95.6%
4	96.1%	96.6%
5	101.4%	97.0%
6	99.5%	96.6%
9	96.1%	96.0%
12	95.5%	96.2%

The morphine hydrochloride content for all tested samples from the morphine oral suspension were all above 95% throughout the 12 months period for both temperatures (**Table 4**). Even though the rate of chemical degradation usually increases with temperature (11), there were no significant differences in the assay results between the two storage conditions to establish any possibility of degradation during storage.

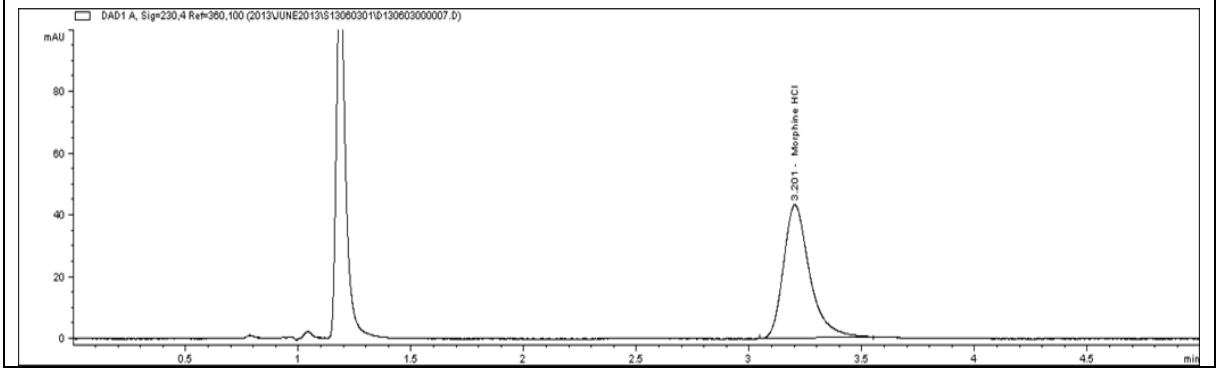
The analytical results of this stability study proved that the HPLC method developed for the analysis of morphine content in extemporaneous preparation to be adequate. The chromatograms illustrated below showed that the HPLC method to be selective for the purpose of this study with minimal interference from the excipients in the formulation (**Figure 3**). The chromatograms of tested samples at the different intervals throughout the stability study period revealed no other peak that could be attributed to a possible morphine degradation compound.

Figure 3: Chromatograms of morphine standard solution and extemporaneously prepared morphine oral suspension

Morphine standard solution



Morphine oral suspension



These results confirmed that the temperature has little effect on the physical and chemical stabilities of morphine in the oral suspension and the morphine content is relatively stable at acidic pH. Storage in the refrigerator may not be considered necessary. The extemporaneous preparation of morphine oral suspension remains stable when stored at room temperature in the same container closure system. Morphine solutions should preferably be stored at room temperature in order to avoid precipitation at low temperatures and water evaporation at higher temperatures causing increase in morphine concentration when store in polymer reservoirs (18).

Microbiological Stability

No microbial contamination was observed in all samples of morphine oral suspension during the 12 months study period for both temperatures (**Table 5** and **6**). The results showed that the microbial quality was within the test limits according to the British Pharmacopoeia (17). The total viable aerobic bacteria count was kept low and total yeast and mould count was minimal. *E. coli* was absent throughout the study period. These results shows that the preservatives of the extemporaneous preparation were effective against bacteria and fungi and the morphine oral suspension is microbiologically stable at both temperatures for up to 12 months.

Table 5: Microbial results of morphine oral suspension (4ºC)			
Time (Months)	Total aerobic bacteria (Not more than 200cfu/g)	Total yeast & mould (Not more than 20cfu/g)	*E. coli* (Absence in 1g)
0	<10cfu/g	<10cfu/g	Conforms
1	<10cfu/g	<10cfu/g	Conforms
2	<10cfu/g	<10cfu/g	Conforms
3	<10cfu/g	<10cfu/g	Conforms
4	<10cfu/g	<10cfu/g	Conforms
5	<10cfu/g	<10cfu/g	Conforms
6	<10cfu/g	<10cfu/g	Conforms
9	<10cfu/g	<10cfu/g	Conforms
12	<10cfu/g	<10cfu/g	Conforms

Table 6: Microbial results of morphine oral suspension (30ºC)			
Time (Months)	Total aerobic bacteria (Not more than 200cfu/g)	Total yeast & mould (Not more than 20cfu/g)	*E. coli* (Absence in 1g)
0	<10cfu/g	<10cfu/g	Conforms
1	<10cfu/g	<10cfu/g	Conforms
2	<10cfu/g	<10cfu/g	Conforms
3	<10cfu/g	<10cfu/g	Conforms
4	<10cfu/g	<10cfu/g	Conforms
5	<10cfu/g	<10cfu/g	Conforms
6	<10cfu/g	<10cfu/g	Conforms
9	<10cfu/g	<10cfu/g	Conforms
12	<10cfu/g	<10cfu/g	Conforms

Formulation Stability

The new formulation for extemporaneous preparation chosen for this study is simple and ideal for any pharmacist in UKMMC to prepare when compared to the old formulation consisting of morphine powder, glycerine, lemon oil, alcohol, water and syrup simplex. No published information is available to support the stability of the old formulation and to justify the shelf-life. Furthermore, traditional use of syrup BP (syrup simplex) as a suspending agent is not recommended as the typical pH of syrup BP is approximately 7.5 to 9.5 and does not promote morphine stability (19).

Preechagoon *et. al.* (2005) have studied the formulation development and stability testing of oral morphine solution using a preformulation approach (20). The study has highlighted that the pH of the solution is a major factor influencing morphine stability and masking of the bitter taste of morphine is another challenge (20). Even though the formulations have been demonstrated to be stable throughout the study period, some may consider the formulations from this study to be too complex for use at dispensary level (19).

The flavour and sweetener from the commercial vehicle, X-Temp Oral Suspension System were sufficient to mask the bitter taste of morphine in the extemporaneous preparation. Besides, the commercial vehicle is buffered to a slightly acidic pH (pH~4.4) and this pH helps to reduce the degradation process of morphine in solution.

CONCLUSIONS

The results from the physical, chemical and microbiological stability studies confirmed that the extemporaneous of morphine oral suspension using X-Temp Oral Suspension System is stable for up to 12 months when packed in HDPE bottles with polypropylene caps and stored at both 4ºC and 30ºC. The extemporaneous preparation can now be prepared with ease by compounding pharmacists in the hospitals using X-Temp Oral Suspension System with validated stability and proven shelf-life. This new evidence will be made available and the protocol can be standardized in the prescribing and compounding practices among the hospitals to provide a safe, effective and quality morphine oral suspension to the patients.

This study not only addressed the chemical, physical and microbial stability, it has also dealt into other parameters including palatability, excipient suitability (e.g. alcohol free for children, sugar free for diabetic patients) and interactions with packaging materials of an extemporaneous oral liquid. Visual appearance, smell, taste and mouth feel all have a big influence on patient acceptance and compliance, especially in the paediatric patients and are as important factor to consider in the development of a suitable extemporaneous preparation (13).

Although some of the risks associated with extemporaneous compounding has been addressed, there are still other inherent risks in compounding which include using incorrect formulation and calculations, selecting incorrect drugs and using incorrect quantities (8,21). Therefore, proper guidelines with focus on quality assurance and quality control practices should be put in place for every compounding pharmacy to deliver consistent, safe and quality products (22).

ACKNOWLEDGEMENTS

The author wished to thank pharmacy department of Universiti Kebangsaan Malaysia Medical Centre (UKMMC) for providing the extemporaneous samples and morphine hydrochloride pure drug required for this study and BioScenergy International Sdn Bhd for its financial support.

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ABSTRACTS FROM THE 25th FEDERATION OF ASIAN PHARMACEUTICAL ASSOCIATIONS CONGRESS 2014 (25TH FAPA CONGRESS 2014)

Expanding the Pharmacists' Roles in Wellness and Sustainable Health

9 – 12 October 2014
Kota Kinabalu, Sabah, Malaysia

Jointly organised by the Malaysian Pharmaceutical Society and the Pharmaceutical Services Division of the Ministry of Health, with the Sabah Pharmaceutical Society (SPS) as local organiser

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TABLE OF CONTENTS

PLENARY LECTURES

CONCURRENT SYMPOSIUM

S8	Assoc Prof Dr Mohamed Azmi Ahmad Hassali	Social Pharmacy Education and Research: The Needs and Challenges In Asia
S10	Mr Navin Kumar Loganadan	Impact of Medication Therapy Adherence Clinic (MTAC) Service on Type 2 Diabetes Patients: The Malaysian Pharmacists' Experience
S11	Dr Suphat Subongkot	Selective Cyclooxygenase-2 Inhibition: A Target in Cancer Prevention and Treatment
S12	Prof Dr Yuen Kah Hay	Clinical Studies on the Neuroprotective Effects of Palm Vitamin E Tocotrienols
S13	Col Dr A Halim Hj Basari	Expanding Pharmacists' Role in the Humanitarian and Disaster Relief (HADR) Missions– Malaysian Military Pharmacy Perspectives
S14	Assoc Prof Dr Allan Mathews	Infusing Quality Into the Pharmaceutical Supply Chain
S15	Mdm. Noraini Mohamad	Clinical Pharmacy in Malaysia: Past, Current and Future
S16	Prof Dr Gul Majid Khan	Liposomes Decorated Topical Drug Delivery for the Treatment of *Cutaneous Leishmaniasis*
S17	Dr Vivian WY Lee	Pharmacy Education for Sustainable Tomorrow – Asia Experience
S18	Prof Dr Hashamian Farshad	Clinical Pharmacy Services in Iran: Improving Patient’s Care

ORAL PRESENTATIONS

Hospital and Clinical Pharmacy

No	Presenting Author	Title
HPO 01	A Ramesh	Prospective Evaluation of Clinical Pharmacy Services at a South Indian HIV Community Care Centre
HPO 02	AM Ong	The Development of a Pharmacy Management Hypertension Program and Opportunities for Pharmaceutical Care
HPO 03	AH Khan	Prevalence and Effect of Smoking on Treatment Outcome among Tuberculosis Patients in Malaysia
HPO 04	JL Quah	A Study on Perception of the Need and Time needed to Render Critical Ward Services by A Clinical Pharmacist in Neonatal Intensive Care Unit (NICU) In Duchess of Kent Hospital, Sandakan
HPO 05	D Yodyoi	Effectiveness of Hyperosmolar Oral Liquid Medications Guideline to Prevent Necrotizing Enterocolitis in Preterm Neonates
HPO 06	F Hashmi	Self-medicating Behavior of Urban Pakistani Population towards Psychotropic Agents and its Correlates
HPO 07	W Utaminingrum	Evaluation of Adherence and Haemoglobin Levels of Iron Tablets Use in Pregnant Women at Public Health Centre in Purwokerto
HPO 08	J Penm	Clinical Pharmacy Services that Influence Prescribing in the Western Pacific Region
HPO 09	IAA Widhiartini	Pharmacokinetic of Rifampicin in Urban and Rural Lung Tuberculosis Patients in Bali Province
HPO 10	S Kanakarathnam	Drug Related Problems (DRPs) among Geriatric Patients in Primary Care Setting
HPO 11	I Abdul Halim Zaki	Risk Factors of Pacemaker Implantation Infection: A Single Centre Experience
HPO 12	FK Hashmi	Statistical Prediction of Risk Frequency for Ischemic Heart Disease in Punjab, Pakistan
HPO 13	J Suphanklang	Prevalence of Comorbidity and Pattern Drug Use among Children with Attention-deficit Hyperactivity Disorder: A Single Center in Thailand
HPO 14	K Duangmee	Study of relationship between trigger tools and adverse drug events at Somdet Phra Sangharaja the 19th hospital, Kanchanaburi
HPO 15	LLYeap	Slow Carbamazepine Clearance in a Nonadherent Malay Woman with Epilepsy and Thyrotoxicosis
HPO 16	SWH Lee	Strategies for a Safer Fasting During Ramadan for Muslim Patients with Type 2 Diabetes Mellitus: A Systematic Review
HPO 17	YP Ng	Comparison of Methods for Estimating Glomerular Filtration Rate in Critically Ill Patients with Unstable Renal Function – A Single Center Retrospective Study from Malaysia.
HPO 18	PM Sigua	Applicability of a Pharmacy-developed Diary in Patient-Reported Monitoring of Compliance to Therapeutic Interventions
HPO 19	C Kongkaew	Hospital Admissions/Visits Associated with Drug-Drug Interactions: A Meta-Analysis

HPO 20	Armenia	The Interaction Impact of Type of Antihypertension therapy, Comorbidity and Medical Adherence to the HRQoL on the Stroke Patients of the National Stroke Hospital, West Sumatera, Indonesia
HPO 21	C Wong	Development and Implementation of a Career Development Pathway and Competency Framework at SingHealth: A 7-year Journey
HPO 22	A Rakhman	Antibiotic Therapy Profile in Intensive Care Unit (ICU) Patients with Ventilator-Associated Pneumonia (VAP) at Sungai Buloh Hospital
HPO 23	FV Gamboa	Portable Pocket Calendar: Improving Patient Compliance to Oral Antibiotic Intervention Approach
HPO 24	B Tangiisuran	Factors Associated with Hospital Readmission among Older Patients Discharged after Acute Exacerbations of Chronic Obstructive Pulmonary Disease
HPO 25	AA Bawadikji	Metabolomics and Pharmacometabonomics Approaches for Diagnosis of Diseases and Predicting Drug Response
HPO 26	JES Liew	Hyperglycaemia Management in the Intensive Care Unit: An Evaluation of Insulin Infusion Protocol
HPO 27	Lailaturrahmi	Relationship between Sociodemographic Characteristics with HRQoL in Stroke Patients of the National Stroke Hospital, West Sumatera, Indonesia
HPO 28	JER Berberabe	Specialized Medication Review on Geriatric Patients in a Public Regional Hospital in the Philippines: A Clinical Pharmacists Perspective
HPO 29	A Tan	Review of Best Practices for Next-Generation Sengkang Health Pharmacy
HPO 30	YL Lo	Advanced Age and Antiplatelets Use are Risk Factors of Upper GI Bleeding among the Elderly
HPO 31	DA Perwitasari	The Quality of Life Measurement on Hypertension Patients in a Primary Health Care of Cirebon City Using Time Trade Off Method
HPO 32	P Pimsi	Effects of Warfarin Dose Adjustment on the International Normalized Ratio (INR) Target Achievement in Thai Patients: A Preliminary Study
HPO 33	R Adepu	Initiation and Evaluation of Patient Reporting ADRs in Out Patient Department of a South Indian Tertiary Care Teaching Hospital
HPO 34	RR Aniza	A Multicentre Analysis on Factors Affecting Anticoagulation Control and Adverse Outcomes among Warfarin MTAC Patients in MOH Facilities, Malaysia
HPO 35	IBN Maharjana	Medication Review Impact on Medication Appropriateness Index in Hospitalized Balinese Elderly Determined by the STOPP/START Criteria
HPO 37	S. Prateepjarassaeng	Factors Influencing Hospital Formulary Decision-Making: A Preliminary Study in Thailand
HPO 38	P.Tanavij	Potentially Inappropriate Medication in Elderly Outpatient Prescriptions at a District Hospital in the South of Thailand
HPO 39	V Sankar	Role of Pictograms in Educating Diabetic Patients about Medication Use and Lifestyle Modifications
HPO 40	W Saelim	Response to an Initial Dose of Warfarin in Thai Patients Undergoing Long-Term Anticoagulant Therapy
HPO 41	W-K Chou	A Preliminary Study of Comprehensive Pharmaceutical Care among Hospitalized Elderly Patients

HPO 42	Y Lertsrisatit	The Prevalence of Febrile Neutropenia due to Etoposide, Methotrexate, Actinomycin-d, Cyclophosphamide, Vincristine (EMA-CO regimen) among Patients with Gestational Trophoblastic Neoplasia: A Report from a Single Medical Teaching Hospital in Thailand
HPO 43	Z Zahari	The Relationship of Pain and Sleep Quality in Opioid Dependent Patients on Methadone Maintenance Therapy (MMT)
HPO 44	Zikria	Comparative Study of Changes in Hepatic Profile Induced by Liposomal Doxorubicin Versus Conventional Doxorubicin Based Regimens in Cancer Patients
HPO 45	Z-M Lee	Evaluation of the Safety of Excipients in Drugs for Infants
HPO 46	P Juacalla	The Geriatric Clinic Care Program: An Approach to Maintaining Good Health and Quality of Life
HPO 47	AM Abd Aziz	Medication Administration Errors: An Unsolved Issue of Pharmaceutical Care
HPO 48	JGST Aquino	The Assessment on the Usage of Complementary and Alternative Medicine among People Living with HIV in Metro Manila

Community Pharmacy

No	Presenting Author	Title
CPO 01	RP Hananditia	Profile Components of Drug Information Service by Pharmacists for Prescription Service in Pharmacy Klojen Subdistrict Malang
CPO 02	IGB Bacud	Consumers Knowledge, Perception and Satisfaction towards the Role of Community Pharmacist as Healthcare Provider in Basco, Batanes
CPO 03	R Illahi	Comparing the Onset of Action and Duration of Action of Available Topical Patches to Ease Muscle Strain in Groups of Subjects between 20-40 years old
CPO 04	GF Galistiani	Evaluation of Drug Information Services in Community Pharmacies using Simulated Patient Method: Amoxicillin Antibiotic and Oral Corticosteroid
CPO 05	LW Raymundo	Pharmacists Counselling Advantages on Medication Adherence and Non-Pharmacologic Interventions
CPO 06	I Nahlah Elkudssiah	Evaluation of Different Inhalational Delivery Devices Techniques among the Community Pharmacists in Urban Areas in Selangor, Malaysia
CPO 07	S Alwi	Response of Community Pharmacists to Request for an Oral Contraceptive
CPO 08	E Roohi	Pharmacists and General Practitioners Collaborative Practice: A Survey of Attitudes, Current Practice and Barriers to Interprofessional Care
CPO 09	MFVT Gamboa	Caffeine Habit: A survey on the use and effects of caffeine-containing beverages among university students
CPO 10	K Hung	Community Pharmacy Dispensing Practice of Non-steroidal Anti-inflammatory Drugs by Pharmacists and Pharmacy Assistants in Manila City

CPO 11	A Panaligan	A Comparative Analysis of the 8-Item Morisky Medication Adherence Scale before and after a Pharmaceutical Care Program among Chronically Hypertensive Elderly Patients
CPO 12	V Lertjanyakun	The Behavioral Intention of Thai Community Pharmacist to Provide Medicine Use Review (MUR)
CPO 13	SS Wong	Transforming Malaysian Community Pharmacists' Role in Wellness and Health-care

Drug Marketing and Socio-Economic Pharmacy

No	Presenting Author	Title
SEO 01	JYH Voo	Cost-Effectiveness Analysis (CEA) of Antihypertensive Drugs in Patients with Type 2 Diabetes Mellitus in Lahad Datu Hospital
SEO 02	IM Tesalona	Wellness in Smallness

Industrial Pharmacy

No	Presenting Author	Title
IPO 01	A Buang	'Halal Pharmaceuticals' - A Way Forward
IPO 02	V Tantishaiyakul	Investigation of the Efficiency and Mechanism of Gelation and Degelation of Three Positional Isomers of Aminobenzoic Acid
IPO 03	Y Mutiawati	Effect of Vitamin E (D-Tocopheryl Polyethylene Glycol 1000 Succinate) in Enhancing Absorption of Lisinopril 10 mg Tablet Formulation
IPO 04	C Tanakitcharoenpat	Development of Multiparticulate Tablet from Alginate Microparticles Prepared By Spray Drying Technique
IPO 05	V Natekrajangkul	Development of Alginate Microparticles using Polymer Blend Technique for Drug Delivery System

Scientific

No	Presenting Author	Title
SPO 01	AA Jamil	Metabolic Therapy: A New Paradigm for the Management of Diabetic Hearts?
SPO 02	AM Kusuma	Acute Toxicity of Calabash Leaves Ethanol Extract in White Male Rats
SPO 03	D Shuwisitkul	Effects of Storage Condition and Preparing Processes on Stability of Recombinant Human Growth Hormone
SPO 04	EMD Ramos	Hypolipidemic Activity of Senna Occidentalis (L.) Link. (Fam. Fabaceae) Methanolic Extract in Atherogenic Diet Induced Hyperlipidemia in Sprague-Dawley Rats
SPO 05	H Ab Hadi	Non-Invasive Measurement Method of Skin Conditions by using Dermalab® Combo
SPO 06	JM Galang	A Study on the Potential of Kappa-carrageenan and Carboxymethylcellulose in Extended Release Potassium Chloride Capsules
SPO 07	R.Garcia	In vivo Study of the Anti-angiogenic Property of the Ethanolic Extract of Annona muricata Linne in the Chorioallantoic Membrane (CAM) of the Duck Embryo

SPO 08	S Mustafa	Nevirapine metabolites ratio at steady state in Malaysian population
SPO 09	S Surini	Diclofenac Sustained Release Tablets using Novel Coprocessed Excipients of Crosslinked-Amylose and Xanthan Gum as Matrix
SPO 10	S Thubthimthed	Research and Development of Weight Loss Product with Lipase Inhibitory Activity
SPO 11	RA Rosdi	The effect of CYP2C9 polymorphisms: Orang Asli Jahai is poor metabolizer to warfarin compared to Malay in Malaysia
SPO 12	B Gowramma	Stability Indicating Chiral HPLC Method for the Estimation of Zaltoprofen Enantiomers in Pharmaceutical Formulations

Phytopharmacy & Pharmacopeia

No	Presenting Author	Title
PPO 01	FV Arce Jr	Antioxidant Activity of Philippine Jasmine Jasminum Sambac Linn, (1789) Leaf Extract using 2,2-Diphenyl-1-Picrylhydrazyl (DPPH) Free Radical Scavenging Assay
PPO 02	E Sasmito	Polysaccharide-Rich Fraction of Noni Fruit (Morinda citrifolia L.) as Doxorubicin Co-Chemotherapy: Evaluation on Catalase, Macrophage, TCD8+ Lymphocyte, Vero, HeLa and T47D Cells
PPO 03	E Lukitaningsih	Macronutrients Content, Glycaemic Index and Anti-Ulcerogenic Effect of Ganyong (Canna edulis Ker.)
PPO 04	G Subramanian	Simultaneous Estimation of Quercetin and Rutin in Aganosma dichotoma [Roth] K. Schum by HPLC Method
PPO 05	S Patil	Phytosomes: A Valuable Phyto-Phospholipid Carriers
PPO 06	P Ahmadi Pirshahid	Determination of Cordycepin in Cordyceps militaris (Linn.)
PPO 07	S Pramono	Effect of Piperine, Piperine Free Non-Hexanic Fraction of Ethanolic Extract of Piper retrofractum Vahl on Sexual Behavior, Blood Testosterone Level, and Sperm Quality of Wistar Male Rats
PPO 08	GLL See	The Anti-Mutagenic Activity of Labanos Raphanus sativus L. var. Longipinatus Vegetable Juice on Male Albino Mice
PPO 09	S Patil	Ethosome: A Versatile Tool for Novel Drug Delivery System
PPO10	Rumiyati	Screening of Ribosome-Inactivating Proteins (Rips) from Indonesian Fruits and Vegetables and Effect of Processing on its Stability
PPO 11	SM Florano	In Vivo Haemostatic Activity Screening of the Decoction of the Peel of Musa Errans (Blco.) Teod. Var. Botoan Teod. on Sprague-Dawley Rats

Pharmacy Education and Student Affairs

No	Presenting Author	Title
PEO 01	AN Mariani	Cyberjaya University College of Medical Sciences (CUCMS) Pharmacy Graduates Career Choices
PEO 02	J Jazul	Self-Medication Practice Among Allied and Non-Allied Health Students of the University of Santo Tomas, Manila, Philippines
PEO 03	SW Lee	Enhancing Pharmacy Students Learning with Audiovisual Educational Tool on Issues Regarding Generic Medicines
PEO 04	PN Yeoh	Perceptions, General Health Knowledge and Health-seeking Behaviour of Outpatients in Two Chinese Medicine Treatment Centres in Kuala Lumpur
PEO 05	RM Elkalmi	Design and Evaluation of the Pharmacovigilance Course in a Pharmacy School (Kulliyyah) In Malaysia
PEO 06	RAT Oli	Curricular Directions for a B. S. Pharmacy Course in Response to the K-12 Program
PEO 07	SQ Jamshed	Students' Views about Problem-Based Learning Facilitators: A Qualitative Insight
PEO 08	JML Magno	The Relationship of the Pharmacy Licensure Examination Scores with the University of Santo Tomas Entrance Test (USTET) IQ Scores, Course Preference and General Weighted Average (GWA) of Pharmacy Students of the University of Santo Tomas Batches 2010
PEO 09	J Chai	Qualitative Research: Recent Application to Study Patients Lived-Experience of Using Insulin Treatment to Manage Type 2 Diabetes Mellitus
PEO 10	MA Nor Muhammad	Causes of Stress and Management Approaches among IIUM Pharmacy Students
PEO 11	TV Narayana	Pharm.D Programme in India: Changing Scenario of Pharmacy and the Pharmacist's Role
PEO 12	T Sottiyotin	Integrating Academic Services into Health Consumer Protection Course: A Community-Based Learning at Satit-Walailak-Pattana Community for the Fifth-year Pharmacy Students, Walailak School of Pharmacy, Thailand
PEO 13	I Kanchanaphibool	Opportunities for pharmaceutical care education in the Greater Makong Subregion: A preliminary study

Pharmaceutical Legislation, Ethics and Regulatory Affairs

No	Presenting Author	Title
PLO 01	M Fan	Trial Plan for Prescription Release from Primary Care
PLO 02	NA Mahmood	Knowledge, Attitude and Perceptions of Pharmacists in Government Service Towards Adverse Drug Reaction Reporting in Kelantan
PLO 03	XR Tan	A Randomized Controlled Study on Compliance towards MASA 1956 among Retail Pharmacists in Sabah
PLO 04	J Jackson	The Policy Framework that Supports Community Pharmacists' Practice

Emergency Medicine and Others

No	Presenting Author	Title
EMO 01	A Shaharudin	Effectiveness and Tolerability of Hyaluronic Acid for Chronic Wounds Healing: A Systematic Review
EMO 02	NJ Chong	A Systematic Review of the Efficacy and Tolerability of Saccharum officinarum for Hypercholesterolemia
EMO 03	T Kajsongkram	Research and Development of Herbal Cosmeceutical for the Prevention of Keloid and Hypertrophics Scars
EMO 04	F Shipton	A Preliminary Survey of the Penetration and Application of Mobile Health Apps in Malaysia
EMO 05	A Vijayakumar	Systematic Review and Meta Analysis on Brain Derived Neurotrophic Factor and Major Depressive Disorder: An Evidence-based approach
EMO 06	Z Aziz	Hydroxyethylrutosides for Signs and Symptoms of Chronic Venous Insufficiency: A Systematic Review
EMO 07	WL Tang	Efficacy and Tolerability of Micronized Purified Flavonoid Fractions (MPFF) for Haemorrhoids: A Systematic Review

PLENARY 1

Pharmacists Today – Winds of Change Through the Decades

Dr Salmah Binti Bahri
Director of Pharmacy Practice & Development
Pharmaceutical Services Division, Ministry of Health Malaysia

The pharmacist profession has evolved from product-oriented to patient-oriented over the past decades. The importance of pharmacist roles has been recognized by World Health Organisation (WHO) that led to the resolution of the 47th World Health Assembly (WHA 47.12). Hence, the Joint International Pharmaceutical Federation, FIP/WHO Guidelines on Good Pharmacy Practice (GPP)has been published to raise standards of pharmacy services and professional practice. The recent 67th World Health Assembly's resolution addressing access to bio-therapeutics (WHA 67.21) and essential medicines (WHA 67.22) further highlights the roles and contributions of pharmacists towards achieving health system goals.The main responsibilities where pharmacists' involvement or supervision is expected by the society includes drug management and distribution, effective medication therapy management, maintain and improve professional performance, and contribution towards effective health-care system. However, these roles are challenged by varied drug policies among countries, lack of competencies and consensus regarding the profession's goals, as well as resistance to broadening the pharmacist's responsibilities beyond dispensing functions which includes pharmaceutical care in the treatment and prevention of disease along with promotion of wellness. These challenges are amplified by the increased disease burden and escalating health care cost. Therefore, it is pivotal to recognize the priorities and engage collaboratively with other healthcare providers and stakeholders in order to achieve present and future societal and pharmaceutical health needs.

PLENARY 2

Global Innovative Strategies to Expand Pharmacists' Roles in Wellness and Sustainable Health – Now or Never: New Models of Care

Mr Ashok Soni OBE
President, Royal Pharmaceutical Society, Clinical Network Lead, NHS Lambeth Clinical Commissioning Group, London, United Kingdom

The traditional model of community pharmacy will be challenged as economic austerity in the NHS , a crowded market of local pharmacies, increasing use of technicians and automated technology to undertake dispensing, and the use of online and e-prescribing bear down on community pharmacies' income and drive change. A broader role for pharmacists as caregivers will be central to securing the future of community pharmacy.
The NHS is engaged in an urgent search for ways to provide better standards of care in the face of unprecedented pressure on budgets, and justifiably intense scrutiny of quality. Only by adapting to the needs of patients with long-term conditions and preventable illnesses can this be achieved. Pharmacists have a vital role in helping the NHS make the shift from acute to integrated care, and fulfilling the pressing need to do more for less.

Some patients, carers and members of the public have access to a broader range of services and care from pharmacy than the traditional dispensing and supply of medicines. Pharmacists increasingly provide services that help people stay well and use their medicines to best effect. However, the pace of change remains slow, and financial and structural incentives are not sufficiently aligned to support it.

Pharmacists are working more closely with patients and healthcare colleagues in hospitals, outreach teams, patients' homes, residential care, hospices, and general practice, as well as in community pharmacies. They are helping patients to manage their own conditions, providing health checks, supporting best use of medicines, and detecting early deterioration in patients' conditions.

High street presence and long opening hours mean that community pharmacy has the potential to play a crucial role in new models of out-of-hours primary and urgent care. Access by pharmacists to integrated patient records will be a key enabler of this, as will the active engagement of pharmacists in local primary care federations, networks and super-partnerships.

Despite its potential, pharmacy – and particularly community pharmacy – is marginalised in the health and social care system at both local and national level. It is seen by others as a rather insular profession, busy with its own concerns and missing out on debates and decisions in other health and social care organisations and the wider world of health policy.

Alongside this, there is insufficient public awareness of the range of services pharmacists can offer. There is a pressing need to de-mystify pharmacy so that patients, the public and the rest of the health service understand the extent of the role that pharmacists do and can have in providing direct care.

Focused, outward-looking local and national leadership of pharmacy will be needed to change this. Leaders within pharmacy need to work with national and local commissioners and providers of other care services to ensure a shift in the balance of funding, contracts and service provision away from dispensing and supply, towards using the professional expertise of pharmacists to enable people to get the most from their medicines and stay healthy.

To enable such a shift, there will be a need for a significant rethink of the models of care through which pharmacy is delivered, as a prerequisite to developing new approaches to contracting and funding that include: the possibility of specific contracts with groups of pharmacists to deliver patient services; and population-based contracts for new larger primary care organisations that include pharmacists in their membership along with GP s, nurses and others.

PLENARY 3

Pharmacy Transformation Plan in Malaysia: Expanding Pharmacists' Roles in Wellness and Betterment of Health Outcomes

Mdm Abida Haq Syed M Haq
Chief Pharmacist, Kuala Lumpur Hospital, Ministry of Health Malaysia

While it is widely acknowledged that Malaysia has a good healthcare system, escalating costs and the need to ensure a sustainable system have necessitated the formulation of a health transformation plan for the future of the country. The Country Health Plan as outlined in the 10th Malaysia Plan 2011-2015 aims to create a seamless effective, efficient, fair and high-tech system of health care which will further improve access to various levels of appropriate health care to all Malaysians. Three Key Result Areas

have been identified for the health sector reform which include ensuring Universal Access to Healthcare, Health Awareness & Healthy Lifestyle and Empowerment of the Individual and Community to be responsible for their health. Pharmacists, both in the public and community setting, are well positioned to contribute towards achievement of these goals through a paradigm shift in the role played by pharmacists today in health care delivery.

Pharmacists in Malaysia are actively involved in clinical services, primary care, drug addiction programs, smoking cessation clinics and wellness campaigns. These collaborative and synergistic efforts that compliment physician services have led to evidence based positive health outcomes and better acceptance of pharmacists as key players in the health care team.

This paper will outline findings from local studies and national data which demonstrate the contribution of pharmacists in achieving better health outcomes in diabetes management, warfarin clinics, methdone replacement therapy and weight management programs.

PLENARY 4

Changes in the Community Pharmacy Services in the Philippines: Assurance for Better Sustainability

Ms Leonila Macuto-Ocampo
Immediate Past President, Philippine Pharmacists Association, Inc.
President, Asia Pacific Institute for Medication Management, Inc.

Community Pharmacy is the most common and the most accessible place for patients and clients who need medicines; the way it serves the patient or client therefore is crucial to allow the optimum outcomes of the medicines the patients buy and will take. These Community Pharmacies practically sell the same products that what can spell the difference between one with the other is the quality of the products and the services that they offer.

In the Philippines where there is no law that limits the number of branches a Chain Pharmacy operates, competition is so stiff and the business is spread widely. Services rendered by majority of the pharmacies also do not demonstrate pharmaceutical care services given to the client or the buying public. The Pharmacies therefore are perceived to do just plain trading of medicines and people do not expect anything more that the Pharmacy nor the Pharmacist is to serve them.

With the ASEAN integration fast approaching, Pharmacists and Pharmacy Operators have no choice but to think of how they can improve their operations and services. Non-Pharmacists owners are also seeking assistance to improve their services. It is on this note that this presentation is prepared; to share some of the changes happening in the country giving particular focus on optimizing health outcomes and patient safety through safe and responsible use of medicines. This too, is to protect and ensure business viability. This is therefore to introduce the idea of Pharmapreneurship and will also tackle the challenges encountered as practice changes is undertaken and how these challenges are resolved or addressed.

PLENARY 6

The Trend of Pharmacy Profession in Asia

Prof Dr Chomchin Chantaraskul
Thailand

The mission of pharmacy profession is to provide the pharmaceutical care needs of the public. Pharmacy is practiced in a wide range of settings: community pharmacies, hospitals, the pharmaceutical industry**,** managed care, and government (Food and Drug Administration, Public
Health Service).Historically, pharmacy profession was very much related to the pharmacy education and pharmaceutical care requirements. There were a lot of changes in pharmacy education and pharmacy practices in the past 40 - 50 years. In the early period, most of the Asian countries had to import finished products from Europe or U.S.A. The major roles of pharmacists were, therefore, on the fields of community pharmacy and industrial pharmacy. The curriculum was emphasized on techniqueof preparing as well as dispensing drugs and medicines.

At present, the scope of pharmacy practice includes not only traditional role but also includes more modern services related to health care, including clinical services, reviewing medications for safety and efficacy, and providing drug information. In the future, if we look at the changes in pharmacy education, the trend of pharmacy profession will be mostly on the field of pharmaceutical care. Pharmacists are expected to become more integral within the health care system and increasingly expected to be compensated for their patient care skills as well. In particular, Medical Therapy

Management (MTM) includes the clinical services that pharmacists can provide for their patients. Other new trends of pharmacy practices may include Nuclear Pharmacy, Internet Pharmacy, and Biopharmacy. In order to cope with this new trend, pharmacists must be competent, trustworthy, care for and about their patients.

PLENARY 7

Health and Environment Changes: The Role of Pharmacists in Enhancing the Development of Sustainable Health

Dr Aktheruzaman Sano

The impact of climate change on human health has been critically increasing. The human induced activities mainly political issues, deforestation, fragmented development activities, increased population, using chemicals in different levels of activities etc. have been worsening the health environment considerably.

Each and every environmentally unfriendly activity is impacting the health situations in different ways. There are some impact human is experiencing directly and there some negative impacts are experiencing at different levels. The poor are the highly affected people's group who are paying for these changes.

Due to weak and sick health condition, the people's contribution in sustainable development fields is limited. As a result, the upcoming UN sustainable development goal achievement may face higher challenges.

In order to enhance the sustainable development processes, there is a need of sustainable health for all.

There are different professionals have been adding value for sustainable health facilities. But the specific roles of pharmacists' are something greater than many great efforts in achieving the sustainable health to add value to the sustainable development processes.

The presentation "Health and Environment Change: The Role of Pharmacists in Enhancing Development of Sustainable Health" outlines doable mechanism how to make it happen.

PLENARY 8

Innovative Pharmacy Practice through Cutting Edge Robotic Technology

Mr Gerard Stevens

Medication compliance is well known to be a major problem with loads of research showing that about 50% of medications prescribed are no longer being taken as they were prescribed after 6 months. This is a startling figure that also demonstrates that there is much room for improvement and pharmacists are best placed to lead positive action. Services tied to 'medication optimisation', is where pharmacists can make their greatest contribution to community health.

It has been said that pharmacists have hard-earned qualifications and skills that are the least utilised when compared to all the professions. Combining that with the fact that pharmacists are the most accessible and visited health professional makes for a potent value proposition.

In difficult times and in order to maintain profitability, or even viability, pharmacy needs to extend its professional and commercial boundaries.

A medication management system such as Webster-pak can help a patient achieve a better health outcome through compliance with the medication prescribed by the doctor. Such a system can be labour intensive. The outcome from improved compliance however is improved customer loyalty and better health outcomes, with older people able to remain independent and stay at home for longer.

Efforts over time to reduce the workload and yet maintain the full benefits to the consumer have led to development of robotic packing machines to assist in the packing process. These technology advances are proving extremely valuable to pharmacy. High accuracy combined with productivity improvements and lower risk reduces costs and makes the service more readily available.

The session today will focus on the development of this new technology that makes robotics and semi-automated systems viable for a community pharmacy as well as hospital pharmacy.

SYMPOSIUM S1

Safety Management in Medication Use System- Experience of a Medical Center in Taiwan

Dr Yueh-Ching Chou
Director of Pharmacy, Taipei Veterans General Hospital, Taiwan
National Yang-Ming University & Taipei Medical University, Taiwan

The medication use system holds a complex process comprised of the following components: procurement/storage, prescribing, prescription verification, dispensing/preparation, administration, and monitoring. In recent decades, hospitals in Taiwan actively promote implementation of safeguard systems in each stage of the medication use process. Taipei Veterans General Hospital (VGH), a national level medical center, was the first in Taiwan to utilize computerized physician order entry (CPOE) system since 1983. The presentation will take the safeguard systems of Taipei VGH as an example to describe safety features in medication use processes.

For medication storage, inventory control is achieved by the computerized bar-code system. We also establish guidelines for high alert/look-alike sound-alike medications. For prescribing, we develop more than 20 error-proofing mechanisms on the CPOE/clinical decision supporting system. We embed useful information database in CPOE system including formulary, package inserts, drug appearances, drug classification lists, clinical indications, and drug substitution lists for on-time inquiry. In addition, we integrate warning and interception mechanisms including duplications, maximum doses, interactions, inappropriate splitting, pregnancy, contraindications, allergies, serious adverse drug reactions, etc. We set up electronic medication error and adverse drug reaction reporting systems to detect and correct errors, and encourage changes to reduce the potential for future errors. We employ quality management indicators to continually improve systems and ensure quality of pharmacy practice. We shall make every effort to fulfill our visions of being a world leading center for pharmaceutical care services, education and research.

SYMPOSIUM S2

Application of a Drug-Interaction Detection Method to the Korean National Health Insurance Claims Database

Prof Wan Gyoon Shin
College of Pharmacy and Research Institute of Pharmaceutical Sciences, Seoul National University, Seoul, South Korea

Adverse drug reactions (ADR) are becoming serious problems causing damage to patients even leading to death. To prevent ADRs, It has been investigated whether the compound causes severe problems to the patient and what extent not only during investigation process but after marketing. However, though massive amount of ADR data had been piling up, it was too time-consuming for clinicians to analyze every single ADR report. But with the improved processing power of the computers and their accessibility, computers have made it possible to analyze ADR reports. It has been proven that massive data analysis is useful in many different fields, from economics to genetics. The Uppsala Monitoring Center (the UMC) initiated handling ADR reports by using computers. The source of the UMC is the report written when ADRs of a drug occurred in clinical practice. However, we have researched on using

administrative data as a source of detecting ADRs. Studies on the model drugs were done by different analysis methods. It was found that some of the signals of the model drugs were concordant with known ADRs, but other signals occurred that were not suspected as ADRs let administrative data remain as an incomplete ADR source. Further studies on other drugs by different methods are needed to evaluate the possibility on utilizing insurance database as a source of detecting ADRs

SYMPOSIUM S3

Trends of Pharmacy Education and Trainings in Asia: Proper Transformation or Not?

Assoc Prof Cheung Hon-Yeung
Department of Biomedical Sciences, City University of Hong Kong, Kowloon Tong, Hong Kong SAR, CHINA

This talk will go through some important breakthroughs in pharmaceutical research, contemporary trends in pharmaceutical education and people's expectation for tertiary education from the view of local society or country in recent years. Some of the major challenges facing the pharmacy trainings and practices will be listed and described. Based on the projection of some changes in the near future, this speaker believes that to be successful in the long run, pharmacy education will need to be slightly different from today in the way that they are offered and operated. By accompanying with well-defined trainings and strategies implemented, it may provide students admitted to the pharmacy program with more competitive strength, influential role and a more prosperous future in our modern society.

SYMPOSIUM S4

Re-Emerging Role of Industrial Pharmacist on Vaccine Delivery

Prof Garnpimol C. Ritthidej
Department of Pharmaceutics and Industrial Pharmacy, Faculty of Pharmaceutical Sciences, Chulalongkorn University, Thailand

The emerging pathogenic diseases have become increasing with alarming rate. The phrase "prevent is better than cure" is truly applied to vaccination that global vaccine market is rapidly grown and vaccine is becoming an engine for the pharmaceutical industry. The advancement in the knowledge of pathogenic diseases now leads scientists especially biotechnologists to dedicate towards the production of antigens whether as whole (live or killed), subunit, conjugate and DNA/recombinant vector to be used as vaccines in order to stimulate immune systems for protection, amelioration or therapy of any disease or infection. In addition, industrial pharmacists especially the R&Ds are becoming to involve in vaccine delivery. Due to several disadvantages of parenteral vaccination, new routes of administration are now sought such as oral, nasal pulmonary and transdermal routes. Because liquid vaccines are prone to instability, lyophilized and spray-freeze drying products are under intensive investigation, not only to improve vaccine stability but also preference for distribution and transportation. Since the subunit and DNA/recombinant vector types of vaccines have lower severe side effects, so is their efficacy. Therefore, adjuvants are incorporated to provoke higher immune response. The advanced knowledge on pharmaceutical carriers is of advantages to vaccine delivery. Several nano/microparticulate systems are under investigation as

adjuvants and some are already in commercialized vaccines. Moreover, strict requirement on GMP of biological products has been recently launched from healthcare institutions and called for special attention. Thus, the role of pharmacists, both services and industry in this particular field is increasing important, as vaccines are drug products which are pharmacists' responsibility.

SYMPOSIUM S5

Pharmacy Education and Practices in Asia – Strategies to Improve the Quality and Sustainability in Pharmaceutical Care

Prof Dr Syed Azhar Syed Sulaiman
School of Pharmaceutical Sciences, Universiti Sains Malaysia, Penang, Malaysia

Pharmacy education has become one of the most top selected professions around the world. Vital changes in education system are expected to create the future graduates who are competent, proficient, highly skill in communication and IT savvy. Modernization is essential for pharmacy education however it should not be to the extent of losing it basics purpose. In Asia harmonization of pharmaceutical education has to be a global agenda that will encompass the developments that have taken place in serving the needs and expectations of society. Certain elements of education structure must be in place to provide quality pharmaceutical care for the graduates to practice once there are in the healthcare systems. Some of these elements are included knowledge, skill, and function of personnel, ability to extract data from the practice area for documentation, and transfer of information, efficient work flow processes, excellent communication skills, and ability to establish quality improvement and assessment procedures. To achieve the goal of Pharmaceutical Care, the education system in each country is expected to fulfil such need in order to optimize the patient's health-related quality of life, and achieve positive clinical outcomes, within realistic economic expenditures. Lots of challenges and barriers exist in developing sustainability of pharmacy education and practices among the countries in Asia. Variations are to be expected in pharmacy education in various countries around Asia , however it should be at certain standard in order to fulfil the expectation of the public in healthcare system. The educational and research activities should be cultivated among the universities and collaboration with other health is very pertinent to create the environment that is conducive for pharmaceutical care to take place.

SYMPOSIUM S6

Pharmacists and Sustainable Knowledge on Medication Safety

Ms Lita Chew
Chief Pharmacist, Ministry of Health Singapore

Medication Safety is a global concern for both healthcare providers and consumers. Medication error is a major cause of preventable patient harm. The scale of medication related incidences has been studied in many epidemiologic studies. The Institute of Medicine in the United States reported estimation of 1 medication error per hospitalized patient per day in the United States and 1.5 million preventable adverse drug events per year in the United States.

Medication use has become increasingly complex and safe medication use remains a challenge. Challenges to current medication safety practice include under-reporting of medication errors and adverse drug reactions, lack of training, lack of communication between providers and patients, and high workloads. Suggestions for improvement include continuous education and competency assessment focusing on medication safety, development of a culture that encourages medication error and adverse drug reactions reporting, use of technology proven to decrease medication errors, and promotion and implementation of national patient safety initiatives.

Pharmacists, as health-care workers, have important roles in making medication use safe. As medication experts we are uniquely qualified to serve as medication safety leaders. These roles include leadership in influencing practice change, development and implementation of proactive error-prevention strategies, education and research.

SYMPOSIUM S7

A Validated NMR-Based Identification of Discriminatory Urine Metabolome of Rats with Low and High Sperm Count Following Oral Treatment Of *EurycomaLongifolia* Extracts

Forough Ebrahimi[1], Baharudin Ibrahim[1], Chin-Hoe Teh[2], Vikneswaran Murugaiyah[1], Kit Lam Chan[1]
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The roots of *Eurycomalongifolia,* locally called Tongkat Ali are traditionally used to improve male libido and fertility. The quassinoids indigenously found in *E. longifolia* have been reported to increase testosterone steroidogenesis and spermatogenesis in rats. Presently, a validated NMR-based spectroscopic method was applied to analyse the rat urinary metabolome related to the sperm count level. Three groups, comprising six Sprague-Dawley rats each, were administered with *E. longifolia* water extract (TAW) of 6 fold TAF273 concentration, quassinoid-poor extract (TAQP), and quassinoid-rich extract (TAF273), which were HPLC standardised for eurycomanone, 13,21-dihydroeurycomanone and 13α(21)-epoxyeurycomanone, the major quassinoids. The groups including a control group of six rats given water alone were orally administered daily for 48 days. The urine samples of post-treatment were analysed for ^{1}H-NMR, *J*-res. and HSQC spectroscopies, using a Bruker Avance III 500 MHz spectrometer at probe temperature of 300 K. At the end of treatment, the animals were sacrificed for sperm count analysis following the WHO method. Their urine profiles were categorized into groups of normal and high sperm count. A significant increase ($p < 0.05$) in sperm count was observed in both TAF273- and TAW-treated groups over those of TAQP-treated and control groups. The OPLS-DA model ($R^2X = 0.9516$, $Q^2 = 0.8247$) indicated a clear separation of outliers related to sperm count amongst the urine profiles. The discriminatory metabolites detected in VIP plot were quantified and showed high concentration of trigonelline and 3-methylhistidine in the urine of TAF273 and TAW-treated groups. In contrast, the urinary metabolite, ethanol displayed higher concentration in TAQP-treated and control groups, but lower concentration for TAF273 and TAW-treated groups. In conclusion, the ^{1}H-NMR urine spectral analysis may provide some reliable metabolome markers for non-invasive prediction of male infertility.

SYMPOSIUM S8

Social Pharmacy Education and Research: The Needs and Challenges in Asia

Assoc Prof Dr Mohamed Azmi Ahmad Hassali
School of Pharmaceutical Sciences, Universiti Sains Malaysia, Minden, Penang, Malaysia.

The practice of pharmacy, and consequently, the pharmacy curriculum has undergone significant change over the years in response to a rapidly changing economic, political and social environment. Within this context, the role of the pharmacist now includes more direct interaction with the public in terms of the provision of health information and advice on the safe and rational use of medications. In order to carry out this function effectively within the society, future pharmacists need to be well prepared on how to deal with patients' behaviour and psychology. Understanding of patients' behaviour and psychology are paramount in order to achieve good outcomes from medication therapy. The concept of behavioural sciences and health psychology are embedded as the fundamental foundation of the field of social pharmacy and it is imperative that this field need to be taught and nurtured to the future pharmacy practitioners. In tandem with the need for future pharmacists to be exposed to issues in social pharmacy, many pharmacy schools around the world had adopted this subject to be part of their standard curriculum. Similarly, in current pharmacy education scenario in Asia Pacific region, the adoption of social pharmacy subjects in pharmacy curriculum is taking it own pace. In Malaysia, efforts had been taken to incorporate social pharmacy subjects in undergraduate pharmacy education since 1995. Beside undergraduate education, there is a dire need to establish research component in the field social pharmacy in order to generate evidence based data for advocating health policy changes. As the field continues to grow, there is a need to train both local and international postgraduate in the field. In this presentation, the experience from the Discipline of Social and Administrative Pharmacy, School of Pharmaceutical Sciences, Universiti Sains Malaysia (USM) in establishing social pharmacy education and research will be discussed.

SYMPOSIUM S10

Impact of Medication Therapy Adherence Clinic (MTAC) Service on Type 2 Diabetes Patients: The Malaysian Pharmacists' Experience

Mr Navin Kumar Loganadan
Ministry of Health, Malaysia

Type 2 Diabetes Mellitus (T2DM) become a major healthcare burden in the world. According to Ministry of Health (MOH), Malaysia in 2011, the prevalence of T2DM among Malaysian adults of over 30 years have increased remarkably from 14.9% in 2006 to 20.8% in 2011. Medication Therapy Adherence Clinic (MTAC) conducted by pharmacists in the MOH hospitals and health clinics in Malaysia in collaboration with the physicians. This program which was introduced by the Pharmaceutical Services Division of MOH in 2006 is aimed to improve patients' knowledge of disease and medication taking behaviour to improved clinical outcomes. T2DM patients with poor medication adherence and poor glycemic control are enrolled into the clinic and monitored by the MTAC Pharmacists through scheduled follow-ups on an average interval of 2 months. During these visits, the patients receive medication history taking, medication adherence assessment, personalised medication counselling and diabetes education from the pharmacists as outlined in the MTAC Diabetes Protocol. The diabetes education is also done using 4

standardised MTAC Diabetes modules which provides patients with knowledge and understanding of their disease and medications, importance of medication adherence, functions of medications and complications of diabetes in an easy to understand manner. Regular feedbacks are given to the patients' treating physicians on patients drug related problems and medication adherence status. A multicentre study on 155 Type 2 Diabetes patients who underwent pharmacist run MTAC Diabetes clinics in 10 MOH hospitals across Malaysia showed improvements in medication adherence and HbA1c reduction of 1.1% in 6 months. The positive findings from the studies conducted to date suggest that pharmacists play an effective and significant role in the diabetes management team comprising doctors and other healthcare professionals.

SYMPOSIUM S11

Selective Cyclooxygenase-2 Inhibition: A Target in Cancer Prevention and Treatment

Dr Suphat Subongkot
*Clinical Pharmacy Division, Faculty of Pharmaceutical Sciences, Khon Kaen University, Thailand***.**

A major goal in the area of cancer prevention and treatment is to make rational use of defined molecular targets in order to block carcinogenesis. Studies conducted in experimental animal models for many human cancers, including those of lung, skin, mammary gland, urinary bladder, colon, and pancreas, have demonstrated that carcinogenesis often may be inhibited by the administration of a highly diverse group of biologic and chemical agents. One very promising and well-studied target is cyclooxygenase (COX)-2. Interestingly, a number of cancers appear to overexpress the COX-2 enzyme, which may play several roles in carcinogenesis. Recent clinical studies have demonstrated the effect of COX-2 inhibitors in the treatment of familial adenomatous polyposis, a genetic disorder that increases the risk for developing colorectal cancer. Ongoing clinical trials with COX-2 inhibitors will increase our understanding and may give us profound insights into the general applicability of this new-targeted approach for cancer control.

SYMPOSIUM S12

Clinical Studies on the Neuroprotective Effects of Palm Vitamin E Tocotrienols

Prof Dr Yuen Kah Hay
School of Pharmaceutical Sciences, Universiti Sains Malaysia, Penang, Malaysia

Cell and animal studies have convincingly shown the tocotrienols to be neuroprotective. However, many compounds have been proven neuroprotective in pre-clinical studies but none succeeded in human trials. Such failures can be attributed to the use of a wrong disease model, example acute ischemic stroke, which has a short treatment time window. Furthermore, the disrupted blood flow will limit the administered agent from reaching the target tissues. The compound should best be given before the stroke event, like in the animal studies. Considering the above, a study was conducted to investigate the neuroprotective effects of palm vitamin E tocotrienols using human volunteers with white matter lesions (WMLs). WMLs are associated with ischemic small blood vessel disease of the brain leading to bundles of nerve fibers degenerating. The lesions are self-progressive and can be quantified using magnetic resonance imaging (MRI). In this study, 121 volunteers with WMLs were randomized 200mg palm tocotrienols or placebo twice daily and imaged at baseline, after 1 year and 2 years of supplementation. Results obtained showed

that the mean WML volume of the treated group remained essentially unchanged after 2 years, whereas the placebo group showed a mark progression. The change in the mean WML volume of the 2 groups was significantly different ($p<0.05$) after 2 years. Based on the encouraging results, a second study is being conducted on 300 diabetic patients with peripheral neuropathy randomized placebo or 200mg tocotrienols twice daily for one year. To date, about 150 of the patients have completed the one year and a majority showed improvements in their total symptom score (TSS) without unblinding. An interim analysis is warranted and may be performed soon.

SYMPOSIUM S13

Expanding Pharmacists' Role in the Humanitarian and Disaster Relief (HADR) Missions– Malaysian Military Pharmacy Perspectives

Col Dr A Halim Hj Basari
Ministry of Defence, Malaysia

The framework of the Malaysian Military Pharmacy practice is discussed to demonstrate similarities and dissimilarities to the conventional non-military practice. Is there really any difference? The peacetime involvement of military and emergency pharmacists in missions for Humanitarian and Disaster Relief be it overseas and/or locally has gone pretty much unnoticed. Much of their contributions have been very unconventional in nature but very important/significant to the nation. So much so, the experiences deserved to be shared and encouraged to other pharmacists who are in the mainstream arena of pharmacy practice. Managing relief initiatives/missions for example, truly expand the pharmacists' role beyond its classroom knowledge and challenge them to be creative and innovative. Such roles definitely fit into the long term capacity building of the nation especially so in promoting wellness and rebuilding affected area for sustainable healthcare. On the other hand, the wartime involvement of military pharmacists reflect their unique roles in making soldiers healthy and recover quickly when they are injured in pre-, during and post-deployment phases. This is n order to maintain the forces' fighting strength to overcome the enemy's initiatives. The need to create perfect soldiers that will ensure battle success stretches the military pharmacists' conventional wisdom and practice in the area of wellness and sustainable health.

SYMPOSIUM S14

Infusing Quality into the Pharmaceutical Supply Chain

Assoc Prof Dr Allan Mathews
Faculty of Pharmacy and Heath Sciences, Royal College of Medicine Perak, Malaysia.

The pertinent quality assurance question to be addressed within the Pharmaceutical Supply Chain starting from the finished product in a Pharmaceutical Manufacturing is how much of the potency has been lost due to the effect of environmental elements, i.e. temperature and humidity. There are increasing demands for higher levels of quality including preventive measures to ensure temperatures are maintained 24 hours a day. In addition, higher demands for quality now cover 7s (Sort, Simplify, Shine, Standardize, Sustain, Safety, Security); preventing trade returns of counterfeits; preventing cross contamination in distribution centres; pest control; electrical audits to prevent fire, system failure, lightning strike; customer care logs

to ensure service levels; ensuring one-way-line process flow from stock receiving to stock despatching; greater emphasis on training including written assessment for participants; and proper documentation.

Most non-cold chain medicines would need a storage temperature of below 25°C but day-time temperatures in the topics will exceed this temperature throughout the day. Although temperatures in major storage facilities such as the Manufacturing Facility, Distribution Centres, hospitals are monitored and documented, concerns arise during shipments in non-air-conditioned metal containers across sea channels which can last weeks and temperatures excepted to soar when in open sea; storage in the wholesaler's store where temperature and humidity controls may not be monitored on a continuous 24-hour basis, or at the pharmacies although air-conditioned there may be inadequate documentation and continuous monitoring. Transportation by air-conditioned vans without thermostat control cannot ensure adherence to the temperature requirement. Some suppliers has taken the step of a non-return policy to ensure quality of their products especially for cold-chain products. The current emphasis on quality appears to be focussed on major storage facilities only and not throughout the supply chain. Temperature monitoring devices are placed together with the products between these major storage facilities.

SYMPOSIUM S15

Clinical Pharmacy in Malaysia: Past, Current and Future

Mdm Noraini Mohamad
Pharmacy Clinical Unit, Pharmacy Practice & Development Pharmaceutical Services Department, Ministry of Health, Malaysia

In 1990, Hepler and Strand introduced the concept of "pharmaceutical care" which defines a new way to look at the responsibilities of the pharmacist and pharmacy services. Since then, the concept has been widely adopted and brings new dimension to the pharmacy practice. Literatures suggested that the involvement of a pharmacist in the evaluation of a patient's drug therapy regimen improves outcomes.

In Malaysia, the 1980s decade already saw a change from product-oriented services to patient-focused care. From the year 2000, the clinical pharmacy has expanded into specialised services which now include medication therapy adherence clinic (MTAC), critical care, cardiology pharmacy and many more. The transformation is inevitable for pharmacy services in Malaysia to be in line with the current development worldwide.

The Pharmaceutical Services Division, MOH, is ensuring that the pharmacy services offered achieve the required standards and not lacking in quality. Among the measures taken include standardisation of practise and expertise development programme.

In the year 2013, 100% ICU wards and 76.4% medical wards are filled/stationed with at least one full time pharmacist. To ensure smooth running of clinical pharmacy service in the wards, placement of pharmacist in the critical care units and medical wards of MOH hospitals has been one of the action plans set for the year 2014.

Medication Therapy Adherence Clinic (MTAC) services started in 2004 with the establishment of Renal Transplant MTAC. Currently, there are 13 types of MTAC services are offered for diabetes, warfarin, retroviral disease, respiratory diseases, nephrology, psoriasis, haemophilia, psychiatry, stroke, rheumatoid arthritis and geriatrics at 660 MOH hospitals and health clinics. Clinical pharmacists in MOH are also

actively involved in research with emphasis given on outcome-based researches which have significant impact towards current or previous practice.

The transformation of clinical pharmacy in Malaysia continues with the direction focus on obtaining subspecialisation and international recognition which will provide clinical pharmacists with a better career pathway.

SYMPOSIUM S16

Liposomes Decorated Topical Drug Delivery for the Treatment of *Cutaneous Leishmaniasis*

Prof. Gul Majid Khan
Department of Pharmacy, Quaid-i-Azam University, Islamabad, Pakistan

Currently, several drugs/products are used for the treatment of *cutaneous leishmaniasis* employing different treatment approaches. However, due to some critical undesired factors, including but not limited to their associated side effects, unaffordable high costs, development of severe resistance against them, regulatory issues and non-availability of such drugs/products, the treatment of this so called '*non-curable*' disease still remains as a big challenge. This presentation is meant to show the endeavors and achievements of my research group towards addressing of the said challenge, while exploiting the potentials of centuries old used indigenous natural products of KPK, Pakistan, alone or in combination with tested synthetic compounds, for development of cheaper but safe and effective topical formulations capable of carrying and retaining suitable concentrations of the target drugs for prolonged local action in the deeper layers of the skin where the leishmanial parasites reside. In this regards, our liposomal drug delivery systems containing *curcumin* in combination with amphotericin B and/or miltefosine exhibited tremendously better results with enhanced *antileishmanial* activity and significantly shorter duration of treatment, both in animals as well as in human beings. We are hopeful to have a few of them as patents and also to translate them into scale-up products before coming into an agreement with a local pharmaceutical industry based in Peshawar for initiation of regulatory process for large scale production.

SYMPOSIUM S17

Pharmacy Education for Sustainable Tomorrow – Asia Experience

Ms Vivian WY Lee
School of Pharmacy, Faculty of Medicine, Chinese University of Hong Kong (CUHK)

Pharmacy education is important for the training of capable future pharmacists and is crucial for the clinical pharmacy development. We nurture our next generation to be the future leaders of our society, and young people learn and grow academically and morally. The impact of university education on the development of students for the future of society cannot be underestimated. This is the time when they learn how to be independent and reliable individuals. With the advancement of technology and health management, how can we better prepare our students to cope with the rapidly changing pharmacy practice? I am fortunate to discover ways to engage my students in my teaching. I believe that teaching, research and service development can co-exist. As a teacher in the pharmacy profession, my responsibility is to train the new generation of practicing pharmacists.

In this presentation, the following topics will be discussed:

1. Illustrate the changing clinical pharmacy practice and the impact on pharmacy curriculum;
2. Demonstrate effective platform for not only teaching but also research and clinical service development.
3. Examples of successful teaching platforms will be demonstrated.

SYMPOSIUM S18

Clinical Pharmacy Services in Iran: Improving Patient's Care

Farshad Hashemian
Islamic Azad University, Pharmaceutical Sciences Branch, Clinical Pharmacy Department, Tehran, Iran.

It was in 1922 that a pharmacy division was set up at the school of medicine in Tehran for the first time. Furthermore, discipline of "Clinical Pharmacy" has been introduced to Iranian health care system, since 20years ago. It consists of a post-graduate program directed at developing specialists who provide first-class pharmacotherapy service in areas of developing pharmacotherapy plans for patient-specific problems, evaluating appropriateness of pharmacotherapy including drug choice, dose, route of administration, monitoring possible drug interactions, and etc. Indeed, there have been numerous studies investigating the effects of clinical pharmacists' interventions on patients' outcomes. According to their results, a significant decrease in medication cost and drug-drug interactions have been reported. Additionally, clinical pharmacists' interventions have been reported to reduce medication errors significantly. Driven by the aspirations for a larger role of clinical pharmacists in health care system, Iranian Society of Clinical Pharmacists tries to build inter-professional relationships with other health care professionals with the aim of optimizing patient care and improving patient outcomes.

If we want to pause to reflect upon clinical pharmacy services and education in the past decades, we recognize that current level of interprofessional collaboration between clinical pharmacists and physicians in most of the cases is beyond expectation and physicians' society do support clinical pharmacists in a good manner; thus, our momentum is moving us to the right direction.

Everyone in the pharmacy profession should take pride in the remarkable progress in pharmacy education and clinical pharmacy services provided in the last decades in the country. The vision of future would be the ultimate interprofessional collaboration of clinical pharmacists and physicians so that the goal of enhanced patient care and outcome through interprofessional collaboration become fully realized.

HOSPITAL AND CLINICAL PHARMACY

HPO 01
FAPA2014000007 (Oral)

Prospective Evaluation of Clinical Pharmacy Services at a South Indian HIV Community Care Centre

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This study was conducted to initiate and evaluate the usefulness of clinical pharmacy services at a South Indian HIV community care centre. The need and importance of clinical pharmacy services were presented to the practising doctors at the study site and the clinical pharmacy services were initiated. Cipole's classification was used to categorize the drug-related problems (DRPs) and suitable scales were used to assess the causality, severity and preventability of adverse drug reactions (ADRs). During the study period, 49 drug interaction (DI) queries were received and a majority of the DI requests were made during ward rounds (47%). Most of the queries (63%) were for better patient care; 41% of the queries were answered immediately (0-30 min) and usually via verbal communication. Of the 65 interventions made during the study period, 32% (n=21) were rated as 'minor', 58% (n=38) as 'moderate' and 9% (n=6) as 'major'. Drug interactions were the most common DRPs identified which accounted for 37% of the total DRPs. The acceptance rate of interventions was 100% and drug therapy was changed in 98% of the cases. During the study period, a total of 176 ADRs were observed which were associated with antiretroviral agents. Of these 176 ADRs, 53.4% were considered as probable and 46.6% as possible. The severity for a majority of the ADRs (95.5%, n=168) was classified as moderate in nature and the rest as mild (4.5%, n=8). Out of the 176 ADRs, 139 (79.0%) were predictable. Vomiting (19.8%) and anemia (13.6%) were the most commonly observed ADRs. The organ system most commonly affected by ADRs was the gastrointestinal system. In conclusion, the clinical pharmacy services (which constituted 49 DI queries, 65 interventions, and 176 ADRs) were well accepted by the doctors in the HIV community care centre.

HPO 02
FAPA2014000227 (Oral)

The Development of a Pharmacy Management Hypertension Program and Opportunities for Pharmaceutical Care

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Hypertension (HTN) is a preventable and most important cardiovascular risk factor. According to the Philippine Society of Hypertension, the rapid increase of patients with hypertension was associated with poor diet, exercise and medication adherence. Pharmaceutical care provides drug therapy for the purpose of achieving the elimination of such disease. The study aims to improve the patient's lifestyle, medication adherence and knowledge with the aid of a community-based programme and application of pharmaceutical care. The prospective cohort study consisted of five theme activities: first and last activity was on profiling, quality of life (SF-12) and medication adherence (Morisky scale); nutrition/DASH and drug information/interaction were the second, third was an exercise seminar and fourth was post intervention. There were 6 stations in each activity: registration, vital signs, eye examination, theme activity, pharmacist's counselling and dispensing. Opportunities for pharmaceutical care services were utilized throughout the programme. Thirty respondents (mean age = 59.5 years and 43% were males), with mostly 2-3 co-morbidities. Seven percent of the respondents

had normal BP, 60% with pre-HTN, 23% at stage 1 HTN, and 10% at stage 2 HTN. In addition, 23% were smokers and 37% were alcoholic drinkers. Post intervention showed higher medication adherence (51% of the respondents) and most of them showed improvement in physical, social, and emotional health. It was also noted that 60% had improved BP, 46% took less or avoided salt intake, 44% of known alcoholic drinkers reduced alcohol consumption, and continued their active lifestyle. In **c**onclusion, the development of a pharmacy-administered hypertension programme has improved the quality of life of patients through lifestyle modification and pharmaceutical care. Pharmacist-managed healthcare activities provided health education and medication counselling as well as promoted medication adherence.

HPO 03
FAPA2014000211 (Oral)

Prevalence and Effect of Smoking on Treatment Outcome among Tuberculosis Patients in Malaysia

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Smoking plays a key role in the development of tuberculosis (TB) infection and is also a predictor of poor TB treatment outcomes and prognosis. The aim of the present study was to evaluate the prevalence of smoking and its influence on treatment success among TB patients. A multicenter retrospective study design was adopted from January 2006 to March 2009 in four states of Malaysia (Penang, Sabah, Sarawak and Selangor) in order to collect data of TB patients. All adult patients diagnosed with TB were included, whereas patients with missing records were excluded. A validated data collection form was used to record patient demographic and clinical data. All the data was analyzed by using SPSS version 20.0. All relevant ethical considerations were obtained. Out of 9337 TB patients, the prevalence of smokers was 4313 (46.2%) while 5024 (53.8%) were non-smokers. Gender ($p< 0.001$), marital status ($p= 0.005$), race ($p< 0.001$), co-morbidity ($p< 0.001$) and area of residence ($p< 0.001$) were significantly associated with smoking habit. Among the smoker group, male gender (OR=1.79, 95% CI 1.64-1.96, $p< 0.001$), unmarried individuals (OR=1.14, 95% CI 1.04-1.24, $p= 0.05$), Sarawakian indigenous (OR=15.73, 95% CI 0.35-0.70, $p< 0.001$), presence of co-morbidity (OR=1.85, 95% CI 1.69-2.01, $p< 0.001$), and urban residents (OR=1.47, 95% CI 1.35-1.60, $p< 0.001$) were found statistically significant. Of the total 4313 smoker TB patients, 3236 (75%) were successfully treated while 1077 (25%) had treatment failure. Among non-smokers TB group, 4004 (79.7%) patients had successful treatment outcome. The treatment failure rate was 1.3 times higher in smoker TB patients as compared to the non-smokers. Smoking had a strong influence on TB and is a contributing factor towards treatment failure (OR=1.30, 95% CI 1.18-1.44, $p< 0.001$). Therefore, proper action should be adopted to stop smoking among TB patients.

HPO 04
FAPA2014000125 (Oral)

A Study on Perception of the Need and Time needed to Render Critical Ward Services by a Clinical Pharmacist in Neonatal Intensive Care Unit (NICU) In Duchess of Kent Hospital, Sandakan

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Due to the extensive exposure to medications in NICU and lack of neonate-specific evidence on pharmacotherapeutic interventions or neonate-specific formulations, neonates are highly vulnerable to medication errors. Participation of clinical pharmacist in ward rounds twice weekly was suggested to improve medication safety in NICU. The objective of the study was to determine the perception of the need and benefits of NICU pharmacy service rendering pharmaceutical care, and to review the time contribution of pharmacist in patient care. An expectation study was carried out, before the clinical pharmacy service commenced in the NICU, Duchess of Kent Hospital, Sandakan. The questionnaire consisted of eight 4-pointers questions regarding NICU pharmacy service. In addition, the clinical pharmacist also documented the time and activities in the ward, when the service was started. The study was carried out on a total of 30 doctors and nurses. Of these participants, 93% expected the pharmacist to take personal responsibility for resolving any drug-related problem. All of the participants regarded the pharmacist as a knowledgeable drug therapy expert, and a reliable source of drug information. The clinical pharmacist spent most of the time on checking and documenting the drug chart (41%), followed by drug dosage calculations (21%). Thirteen and seven percent of the time was spent on providing drug information and stock control, respectively. In conclusion, doctors and nurses have high perception of the need and expectation towards the role of a pharmacist in the NICU. The time spent by the pharmacist in checking the drug chart and in dosage calculations would improve patient care.

HPO 05
FAPA2014000053 (Oral)

Effectiveness of Hyperosmolar Oral Liquid Medications Guideline to Prevent Necrotizing Enterocolitis in Preterm Neonates

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The purpose of the study was to establish the guideline for dilution of high osmolality oral liquid medications which were administered to preterm neonates. Healthcare professionals' compliance to guideline and incidence of necrotizing enterocolitis (NEC) was monitored for the effectiveness. The osmolality of 20 oral liquid medications was measured using the freezing point depression method. The medications with osmolality more than 350 mOsm/kg H_20 were classified as hyperosmolar medications. The guideline for dilution of the hyperosmolar medication was established and communicated to healthcare professionals by several methods: oral presentation, attachment of the guideline in patient charts and at the nursing area for medication preparations. The incidence of necrotizing enterocolitis in preterm patients was monitored for 1 year, between 1 September 2012 and 31 August 2013 and it was compared with the incidence of 1 year before the guideline was launched. All of the oral liquid medications used in preterm neonates, except for caffeine solution, had osmolality more than 350 mOsm/kg H_2O. These included sildenafil, furosemide, Ursolin®,and digoxin. Multivitamin drops with 8,512 mOsm/kg H_2O was the highest osmolality medication. These hyperosmolar medications were put in the guideline and made recommendation to dilute with water before administrtion to preterm neonates. After the guideline was launched, we found that healthcare

professionals complied with our guideline for all preterm neonates (95) who got the hyperosmolar medications. The NEC incidence was decreased from 14 cases per year (2 cases were severe NEC with surgical treatment) to 6 cases per year and no severe necrotizing enterocolitis with surgical treatment. All of the oral liquid medications used in preterm neonate were hyperosmolar except for caffeine solution. Guideline for dilution of hyperosmolar oral liquid medications could be an alternative for severe necrotizing enterocolitis prevention in preterm neonates.

HPO 06
FAPA2014000250 (Oral)

Self-medicating Behavior of Urban Pakistani Population towards Psychotropic Agents and its Correlates

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The increasing trend of self-medication, particularly in developing countries is associated with a large number of complications. Therefore, a cross-sectional study was conducted to investigate self-medication trend in an urban community and its correlates such as educational level, gender and behavior of using psychoactive medicines. A validated questionnaire was used to collect the data from 110 individuals in different locations of Lahore, the provincial capital of Punjab, Pakistan. The education levels of respondents included 1.82% illiterates, 13.64% primary, 34.55% secondary, 16.36% higher secondary and 33.64% university level. The respondents consisted of 54.55% males. A total of 26.36% were found to be using psychoactive agents without consulting a physician. The trend of self-medication was 10% higher in individuals with primary education and of lower socio-economic status. Poor medicine accessibility, religious and cultural beliefs, lack of awareness of risks of medication use, non-prescription sales and previous medication experience were also found to be responsible for the self-medication behaviour. It is concluded from the results of this study that literate people tend to be involved in self-medication despite knowing the side effects. Moreover, a significant fraction of the population is using psychotropic drugs without consulting a physician.

HPO 07
FAPA2014000176 (Oral)

Evaluation of Adherence and Haemoglobin Levels of Iron Tablets Use in Pregnant Women at Public Health Centre in Purwokerto

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Anaemia in pregnant women is a major cause of morbidity in foetus and infants. Administration of oral iron tablets is to prevent iron deficiency anaemia. Patient adherence of iron tablets can affect haemoglobin levels in pregnant women. The aim of this study was to know the relationship between adherence and haemoglobin levels in pregnant women who consumed iron tablets. This study is an observational study conducted by analytic study design at 5 public health centres in Purwokerto. A total of 66 pregnant women who required antenatal care were included in this study. Morisky Medication Adherence Scale and pill count were used to measure patient adherence while the Sahli method was used to determine haemoglobin levels after the patient obtained 90 iron tablets. Chi-square test was used to test the hypotheses. A total of 42.4% of the patients were adherent. Based on the examination of haemoglobin levels, a total of 59.1% were anaemic. Statistical analysis using Chi-Square test showed a relationship between adherence and haemoglobin levels ($p = 0.005$). There was

a relationship between adherence and haemoglobin levels of iron tablets use in pregnant women at public health centre in Purwokerto.

HPO 08
FAPA2014000048 (Oral)

Clinical Pharmacy Services that Influence Prescribing in the Western Pacific Region

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The Western Pacific Region (WPR) is home to approximately 1.8 billion people, more than one-fourth of the world's population. It stretches over a vast area, from China in the north and west, to New Zealand in the south, and French Polynesia in the east. Clinical pharmacy services have recently been introduced into many of these countries, particularly in Asia. Services that focus on pharmacists' influence on prescribing have been of particular interest in this region. The aims of this study were to identify the extent of implementation of clinical pharmacy services that influence prescribing in the WPR and also to explore the barriers and facilitators involved in their implementation. The surveys were distributed online to hospital pharmacy directors in the WPR. Reminders were sent to non-responders at one and three weeks after the initial invitation email was sent. Surveys were available in English, Japanese, Chinese, Vietnamese, Lao, Khmer, French and Mongolian. In total, 726 responses were received from 31 countries and nations. Nearly all hospitals, 90.6% (658/726), stated that they provided clinical pharmacy services. From those with such services, 28% of their clinical pharmacists attended medical rounds regularly. The median percentage of inpatients receiving a medication history and discharge counselling by a pharmacist was 40% and 30%, respectively. Higher internal facilitator factor scores significantly increased the likelihood to offer clinical pharmacy services and have pharmacists attend medical rounds regularly. Higher environmental facilitator factor scores significantly increased the percentage of inpatients receiving a medication history, review and discharge counselling by a pharmacist. A large proportion of hospitals in the WPR has implemented clinical pharmacy services and is regularly involved in educating prescribers. Although internal facilitators are important for initiating such services, the addition of environmental facilitators is crucial for them to be integrated throughout the hospital.

HPO 09
FAPA2014000142 (Oral)

Pharmacokinetic of Rifampicin in Urban and Rural Lung Tuberculosis Patients in Bali Province

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Many determinants of rifampicin variability other than urban and rural groupings have been evaluated. Pharmacokinetic difference in a group of population can be a determinant of suboptimal rifampicin therapy. This study compared the pharmacokinetics of rifampicin plasma level of urban and rural tuberculosis patients upon once daily oral antituberculosis fixed dose combination given at standard dose. A cross sectional study was conducted on new tuberculosis urban and rural patients in several primary health care centres, who used oral antituberculosis category I as a core therapy. Plasma samples at 2 and 6 hours after oral administration were collected and analyzed by TLC densitometry method. Comparison of the mean serum levels at 2 and 6 hours from the two groups were carried out using t-test. Eleven urban and nine rural new lung tuberculosis patients participated in this study. The participants were between 19 and 55 years old, with IBW between 15.8 kg/m2 and

29.5 kg/m2. The mean plasma level at 2 hours were 6.09 mcg/mL and 5.88 mcg/mL in urban and rural, while at 6 hours were 4.57 mcg/mL and 4.87 mcg/mL in urban and rural, respectively. The mean plasma levels of rifampicin between the two groups of participants were clinically different but not significantly different at 2 and 6 hours. The results indicate that urban and rural lung tuberculosis patients in this study may have similar absorption, distribution, metabolism, and excretion. Further studies on the pharmacokinetic differences in urban and rural tuberculosis patients should be explored and more patients should be included. The pharmacokinetic properties of rifampicin in urban and rural patients were not significantly different.

HPO 10
FAPA2014000212 (Oral)

Drug Related Problems (DRPs) among Geriatric Patients in Primary Care Setting

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Drug related problems (DRPs) or medication related problems (MRPs) which may lead to poor clinical outcomes are common, costly, and often preventable in geriatric population. Geriatric patients are particularly vulnerable to DRPs for two major reasons which are age-related physiological changes and multiple co-morbidities with multiple medications. This study was conducted to determine the incidence and types or nature of DRPs associated with medication use in geriatric patients. A retrospective study was conducted using the patient medical records of geriatric patients who seek treatment at the Department of Primary Care in University Malaya Medical Centre (UMMC) from January 2014 to April 2014. The assessment and classification of DRPs was based on Pharmaceutical Care Network Europe Classification (PCNE) of Drug-related Problems tools version 6.2. Out of 408 geriatric patients included in this study, 142 (34.8%; 95% confidence interval: 39.4; 30.2%) had at least one DRP, with a total of 177 DRPs. This means 44 DRPs per 100 patients. The most common category of DRPs was adverse events (53.7%) such as muscle ache, gastrointestinal disturbances, cough, hypoglycemia and dizziness, followed by treatment effectiveness problems (30%) and non-adherence to medications (9.0%). Drug-drug interactions (27.7%) and inappropriate drugs (27.1%) were the most common causes of DRPs. In conclusion, DRPs are frequently encountered by geriatric patients with multi-morbidities and hence, polypharmacy is common. Interventions by healthcare providers are essential to resolve such problems and consequently to reduce the mortality and morbidity associated with DRPs.

HPO 11
FAPA2014000126 (Oral)

Risk Factors of Pacemaker Implantation Infection: A Single Centre Experience

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Implantation of permanent pacemaker (PPM) is a device treatment for various brady-arrhythmias. Several risk factors have been associated with infection of PPM implantation, including peri-procedure antibiotic use. Currently, there is no study published in Malaysia to analyze the risk factors of permanent pacemaker infection. This study was conducted to determine the associated factors of PPM implantation infection. A retrospective case control study was designed from January 2011 to July 2013, at a tertiary regional cardiac centre in Hospital Queen Elizabeth II located in Sabah, East

Malaysia. A checklist was used for data collection: patient and procedural risk factors, including peri-procedural antibiotic use. Risk factors were analyzed based on clinical surveillance of infection at discharge on Day-10 which was carried out as part of routine practice. Sample size calculation was done using two proportional formulae with the power of the study set at 80%. A total of 112 patients were included: 12(10.7%) with PPM infection and 100 controls (no infection). All patients received pre-implant prophylactic use of antibiotics, varied at discretion of implanting clinician. Univariate analysis showed post-implant administration of cefoperazone was associated with lower infection rate (OR 0.198: 95% CI 0.05, 0.79; $p<0.05$) and longer procedure duration was associated with higher infection rate (OR 5.158: 95% CI 0.965, 27.564; $p<0.05$). Multivariable logistic regression showed the post-implant amoxicillin plus clavulanic acid (OR 16.852: 95% CI 1.977, 143.63; $p=0.010$) and post-implant cefazolin (OR 32.50: 95% CI 3.222, 327.774; $p=0.003$) were independent factors for PPM infection. Pre-implant antibiotic choice was not significantly associated with infection rate. In conclusion, implant infection could probably be due to different choice of antibiotic use during the procedure. This may be associated with procedural complexity and operator experience, which deserve further study in order to formulate preventive strategy to minimize risk of PPM infections, including antibiotic policy.

HPO 12
FAPA2014000248 (Oral)

Statistical Prediction of Risk Frequency for Ischemic Heart Disease in Punjab, Pakistan

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A case-control interview based survey on the prevalence of IHD risk factors in Pakistani community was conducted. A total of 96 individuals were included in this study of which, 46 were patients and 50 were healthy individuals who served as control. Social and medical factors that either directly or indirectly influence the development of IHD were used as factors affecting risk of IHD. These factors included modifiable risk factors such as hypertension, dyslipidaemia, tobacco smoking, physical inactivity, obesity, unhealthy diet and diabetes mellitus, and non-modifiable risk factors such as age, family history, gender, anxiety and post-menopausal status. Patients with confirmed diagnosis of IHD and a history of IHD not more than five years were included. Individuals who had not demonstrated even a single symptom of IHD were taken as controls. The IHD risk factors frequency was assessed by logistic regression model using SPSS version 17®. Overall, high fat-diet intake was the most prevalent risk factor (73.91%) followed by age (>50 years) (67.39%). In terms of gender comparison, the most significant difference was observed in hypertension, with more female patients (84.61%) compared to males (39.39%). Similarly, age of patients was found to be the most apparent risk factor of IHD, owing to a significant decline in physical activity with advancing age. A probability equation was derived for risk prediction and hypertension was found to be the most significant factor with P=0.115, followed by diabetes 0.135 and age 0.148. When the model was tested on pre-observed data, 81.3% correct prediction was observed. Although the logistic regression model did not produce significant results, the probability equation was able to predict IHD risk factors with moderate precision.

HPO 13
FAPA2014000196 (Oral)

Prevalence of Comorbidity and Pattern Drug Use among Children with Attention-deficit Hyperactivity Disorder: A Single Center in Thailand

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Attention-deficit hyperactivity disorder (ADHD) is a common psychiatric disorder in childhood. The treatment of this condition has to include a multi-modal approach, involving parent education, psychological interventions, educational intervention, and appropriate medication use. Therefore, this study aimed to describe the prevalence comorbidity and drug use pattern of ADHD in Thai children. A retrospective study was conducted among children (6-12 years old) with ADHD from Psychiatric Outpatient Unit during January 2013 to March 2014 at Hua Hin Hospital, Prajuabkirikhan province, Thailand. Demographic data, underlying disease, comorbidity and medication use were collected and analysed. During study period, 87 patients were included. The first three ranked comorbid diseases were oppositional defiant disorder, ODD (n=28, 32.2%); learning disorder, LD (n=21, 24.1%) and anxiety (n=8, 9.2%), respectively. Thirty-five out of 87 patients had underlying diseases. Accidental injury (n=19, 54.3%) and epilepsy (n=9, 25.7%) were common. The pattern of medication use showed that 54.0% of the patients received only methylphenidate (n=47) and combined regimens; methylphenidate plus atypical antipsychotics (n=30, 34.5%), respectively. The mean dosage of methylphenidate and risperidone were 14.9 mg/day and 0.55 mg/day, respectively. The combined regimen was used in 53.6% and 33.3% of patients with ODD and LD, respectively but there was no statistical significance. The most comorbidities of ADHD were ODD and LD. Combined regimens were commonly used in ODD patients but its benefits required further investigations.

HPO 14
FAPA2014000174 (Oral)

Study of relationship between trigger tools and adverse drug events at Somdet Phra Sangharaja the 19th hospital, Kanchanaburi

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The purpose of this study was to analyze a relationship between the trigger tools and adverse drug events (ADEs) at Somdet Phra Sangharaja the 19th hospital. Researchers collected inpatient medical records from August to September 2013, with existing trigger tools: vitamin K, INR greater than 4, naloxone, calcium polystyrene sulfonate, potassium chloride elixir, serum glucose lower than 50 mg/dl, rising serum creatinine due to enalapril and chlorpheniramine (CPM) injection. Data were calculated for positive predictive value (PPV) and the results showed that naloxone has the highest value (PPV = 1.00). Besides that, INR greater than 4 (PPV = 0.5), rising creatinine due to enalapril (PPV = 0.44), potassium choride elixir (PPV = 0.41), CPM injection (PPV = 0.17), calcium polystyrene sulfonate (PPV = 0.17) and vitamin K (PPV = 0.09). Sensitivity of potssium chloride elixir, CPM injection and calcium polystyrene sulfonate were 0.48, 0.50 and 0.50, respectively. Furthermore, chi-square test of potassium chloride elixir showed that it was associated with drug-induced hypokalemia (P-value = 0.001). In conclusion, these trigger tools can be used for detecting adverse drug events and planning ADEs prevention scheme.

HPO 15
FAPA2014000035 (Oral)

Slow Carbamazepine Clearance in a Nonadherent Malay Woman with Epilepsy and Thyrotoxicosis

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Slow carbamazepine clearance may be related to genetic polymorphisms of drug metabolizing enzymes and transporters. Such altered metabolism can lead to drug toxicity and consequently poor adherence, even when small doses of carbamazepine are administered. Drug–drug interactions or drug–disease interactions may also have attributed to the inconsistency in treatment outcome with carbamazepine which inherently has a narrow therapeutic window. Therapeutic drug monitoring (TDM) of carbamazepine was carried out on a Malay woman with seizure relapse presented to an epilepsy clinic. The patient was recently diagnosed with hyperthyroidism and was treated with carbimazole and propranolol. TDM revealed a slow carbamazepine clearance of 1.45 L.h-1 per 70 kg. Genotyping of selected genetic variants in CYP3A4, CYP3A5, EPHX1, ABCB1, and ABCC2 was carried out. The patient has CYP3A5*3/*3 and ABCB1 3435-CC genotypes which have been associated with a higher adjusted mean serum carbamazepine concentration in Chinese and Korean patients with epilepsy. The seizure relapse in this patient was assumed to be related to poor medication adherence, possibly due to avoidance of medication adverse effects. Individualization of drug therapy for this patient using pharmacokinetic modeling and simulations of carbamazepine dosing regimens was performed. Attending physicians should be vigilant and request TDM service judiciously, so that the dosage of CBZ can be adjusted promptly for maximum seizure control with minimum adverse effects. Pharmacogenomic studies on CBZ patients of various races may be helpful in identifying individual with a slow carbamazepine clearance.

HPO 16
FAPA2014000041 (Oral)

Strategies for a Safer Fasting During Ramadan for Muslim Patients with Type 2 Diabetes Mellitus: A Systematic Review

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Fasting during Ramadan increases the risk of hypoglycaemia in diabetic Muslim patients. Clinical interventions can provide diabetic Muslims a safer fasting period during the month of Ramadan. The aim of this systematic review was to evaluate the different strategies used to keep diabetic Muslims safe when fasting during the month of Ramadan. A total of seven electronic databases was searched (PubMed, Cochrane Central Register of Controlled Trials, AMED, PsycINFO, EMBASE, CINAHL, Clinicaltrials.gov) for randomized studies that studied the strategies to keep diabetic Muslims safe when fasting during Ramadan. Seven trials involving 2977 patients were included. Five out of seven studies involved drug interventions with sulphonylureas being used as the most common comparator drug. The average diabetic years among seven studies are 7.9 years while the average duration of the studies was 14.5 weeks. All studies reported hypoglycaemic episode or events, side effects and adverse effects. Out of the five studies that confirmed the incidence of hypoglycaemia with corresponding blood glucose value, four studies reported hypoglycaemia event(s) during Ramadan and one study reported incidence of severe hyperglycaemia in their fasting group versus non-fasting group. Hypoglycaemic events were noted with an average of 9.5% in the control group versus 5.8% in the intervention group. In two studies that reported the occurrence of hypoglycaemic episodes, an average of 32% was noted in the control group and 19% in the intervention group. In conclusion,

sulphonylureas are associated with higher risk of hypoglycaemia and hyperglycaemic events. Patients wishing to fast should consider alternative drugs for their diabetes during Ramadan to reduce the risk of hypogylcaemia.

HPO 17
FAPA2014000002 (Oral)

Comparison of Methods for Estimating Glomerular Filtration Rate in Critically Ill Patients with Unstable Renal Fucntion – A Single Center Retrospective Study from Malaysia.

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Dosing of drugs is challenging in critically ill patients with unstable kidney function. Equations like Jellife, Brater and Chiou are options but they are not robustly tested. This study aimed to investigate the mean differences of estimated creatinine clearance (eCrCl) using Cockroft-Gault method compare to Jellife, Brater, and Chiou method and the appropriateness of dosing adjustment of renally excreted drugs based on these methods for critically ill patients with unstable kidney function. A total of 120 patients admitted to the intensive care unit (ICU) of Taiping Hospital in Perak, Malaysia from year 2010 to 2012, were reviewed retrospectively. Serum creatinine levels and urine outputs from day 1 to 7 of admission were collected. The median differences of calculated CrCl based on four different methods were analysed using Friedman-ANOVA test. Spearman rank correlation test was used to determine the relationship between the calculated CrCl and urine output. Median values of eCrCl calculated were compared using Cockroft-Gault equation versus Jellife, Brater and Chiou. At point of acute kidney injury, the calculated median CrCl were 34.70 mL/min (IQR 13.50) with Cockroft-Gault; 26.00 mL/min (IQR 12.40) with Jellife; 32.70 mL/min (IQR 11.90) with Brater and 27.90 mL/min (IQR 14.70) Chiou. At this point, the calculated CrCl was 25% lower with Jellife; 5.76% lower with Brater; and 19.60% lower with Chiou compared to using Cockroft-Gault. The two suspected drug toxicity reported was upper/lower gastrointestinal bleeding secondary to antifactor Xa inhibitor, fondaparinux and fits secondary to imipenem use. Clinicians and Pharmacists should consider using Jellife, Brater or Chiou equations to estimate CrCl for patients with acute kidney injury with unstable renal functions.

HPO 18
FAPA2014000036 (Oral)

Applicability of a Pharmacy-developed Diary in Patient-Reported Monitoring of Compliance to Therapeutic Interventions

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Patients compliant to medications had fewer hospitalizations and overall costs that were 23% lower than non-compliant patients. A patient-centered care model has the potential to improve long-term care, manage chronic conditions, and minimize complications. Clinical pharmacy students developed a hypertension (HTN) diary, a journal to measure patient compliance to pharmaceutics and non-pharmacologic interventions. Diaries were given to patients (N=66) of an urban community in the

Philippines who attended a five-phased intervention programme. The diary contains education-based knowledge on HTN, DASH diet, exercise, and drug information. A calendar was added for patients' documentation of daily blood pressure measurement, exercise, sleeping habits and medication intake. The effectiveness of the diary was measured using patient satisfaction survey and modified QQ10 questionnaire. Out of the 66 patients, 94% used the diary. Patients monitored their blood pressure on an average of 3-4 times a week (74%) and religiously updated their diary on sleeping habits (71%) diet (70%) and exercise (91%). There was an overall reduction in blood pressure (63%), reduced sodium intake (33%) and increased physical activity (93%). Patients (97%) gave positive feedbacks on the diary use and were highly satisfied with the self-monitoring logbook. In conclusion, the diary was a visible reminder for compliant and subsequent medication intake, reduction in blood pressure, sodium intake as well as improved mobility. Health providers can utilize this diary to measure patient's compliance by the completion of the diary itself. The diary showed great potential to improve patient outcomes, focusing on the patient and addressing improved health management.

HPO 019
FAPA2014000111 (Oral)

Hospital Admissions/Visits Associated with Drug-Drug Interactions: A Meta-Analysis

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The objective of this study was to estimate prevalence of hospital admissions/visits associated with actual drug-drug interactions (DDIs) and to examine the effect of study design; population; and method of detecting DDIs on reported prevalence. PubMed, International Pharmaceutical Abstracts, EMBASE, CINAHL and the Cochrane Database of Systematic Reviews up to October 2013 were searched for observational studies examining actual DDIs, in many languages. The outcomes in this study were DDI prevalence rates in total populations and frequency of each pairs of DDIs. Thirteen studies met our inclusion criteria. The median DDI prevalence rate for hospital admissions was 1.1% (367 DDI cases/47,976 patients, IQR 0.4-2.4%) The median DDI prevalence rate for hospital visits was 0.1% (20DDI cases/23,607 patients, IQR 0.0-0.3%). Medical record, interview, drug interaction screening program, adverse reaction report, and electronic medical record were identified as methods used for detecting DDIs. Non-steroidal anti-inflammatory drugs (NSAIDs) were most commonly involved in hospital admission associated DDIs, while warfarin was frequently involved in DDIs detected as hospital visits as outpatients/emergencies. In conclusion, DDIs are a significant cause of hospital admissions and hospital visits. Improved DDI information gathering could help to reduce such adverse effects from DDIs, especially for patients using NSAIDs and warfarin.

HPO 20
FAPA2014000285 (Oral)

The Interaction Impact of Type of Antihypertension therapy, Comorbidity and Medical Adherence to the HRQoL on the Stroke Patients of the National Stroke Hospital, West Sumatera, Indonesia

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HRQoL of the patients is affected by several factors. This study is performed to determine the association impact of the type of antihypertensive and medical adherence to HRQoL on hypertensive

stroke patients with or without other comorbidities. About 155 patients were involved in the research that was conducted between March to May 2014. The HRQoL of the patients were determined by using Stroke the Specific Quality of Life (SSQoL) while the adherence were determined using the Morisky Medical Adherence Scale-8 (MMAS-8) questionnaire that has been translated into Indonesian. Data of stroke types and durations, and antihypertensive therapies that were received by the patients were collected from patients' medical records. Analysis of covariance was used to analyse the data, and the 95% confidence interval was taken for the significance. There was no significant impact of type of anti-hypertensions, medical adherence and comorbidities to HRQoL on the stroke patients ($p>0.1$), but there was a three-way interaction among type of anti-hypertension, comorbidities, and medical adherence impact to the HRQoL ($p<0.05$). The average score of the patient's HRQoL are good (44.83±5.73 with the maximum score of 60), but stroke patients with comorbidities of hypertension which received combination of calcium channel blocker and angiotensin converting enzyme inhibitor with a moderate adherence to this antihypertensive therapy had the highest HRQoL average score among others. On the other hands, stroke patient with comorbidity of hypertension, diabetes mellitus and dyslipidaemia which received calcium channel blocker with a moderate adherence possess the lowest HRQoL average score. In conclusion, type of anti-hypertensive therapy, comorbidities, and medical adherence of hypertensive stroke patients determined their HRQoL score of the stroke patients. HRQoL and medical adherence assessment would be important for the pharmacist intervention plan which may be needed to improve patient's medical adherence, and thus HRQoL.

HPO 21
FAPA2014000182 (Oral)

Development and Implementation of a Career Development Pathway and Competency Framework at SingHealth: A 7-year Journey

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The healthcare system in Singapore continues to be in a state of evolution with the silver tsunami looming in front of it. There is an increasing prevalence of chronic diseases, polypharmacy and higher hospital admission rates. To meet these challenges there is a need to ensure a highly competent pharmacy workforce in the areas of service, education and research. This presentation aims to share the journey SingHealth took to achieve this. In 2007, the Department of Pharmacy at Singapore General Hospital (SGH) (an institution under SingHealth) took lead to develop its Career Development Pathway (CDP) and Pharmacy Competency Frameworks. Local and international CDPs were reviewed by the workgroup but none were found suitable and the department had to develop one that would meet the hospital needs. Concurrently, it reviewed the Singapore Competency Standards (for entry-to-practice), and the UK CoDEG's General Level and Advanced Consultant Level Frameworks. Then in 2009, after much deliberation by the workgroup and piloting of and soliciting feedback on the frameworks, the revised CDP and frameworks were implemented in SGH. Coupled with this, were the General Level (GLF) and Advanced Level Frameworks (ALF), each with clearly defined competency standards for the various job grades in the respective pathways within the CDP. The criteria were also set for promotion and include the relevant years of experience, postgraduate education, certification and meeting the respective competency standards. Junior pharmacists utilise the GLF to show frequency of demonstrating competencies in the areas of Delivery of Patient Care, Problem Solving, and Professional Attributes. They subsequently transit onto the ALF which comprise of 6 domains i.e. Expert Professional Practice, Building Working Relationships, Leadership, Management, Education, Training and Development, and Research and Evaluation, with subdomains further categorised into Foundational, Excellence and Mastery competency levels. In the same year, the SGH CDP and frameworks were adopted SingHealth-wide and the CDP now encompasses 4 pathways for a pharmacist to pursue a career in i.e. Professional (administrative), Clinical (including specialists), Education and Research. In conclusion, the CDP and competency frameworks have been

implemented successfully within SingHealth, with the frameworks supporting performance review and the identification of competency gaps. The Singapore Ministry of Health too had adopted the SGH CDP in 2009 for all of its public institutions and plans are currently underway to implement the ALF at a national level.

HPO 22
FAPA2014000305 (Oral)

Antibiotic Therapy Profile in Intensive Care Unit (ICU) Patients with Ventilator-Associated Pneumonia (VAP) at Sungai Buloh Hospital

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VAP is a lower respiratory tract infection which has been one of the common nosocomial infections in ICU worldwide. This study aimed to identify the frequency and distribution of VAP, and the antibiotic therapy profile in VAP patients. An observational retrospective study of VAP patients (n=43) in ICU was conducted from January to June 2013. The patient's demographic data, types of bacteria, as well as antibiotic therapy profile were collected through the eHIS (electronic Health Information System). The highest number of VAP cases was reported in March and April 2013 (25.6%) respectively. Thirty-four (79.1%) male patients were diagnosed with VAP whereas nine (20.9%) cases for female patients. Malays (67.4%) were the majority ethnic group compared to the Chinese (7.0%) and Indian (7.0%). Age group which is most commonly diagnosed with VAP was 13-25 years old (30.2%). The most commonly isolated bacteria were *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, and *Acinetobacter sp*. The most frequently used antibiotic in the early-onset of VAP was Ampicillin/Sulbactam (17.4%); however, in the late-onset of VAP was Ampicillin (16%) and Piperacillin/Sulbactam (16%). In conclusion, based on the demographic result, male, Malays, and age group between 13 and 25 years old had the highest number of VAP cases. From January to June 2013, the highest frequency of VAP cases was documented in March and April. Penicillins were the most common group of antibiotic therapy used in treating VAP patients in this hospital.

HPO 23
FAPA2014000302 (Oral)

Portable Pocket Calendar: Improving Patient Compliance to Oral Antibiotic Intervention Approach

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Noncompliance to antibiotic therapy such as misuse of antibiotics, including failure to complete therapy, skipping of doses, or reuse of leftover antibiotics has led to a significant percentage of medical admissions that were actually deemed preventable. The purpose of this study is to improve patient compliance to a 7-day oral antibiotic therapy through the use of a portable pocket calendar. Sixty outpatients from East Avenue Medical Hospital were used as subjects comprising of 30 patients as control groups subjected to the traditional counselling method and 30 patients as test groups given the portable pocket calendar. Patients were assessed through a given set of pre-test and post-test questionnaires to evaluate their compliance. The statistical parameters that were considered in this study were the patient's demographic profile, history of health compliance to antibiotics, patient's drug information (antibiotic prescribed, dose, frequency), patient's health status (duration of

treatment, healthcare provider, diagnosis, follow-up treatment) and patient's compliance based on the Morisky questionnaire with special questions for the assessment on the usability of the portable pocket calendar. Tabulation on the Morisky data showed that both the traditional and calendar groups were categorised as low in adherence but upon averaging the scores of people in both groups, the calendar group acquired a lower score (5.53) as compared to the traditional group (6.40) thus indicating the former group to have a better adherence than the latter group.

HPO 24
FAPA2014000254 (Oral)

Factors Associated with Hospital Readmission among Older Patients Discharged after Acute Exacerbations of Chronic Obstructive Pulmonary Disease

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Chronic obstructive pulmonary disease (COPD) is associated with exacerbation which is the main cause of hospitalisations especially among the elderly. The purpose of the study was to identify predictors for COPD hospital readmission among older patients discharge after acute exacerbation of COPD (AECOPD). Prospective longitudinal study was conducted in four major hospitals in Malaysia. Older (≥60 years) patients discharged after AECOPD were recruited. Demographic and clinical characteristics were extracted during the index hospital admission. Patients were followed up 3-months after discharge. Eighty one patients were recruited during the one year study period. The median age was 72 (Inter Quartile Range (IQR) 66.4-78) years. Majority of the cohort was representing patients with moderate to severe COPD disease based on the standardised GOLD criteria and comprised mainly males (97.5%). Ethnicity distribution representing Chinese (44.4%), followed by Malay (42%) and Indian and others (13.6%). Almost a quarter (23.5%) was current smokers. Hospital admission due to COPD in the previous year was common (59.3%), of which, 42% of the cohort had ≥ 2 admission (history of frequent admissions). The most common co-morbidities were hypertension (49.4%), diabetes (25.9%) and ischemic heart disease (IHD) (18.5%). The median score for dyspnoea severity among patients was 3 (IQR = 2-4). The median days of hospital stay were 6 (IQR 4-9) days. More than one-third (40.7%) of the patients were readmitted at least once during the follow up. History of frequent AECOPD admission (OR=2.87; 95% CI 1.05-7.85, p=0.040) and IHD (OR=4.04; 95% CI 1.1-14.6, p=0.032) were identified as factors increased the risk of COPD readmission after discharge. High readmission rate was noticed among the elderly cohort. COPD older patients with IHD and history of frequent exacerbation admissions were at higher risk for hospital readmission. Special attention and regular monitoring among those patients are needed.

HPO 25
FAPA2014000253 (Oral)

Metabolomics and Pharmacometabonomics Approaches for Diagnosis of Diseases and Predicting Drug Response

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Complexity and heterogeneity of diseases necessitate the need for novel and more accurate diagnostic methods. A simple, convenient and non-invasive technique will provide comfort to both the physician

and the patient. Metabolomics, the study of all the metabolites in the body, may be an alternative and promising option for diagnosing diseases. Meanwhile, every patient has a unique biology and pathophysiology and may respond differently to different drugs thus this should be reflected in the choice of pharmacotherapy. Pharmacometabonomic, a branch of metabolomics, focuses on the detection of specific biomarkers in the metabolic profile that are associated with the pharmacodynamic/response and/or toxicity of a drug. Molecular information obtained from these analyses may lead to a more targeted therapy including dosing adjustment and therefore may reduce or prevent drug failure, cost and adverse drug reactions. The aim of this presentation is to comprehensively evaluate some of the metabolomics and pharmacometabonomics researches that have been done in our setting to identify disease biomarkers such as for asthma, COPD, male infertility and alcohol dependence and predicting drug response such as for clopidogrel and warfarin. The outcome from these non-invasive approaches is hopefully can lead to the development of point-of-care diagnostics in future and personalized drug treatment.

HPO 26
FAPA2014000313 (Oral)

Hyperglycaemia Management in the Intensive Care Unit: An Evaluation of Insulin Infusion Protocol

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Physiological stress experienced by critically ill patients results in hyperglycaemia. Insulin infusion protocols have been suggested however, glucose control has been inconsistent. Our aim was to evaluate the effectiveness of current standard insulin infusion protocol in critically ill patients. A prospective cohort study was conducted in an adult medical intensive care unit. All adult patients who received insulin infusion were recruited over 9 month period and followed up throughout ICU stays. Variables were collected and glycaemic performance was assessed by percentage of time spent within predefined glycaemic range, prevalence of hyperglycaemia and hypoglycaemia. Clinical outcome was ICU mortality and length of stay. Thirty nine critically ill adult patients with 2799 glucose measurements were recruited. The percentage (%) of time spent in the < 4.0, 4.1-6.0, 6.1-10.0 and >10.0 mmol/L range was 0.6 (0.09-1.1), 9.1 (6.2-12.0), 55.5 (51-60.0) and 32.6 (27.4-37.9), respectively. Hyperglycaemia (% time spent in >10.0 mmol/L) was noted in patient with prior diabetes mellitus (DM) (x=10.658, 95% CI, 0.580-20.736, P< 0.05) and without renal replacement therapy (RRT) (x=12.557, 95% CI, 2.239-22.875, P<0.05). In fact, diagnosis of DM also caused lower % time spent 6.1-10.0 mmol/L (x=-10.029, 95% CI, -18.579- -1.479, P<0.05). Moderate correlation was noted between hyperglycaemia and age (r=-0.326, p<0.05), weight (r=0.365, p <0.05) and HbA1C (r=0.575, p<0.05) whereas % time spent in 6.1-10.0 mmol/L was correlated with age (r=0.399, p<0.05) and HbA1C (r=-0.512, p<0.05). Prevalence of hyperglycaemia (>10.0 mmol/L) was 34.7 % as compare to hypoglycaemia (<4.0 mmol/L) 1.4%. No significant different was noted between glycaemic control and mortality or ICU length of stay. Preliminary result shows an acceptable performance (55% of time spent in 6.1-10.0 mmol/L) of the current standard insulin infusion protocol in achieving target glucose control. Glycaemia changes may be influenced by underlying DM, RRT, age, HbA1C and body weight.

HPO 27
FAPA2014000290 (Oral)

Relationship between Sociodemographic Characteristics with HRQoL in Stroke Patients of the National Stroke Hospital, West Sumatera, Indonesia

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HRQoL is a comprehensive assessment method to understand the disease burden of stroke patients. This study determines the association between sociodemographic characteristics (gender, age, education, and occupation) with HRQoL of the hypertensive stroke patients with or without other comorbidities. The research was conducted between March to May 2014. An amount of 155 patients were participated in this study. The patients were interviewed by using Stroke Specific Quality of Life (SSQoL) questionnaire that has been translated to Indonesian to determine the HRQoL score. Data of patient's gender, age, education, and occupation were collected by interviewing the patients who were confirmed by their medical records. T-test and one-way ANOVA were used to analyse the relationship between sociodemographic characteristics of hypertensive stroke patients with their HRQoL. The 95% confidence interval was taken for the significance. Results showed that education level significantly affected the HRQoL score ($p<0.05$), while gender, age, and occupation were not significantly influenced the HRQoL score ($p>0.1$). Patients who have higher level of education possessed higher average score of HRQoL as compared to those with lower level of education. In conclusion, the HRQoL of the stroke patients is determined by their level of education, but not by gender, age, and occupation.

HPO 28
FAPA2014000320 (Oral)

Specialized Medication Review on Geriatric Patients in a Public Regional Hospital in the Philippines: A Clinical Pharmacists Perspective

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Geriatrics in the Philippines accounts for 6.8% of the population in 2010 with a high percentage of geriatric prescription. High-risk for medication misuse are the geriatric patients, due to the critical nature of their illnesses, polypharmacy, use of high-risk drugs, and a high frequency of changes in pharmacotherapy. On-ward participation of a clinical pharmacist can effectively and efficiently reduce the number of medication errors and related patient harm. This study aims to conduct a specialised medication review on geriatric patients in a regional public hospital in the Philippines and to determine the prevalence of polypharmacy and to identify the most common medications prescribed to the geriatric patients including the clinically relevant pharmacotherapeutic complications presented. Patient medication profile data were collected from Batangas Medical Center. The patients were aged 65 years old and above, admitted during December 2013. The medication reviews were performed with the required parameters: dose, route of administration, dosage form, frequency, administration-techniques, monitoring, occurrence of possible adverse drug reaction and drug interactions, and patient compliance. From the accomplished evaluation, the identified errors were categorised based on ASHP types of medication errors. From the 70 medication profiles reviewed, averages of 10-15 drug orders per medication profiles were assessed. The most common medications prescribed to geriatric patients were those that are indicated for cardiovascular diseases, namely, beta-blockers, diuretics, and ACE inhibitors, as well as those that are indicated for infections. The most common error found was related to monitoring – with potential and significant drug interactions. The skills and competencies of the clinical pharmacist promoted positive outlook in

the importance of medication review in determining consequences due to medication errors thus providing a higher standard in terms of regulating safety and efficacy of the medications and pharmacotherapy.

HPO 29
FAPA2014000186 (Oral)

Review of Best Practices for Next-Generation Sengkang Health Pharmacy

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This study aimed to explore and innovate new ways to bring pharmacy practice to a new frontier at the upcoming Sengkang Health Hospitals, through review of current medication use and related supply chain processes (locally and internationally). Through a series of site visits, focus group discussions and review of evidence with end-users, medical planners and consultants, a range of options were explored. New proposed infrastructural options and workflows were debated on, simulations and test calculations were conducted before fine-tuning into a consensus that was acceptable to all stakeholders. The three categories of focus were: 1) medication safety by closed-loop medication management (CLMM) and knowledge-based medication administration (KBMA) 2) outpatient medication reconciliation and automation and 3) community centred pharmacy services and infrastructure. For inpatient CLMM, KBMA together with automated medication cabinets, ensure medication safety and timely supply of medications. Medications are prepared by pharmacy and delivered to the wards by Automated Guided Vehicles (AGVs) at night, ready for nurses to serve at the morning administration time. For outpatient medication reconciliation will be conducted within clinic floors. This allows for timely pharmacy interventions and ease of collaboration with doctors to optimise pharmaceutical care for patients. For community-centred pharmacy services, steps are taken to cooperate with community partners to bring about affordable and convenient services, e.g. home delivery of mediations, multi-disciplinary home care and online-ordering of medications. Apart from conventional pharmaceutical delivery approaches, we also approached industry partners like Singpost to explore possibility of utilising their 100 island-wide POP station systems for self-collection of medication. Discussions are actively ongoing and a pilot has been planned at the Singhealth Sengkang Polyclinic. The proposals have been incorporated into the Sengkang Health hospital designs. With strong support from Singhealth and continued innovations, we hope to see a more healthy and vibrant community in the North Eastern region of Singapore in 2018.

HPO 30
FAPA2014000101 (Oral)

Advanced Age and Antiplatelets Use are Risk Factors of Upper GI Bleeding among the Elderly

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Upper gastrointestinal bleeding (UGIB) affects a number of elderly patients and results in an increased morbidity and mortality. The objectives of this study were to determine the occurrence of UGIB among the elderly, to identify contributing factors, and the clinical outcome of UGIB among these patients. Combined data were collected prospectively and retrospectively from a geriatric medical ward and a surgical ward in a tertiary hospital for a period of 6 months. Of the 766 patients (362 males [47%]; mean age 74.3 years) recruited during the study period, 80 (10.4%) patients were noted to develop UGIB. Patients of advanced age (OR 1.72, 95% CI 1.00-2.95; p=0.047) and those

who received antiplatelet drugs therapy (OR 1.8, 95% CI 1.11-2.88; p=0.005) were at a higher bleeding risk. Moreover, the odds of UGIB was 2 times higher given aspirin administration compared to no aspirin administration (95% CI 1.23-3.30; p=0.005). The duration of antiplatelet agents use, however, did not contribute significantly to a higher bleeding risk (OR 0.90, 95% CI 0.42-1.94; p=0.804). Previous history of gastrointestinal diseases was the most common risk factor (46.3%) presented in the case subjects. Mortality of patients with UGIB was 15 or 19%. Only 2 deaths or 13.3% were directly caused by UGIB while the remaining 87% were due to intercurrent illnesses. In conclusion, elderly with a previous history of GI diseases and on antiplatelet agents in particular aspirin, are at a higher risk of developing UGIB. The risk of bleeding may outweigh the benefit in some patients. Therefore, the decision to use antiplatelet agents in particular aspirin among the elderly must be more individualized to reduce the risk of UGIB.

HPO 31
FAPA2014000021 (Oral)

The Quality of Life Measurement on Hypertension Patients in a Primary Health Care of Cirebon City Using Time Trade Off Method

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One of the treatment's outcomes in hypertension disease is to increase patients' quality of life during the hypertension treatment. Thus, using the appropriate method to measure patients' quality of life became the important issue in hypertension treatment. This study was conducted to understand hypertensive patients' quality of life in a primary health centre using Time Trade Off (TTO) method. A cross-sectional study was conducted over two months. Adult hypertensive patients who had been treated with antihypertensive agents for at least for 6 months, were recruited from a Primary Health Centre of Cirebon City. Two scenarios of TTO were used: A) patient can live in a very good health for 5 years without medication, followed by death and B) patients can live in a good health for 10 years with medications, followed by death. This design was arranged according to the preliminary study in hypertensive patients. Besides using TTO, SF-36 questionnaire was used to understand the patients' quality of life according to the TTO. A total of 27 subjects were recruited, with the following characteristics: 78% were female; 52% were above of 50 years old; 38% were covered by national health insurance; 72% have complications and 48% were in stage 2 hypertension. More patients (67%) choose B of the TTO and the patients in this group had higher quality of life (73.96 ± 13.73) than those who chose A of the TTO. However, there was no significant difference in patients' quality of life between those who chose A or B of the TTO (*p value*= 0.384). In conclusion, hypertensive patients in a primary health centre of Cirebon city preferred to take antihypertensive medications to maintain their health and to achieve a better quality of life.

HPO 32
FAPA2014000215 (Oral)

Effects of Warfarin Dose Adjustment on the International Normalized Ratio (INR) Target Achievement in Thai Patients: A Preliminary Study

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Warfarin is the standard treatment for thromboembolism. Factors that affect INR were drug - drug interaction, underlying diseases, body weight, adherence and VKORC1 polymorphism which is associated with an individual warfarin dose. The 9th edition of ACCP guideline for antithrombotic therapy and prevention of thrombosis recommended that warfarin dose should be adjusted by 5% -

20% of previous total weekly dose (TWD). Currently, the optimal warfarin dose adjustment in Thai patients is still unknown. This study aimed to evaluate the effects of warfarin dose adjustment on INR target achievement among Thai patients. The present study was a preliminary observational retrospective study conducted in Hua-Hin hospital, Thailand. The patients who were included in the study received warfarin therapy during January 2013 – July 2014. The INR of these patients were not accomplished the target range of 2 – 3. The patients in the present study must not have any factors that affect the INR. INR values and the percent change between the previous TWD and the TWD after dose adjustment were observed. Forty-two patients were included in the present study. The mean age was 61.57±16.82 years. 28 patients (66.7%) had atrial fibrillation. More than 90% of the patients achieved the target range of INR 2-3. Twenty-six patients (61.9%) received warfarin dose adjusted by 5% - 20%, 16 patients (61.54%) achieved the target range. Others received warfarin dose adjusted more than 20% (16 patients, 38%), 9 patients (56.25%) achieved the target range. The patients who received warfarin dose adjusted by 5% - 20% had more opportunity to achieve the expected target range of INR than the other group. The present study is a preliminary study, therefore the further prospective study is needed.

HPO 33
FAPA2014000214 (Oral)

Initiation and Evaluation of Patient Reporting ADRs in Out Patient Department of a South Indian Tertiary Care Teaching Hospital

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In Post Marketing Surveillance (PMS), patients are key elements in tracking about ADR information. Studies have corroborated that sensitization and motivation of patients will increase the reporting of suspected ADRs and increase the knowledge about the potential harm of drugs. The objective of this study was to initiate and evaluate patient reporting of suspected ADRs in an ambulatory care setting. In this prospective observational study, patients visiting out-patient Medicine department were briefed about study after obtaining their written informed consent. Patients were advised to inform the investigator in case if they have experienced any unpleasant drug effects. The investigators collected all the necessary data on patient's call and analysed the data for establishing causality, type of reaction, outcome and fate of the suspected drug. Descriptive statistics, T-test and Chi Square test were used to perform the analysis of findings. During the study period, 1125 patients were enrolled and 128 patients called back and reported 95 ADRs [response rate 8.44%]. The mean age of the study population was 50.14% +/- 16.39 years. Female patients [54 (57%)] reported more ADRs than males [41 (43%)] [P = 0.001]. Patients in the age group of 40-60 [38 (40%)] reported more ADRs. Patients with UG education reported more ADR (38.8%). Majority of the reported ADRs were associated with GI [34 (35.78%)] and Skin & Appendages [22 (23.10%)]. A comparison of the Modified Hartwig & Siegel plot of patient reported ADRs with that of physician reported ADRs suggest that reports from physician include more of *Moderate* (57.57%) in nature compared to patient reports which more often included *Mild* reactions (66.15%) [T-test (0.986)]. The research findings suggest that patients' sensitization will improve patient reporting of ADRs. This will also strengthen the pharmacovigilance activity of the country and results in safer use of medicines.

HPO 34
FAPA2014000131 (Oral)

A Multicentre Analysis on Factors Affecting Anticoagulation Control and Adverse Outcomes among Warfarin MTAC Patients in MOH Facilities, Malaysia

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Warfarin Medication Therapy Adherence Clinic (WMTAC) in Ministry of Health (MOH), Malaysia was first introduced in 2005 with the aim to optimize anticoagulation therapy. Anticoagulation control and adverse outcomes have been the main determinants of the effectiveness of long term warfarin management in outpatient setting. Thus, it is imperative to recognise patients' variability that could lead to inadequate anticoagulation control and occurrence of adverse outcomes. The objectives of this study were to explore any differences in weekly dose and anticoagulation control between patients' unmodifiable factors (age, race and indication) and to identify factors associated with bleeding and thromboembolic complications in WMTAC patients. Data were collected from 36 MOH facilities. Patients were enrolled if they are actively followed up and had been taking warfarin for at least 3 months prior to January 2012. Patients' demographics, INR values, bleeding and thromboembolic history were collected from patients' medical record or INR booklet. The expanded INR range (±0.2) was used to calculate TTR using Rosendaal linear interpolation method. All relevant variables were analysed against the intended parameters. A total of 1589 patients (mean age; 60 ±13.65) were included in the study. The main indication was atrial fibrillation (67.1%), followed by prosthetic heart valves (23.4%). The youngest patient group (15-30 years old) have the highest mean weekly dose among the age groups ($p<0.001$). Besides, Indians have the highest mean weekly dose whereas Chinese have the highest TTR compared to other ethnicities ($p<0.001$). Bleeding events were seen more in patients with inconsistent diet and those taking alternative medicines compared to their counterparts ($p<0.001$). Additionally, non-compliant patients and those with inconsistent diet have 2.3 and 2.9 times the chance to have thromboembolic events respectively compared to their counterparts (95% CI=1.11-4.57, p=0.024; 95% CI=1.37-6.18, p=0.006). In **c**onclusion, knowledge on the factors that could compromise anticoagulation control and contribute to adverse outcome would assist on improving the service.

HPO 35
FAPA2014000318 (Oral)

Medication Review Impact on Medication Appropriateness Index in Hospitalized Balinese Elderly Determined by the STOPP/START Criteria

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Indonesia has the fourth highest elderly population in the world. Inappropriate prescribing can lead to medication errors in elderly patients. Pharmacists can contribute by conducting medication review in

preventing the occurrence of medication errors. STOPP/START can be used as a guide to conduct medication reviews but their effectiveness has not been tested in Indonesian. This study aimed to find out if medication review using STOPP/START as a guide can improve the Medication Appropriateness Index (MAI), reduce the risk of ADR (gerontonet score), and Length of Stay (LOS) in elderly patients. An NRCT was conducted over a 3-month period using consecutive sampling. The outcomes measures assessed were MAI, gerontonet score and LOS. A total of 63 patients were included inthis study: 33 patients in the control and 30 patients in the intervention groups. Both groups were comparable. There were significant differences between the control and intervention group on measures of MAI ($p < 0.001$), gerontonet score ($p = 0.003$) and LOS ($p = 0.011$). MAI mean values were 9.94 ± 6.14 and 2.97 ± 2.25 after intervention. Gerontonet score mean values were 5.18 ± 2.10 and 3.33 ± 2.28 after intervention. LOS mean values were 14.18 ± 9.97 and 7.63 ± 3.00 after intervention. Thirteen out of the 33 patients experienced ADRs in the control group and 3 out of 30 in intervention group. STOPP / START used as a guide for medication review can improve the medication appropriateness index, and reduce the risk of ADRs and LOS.

HPO 37
FAPA2014000180 (Oral)

Factors Influencing Hospital Formulary Decision-Making: A Preliminary Study in Thailand

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Effective hospital formulary management is a widely accepted mechanism to contain cost and to assure rational drug use. In Thailand, limited evidence on decisive factors for the Pharmacy and Therapeutics Committee (PTC)'s decision making has been disclosed. The objective was to identify decision-making factors of the PTCs on hospital formulary (HF) inclusion**.** This preliminary study was conducted using a content analysis of the PTC's meeting minutes, voice records (if any), during 2012 – 2013. Two public hospitals were purposively recruited, including a 1,200-bed university hospital (UH) and a 305-bed provincial hospital (PH). The justification for selection of new drug items was determined by particular groups of drugs. The total numbers of drug items in the HF were 2,164 (UH), and 550 (PH). The ratios of drug items in the National List of Essential Medicines (ED) and not in this list (NED) were 56:44, and 81:19 respectively. There are 156 new drug items of 2 hospitals including 57 ED and 99 NED items. Most of the new drug items were included in the HF with only one reason (61 items, 62.2%). For these drug items were based on cost (36.8%) and compliance (24.6%), indication (24.6%), and others. Only 31 drug items (31.6%) were selected by two reasons, including cost (58%) with efficacy (25.8%), compliance (12.9%) or other reasons. Me-Too drugs that selected were 59.4% and New Chemical drugs (NCs) were 40.3%. %ED:NED of NCs were 25.4:74.6 and Me-Too drugs were 44.1:55.9. The most of the influential factors in NCs were efficacy and Me-Too drugs were cost (38%), but cost was the least in NCs (8.9%). In conclusions, cost, compliance, and efficacy seems to be the imperative decision-making factors for new drug items selection to include in the HF. Further studies are needed to triangulate these findings with other sources of information.

HPO 38
FAPA2014000158 (Oral)

Potentially Inappropriate Medication in Elderly Outpatient Prescriptions at a District Hospital in the South of Thailand

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Thai elderly patients have grown rapidly for decades, as well as, the rise of chronic diseases. Accordingly, multiple medications were required that, consequently, caused medication-related problems among those elderly patients. This study aims to know the prevalence of, and to describe patient's factors associated with prescribing potentially inappropriate medication (PIM) at a district hospital in the South of Thailand. A cross-sectional study with retrospectively prescription data during October 1, 2011 to September 30, 2012 were retrieved from a district hospital in the South of Thailand. Participants, as hospital outpatients, aged 65 years or more, who had at least 1 prescribed medication during the study period. 430 out of 5,265 participants were randomised and their 2,128 prescriptions were assessed regardless of multiple counts of PIM in each participant. Unconditionally Beers criteria 2012 were applied for screening PIM. Of all participants, 39.1% were female; 53.7% aged 65-74 years; 49.8% had at least 1 PIM. Most PIM prescriptions were observed in mental and behavioral disorders, while lorazepam were frequently prescribed. There were significant differences of number of prescribed medications, outpatient visits and diagnoses between PIM users and non users (Chi-square, $p<0.001$). Futhermore, there was the more likelihood of PIM users increased significantly when they were prescribed more medications during the study year (Logistic regression, B=0.219, 95%CI=1.157-1.339, $p<0.001$). No statistically significant association of PIM and patient's gender, age, number of diagnoses, health insurance schemes, and hospitalizations. Almost 50% of the elderly outpatients had at least 1 PIM across 1 year. It is obviously that the number of medications had a strong association to PIM prevalence. Therefore, all prescribers should weigh benefits to risks of medications prior to prescribe them to elderly patients. To be more specified, however, a country-modified criteria with conditional patient's disease are recommended in order to apply for decision-making in clinical practice.

HPO 39
FAPA2014000161 (Oral)

Role of Pictograms in Educating Diabetic Patients about Medication Use and Lifestyle Modifications

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The study examined the role of pictograms in educating diabetic patients about proper medication use and lifestyle modifications. The prospective-observational comparative study of 6-month duration was undertaken with 100 participants for Phase-1 (Survey with discussion; n=100) to select the best understood pictograms from the 24 pictograms chosen for the study. This set was carried out for Phase-2 (one-on-one interview; n=100), which had Guessability and Translucency as its components. Guessability study was carried out in 50 diabetic patients and their response to pictograms was recorded in a 3-point Likert scale. Modifications were made to the pictograms based on the difficulties faced by the patients in understanding the pictograms. These modified pictograms were used for Translucency study and result was obtained using 5-point Likert scale. Student t-test and Chi-Square test using SPSS 19 were used to analyze the data. The results of this study show that pictograms are generally well understood by the diabetic patients when the intended meaning of the pictograms are explained and are accompanied with text. The statistically significant p values were

obtained only with levels of education in both Guessability (0.040) and Translucency (0.050). The overall Guessability (all pictograms included) was 69.6% and the overall Translucency was 90.9 %.

HPO 40
FAPA2014000208 (Oral)

Response to an Initial Dose of Warfarin in Thai Patients Undergoing Long-Term Anticoagulant Therapy

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It is important to accomplish a goal of therapeutic international normalized ratio (INR) with warfarin treatment because of the benefit in thromboembolism risk reduction. This study aimed to describe the efficacy and safety of initial dosing of warfarin in Thai patients. A retrospective study was conducted at Hua Hin Hospital, Thailand. Patients who were at least 18 years old and initiated warfarin therapy from June 2012 to June 2014 were eveluated. Initial dose of warfarin was adjusted by the physicians. Patient demographic data, warfarin dosing, INR values, and drug interactions were collected. The patients needed to have 2 follow up visits consecutively which no longer than 12 weeks apart. The target INR of 2.0-3.0 or 2.5-3.5 was the primary endpoint. Bleeding complication, subtherapeutic or supratherapeutic INR values were the secondary endpoints. Of 55 patients, 28 (50.9%) were males. The mean age and body weight were 61.3$\pm$ 13.8 (22.0-85.0 years) and 61.5 $\pm$ 12.2 (41.0-95.0 kg), respectively. Atrial fibrillation was a majority of indication for warfarin therapy (70.9%). The mean initial dose of warfarin was 2.5 $\pm$ 0.6 (1.0-3.0 mg). Thirty patients (54.6%) received 3 mg of warfarin as the initial dosing of therapy and 30.9% of the patients received 2 mg of warfarin. However, only 13 patients (23.6%) were achieved the target INR. Interestingly, the most of patients (76.8%) had INR values out of the target range; subtherapeutic and supratherapeutic INR values were 63.6% and 12.7%, respectively. None of the patients had major bleeding, while 3 patients (5.5%) had minor bleeding during the follow up period. Although recent evidence suggested that an initial dose of warfarin use as 2 or 3 mg might be relatively less effective, the clinicians should consider patient specific factors prior to making a decision for an initial warfarin dose.

HPO 41
FAPA2014000063 (Oral)

A Preliminary Study of Comprehensive Pharmaceutical Care among Hospitalized Elderly Patients

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Currently, studies of pharmaceutical care focusing on elderly patients with multi-comorbidities and polypharmacy are rare and usually fragmentary. The aim of the study was to establish the assessment protocol of comprehensive pharmaceutical care. We enrolled hospitalized patients aged $\geq$ 65 years in a geriatric ward from a medical center in southern Taiwan. After interview with patients and caregivers by pharmacists, the drug utilization evaluation was conducted using the assessment form of

comprehensive pharmaceutical care. The following contents of the evaluation were included: 1) Reasonability of drug utilization; 2) Potential association between medications and geriatric syndrome; 3) Potentially inappropriate medications based on STOPP & START criteria; 4) Patient education and feedback. A total of 60 patients were recruited. The mean age was 82.5±7.5 years, 50% were female. Total number of prescribed medications assessed was 780 and a mean of 13±4.8 medications per patient during hospital stay. The application of comprehensive pharmaceutical care identified consisted of 15 types of 249 medication problems, including crushing the non-crushed medications in 77 (30.9%), potential association of geriatric syndrome and medications in 43 (17.3%), dosage adjustment according to renal function in 21 (8.4%), and medication-related abnormal laboratory data to be followed up in 20 (8%). During the hospital stay, 28 (46.7%) patients received ≥ one inappropriate medications by STOPP criteria and 15 (25%) medications needed to be added by START criteria, with a total of 58 medications detected by both criteria. Calcium channel blockers in 11 (18.3%) patients with chronic constipation were the most common by STOPP criteria. Antiplatelet therapy was used by 7 (11.7%) diabetic patients with co-existing major cardiovascular risks based on the START criteria. The application of comprehensive pharmaceutical care might detect medication problems among hospitalized elderly patients. Further study to clarify the effects of the suggestions by pharmacists for medication problems is needed.

HPO 42
FAPA2014000213 (Oral)

The Prevalence of Febrile Neutropenia due to Etoposide, Methotrexate, Actinomycin-d, Cyclophosphamide, Vincristine (EMA-CO regimen) among Patients with Gestational Trophoblastic Neoplasia: A Report from a Single Medical Teaching Hospital in Thailand

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According to a very few reports of febrile neutropenia (FN), this study aimed to determine the prevalence of FN among patients treated with the combination of etoposide, methotrexate, actinomycin-d, cyclophosphamide and vincristine regimen (EMA-CO regimen). The patients with gestational trophoblastic neoplasia who received EMA-CO regimen during January 2010 – July 2014 at Siriraj Hospital, Bangkok, Thailand, were reviewed retrospectively. FN was defined as the patient with absolute neutrophil count below 500 cell/mm^3 become febrile (single oral temperature ≥38.3°C or ≥38°C sustained over 1 hour). During the study period, ten female patients, 78 cycles of chemotherapy were evaluated. The patients' median age was 34.5 years (range 21-49 years). The prevalence of FN was 1 of 10 cases (10%) or 1 time of overall 78 cycle (1.3%), respectively. The FN occurred in the fifth cycle. Such patient had positive blood culture with *Streptococcus pasteurianus, Klebsiella pneumoniae, Escherichia coli, Pseudomonas aeruginosa* identified. Neutropenia grade 3 and 4 occurred in 70% (7/10) and 50% (5/10), respectively. The FN in patient with EMA-CO regimen was 10%. This number seems to be intermediate risk of FN based on National Comprehensive Cancer Network (NCCN) criteria. Therefore, the granulocyte-colony stimulating hormone may be used for primary prophylaxis among these patients.

HPO 43
FAPA2014000042 (Oral)

The Relationship of Pain and Sleep Quality in Opioid Dependent Patients on Methadone Maintenance Therapy (MMT)

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Opioid dependent patients on methadone maintenance therapy (MMT) have been reported to complain about pain and poor quality of sleep. Data on pain intolerant and poor sleep quality among MMT patients in our population are largely unavailable. This study investigated pain sensitivity and quality of sleep in this group. A total of 168 opioid dependent patients from MMT clinics in Kelantan, Malaysia completed the study. Pain tolerance to cold pressor test (CPT) were evaluated at 0 hour and at 24 hours after the first CPT. Malay version of the Pittsburgh Sleep Quality Index – PSQI and the subjective opiate withdrawal scale (SOWS) questionnaires were administered for the evaluation of quality of sleep and withdrawal symptoms, respectively. The mean age of the study participants was 37.2 (range: 25 - 55) years old. The mean daily methadone dose was 76.6 (range: 20 - 360) mg/day. The mean averaged SOWS score was 5.4 (range: 0 – 48). The averaged pain tolerance time ranged from 7 to 300 seconds with a mean time of 32.2 (SE 2.72) seconds, slightly below a cut-off score of 37.14 seconds. More specifically, 78.6% (n = 133) of subjects were identified as 'pain-sensitive' (averaged pain tolerance time = 37.14 seconds), and 36 (21.4%) had averaged pain tolerance time > 37.14 seconds, indicating 'pain-tolerant' subjects. The mean global PSQI score was 5.47 (range: 0 – 14). The pain-sensitive patients reported poorer sleep quality compared with pain-tolerant patients (t (df) = 2.88 (165), p = 0.005). However, the mean SOWS scores were similar in pain-sensitive and pain-tolerant opioid dependent patients (t (df) = 1.14 (168), p = 0.256). Opioid dependent patients on MMT represent a pain-sensitive subset of clinical patients. Results also provide evidence that pain-sensitive patient was associated with poorer sleep quality.

HPO 44
FAPA2014000237 (Oral)

Comparative Study of Changes in Hepatic Profile Induced by Liposomal Doxorubicin Versus Conventional Doxorubicin Based Regimens in Cancer Patients

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The study aimed to compare the liposomal doxorubicin with conventional doxorubicin to see their relative effects on hepatic profiles. In this retrospective observational study, computerized records of cancer hospitals were utilized to check patient demographic details, diagnosis, treatment and laboratory findings. Liver functions were assessed by analyzing pre and post drug therapy values during the course of 4 different cycles (cycle 1, cycle 2, cycle 3 and cycle 4). After applying paired t-test through SPSS version 21, overall no significant changes in liver enzymes and proteins in patients

receiving liposomal doxorubicin ($p>0.005$) were observed. However, a marked increase in liver enzymes levels ($p<0.005$) and a noticeable decrease in total protein and globulin ($p<0.005$) levels in patients receiving conventional doxorubicin were observed – exasperating liver damage. Doxorubicin induced hepatic dysfunction is more prominent in the elderly patients of age groups ranging from 41-68 years. Moreover, it is pertinent to mention that the study outcome has far reaching implications on current health practices focusing on cancer therapeutic management, patient disease prognosis and the pocket friendly management of the finances.

HPO 45
FAPA2014000043 (Oral)

Evaluation of the Safety of Excipients in Drugs for Infants

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Excipients are inactive substances formulated alongside a pharmaceutical compound, have long been added to be part of drugs, and considered inert and pharmacologically inactive. However, as infants have immature hepatic and renal function, there have been more and more evidence suggesting that some excipients may not be safe for infants, leading to their accumulation and resultant toxicity. A review of clinical studies was conducted through Medline 2.0 database from 1860 to May 2014, using keywords of "drug additive" and "toxicity"; "drug additive" and "poison"; "excipient" and "toxicity"; and "excipient" and "poison", respectively, and found different numbers of journals for each matched term. Abstracts of these journals were reviewed, and excipients which had caused major toxicity, or are not recommended for use in infants, were recorded. Benzyl alcohol, propylene glycol, and ethanol, as safe excipients in medicines for adults, were noted to have induced major toxicity or even death in infants. Parabens and sodium metabisulphite drew mixed results. A prescriber should be aware of the potential adverse reactions caused by excipients. Critically ill infants, especially those receiving medication by continuous infusion are at great risk. Constant observation and evaluation of medication used in infants is essential for drug safety.

HPO 46
FAPA2014000296 (Oral)

The Geriatric Clinic Care Program: An Approach to Maintaining Good Health and Quality of Life

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The Geriatric Clinic aspires to address the health care needs of the geriatrics through provision of free medical services. We commit to providing the patients with access to free health services and medications, and to promote activities and lifestyle modifications for a better quality of life. The Geriatric Clinic advocates proper care to reach out to the elderly and improves overall well-being through education, diagnosis and prevention of diseases and provision of appropriate management and specific care to ensure the improvement of quality of life. The programme was conducted at the St. John's Home for the Elders, Quiapo, Manila, Philippines between September 2013 and January 2014 and was divided into four phases. Phase I comprised of patient profiling and consultation. Patient profiling included patient demographic data, patient history, adherence to medication, eye examination, vital signs, SF-12 (a measurement of patient's limitation of activities), and

chronotyping. Doctors assessed patients and recorded their corresponding management. Phase II focused on providing diagnostic tests which included X-ray, ultrasound, and electrocardiogram. Phase III comprised of communicating diagnostic test results and giving management plan for patients, together with medicines and medication information. Phase IV comprised of follow-up monitoring, and seminars on nutrition, exercise, and sleeping habits. Activities which included showcasing of talents, games and activities, and lunch were given to the beneficiaries. Volunteers quantified the effect of the interventions. Results showed that medication adherence rate was found to be high among patients after an intervention, and poor adherence rate was found to affect BP control. However, this was found to be inconclusive because of very small population. Patient demographics showed that the population exhibits a high prevalence of hypertension and diabetes. The community was endorsed to Hypertension clinic and Diabetes Clinic. Overall we conclude that the patients' quality of life improved.

HPO 47
FAPA201400324

Medication Administration Errors: An Unsolved Issue of Pharmaceutical Care

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The frequency of medications errors in the medication use cycle based on the Unit of Dose System to reduce medication errors is still questionable. This study aimed to determine the incidence, types of medication administration errors in the implementation the Unit Dose System and to identify the frequency and the potential risk factors. This is a prospective disguised observational study of nurses preparing and administering drugs in three wards at a 314 bedded district hospital in Negeri Sembilan. The nurses were followed by a clinical pharmacist of three medication rounds on each day for 10 days per ward. Main outcome were number, type of errors and associated risk factors. Medication administration error rate was calculated with and without wrong time errors. Relationship between the occurrence of errors and potential risk factors were investigated using logistic regression models. The most common type of prescribing and dispensing errors were incomplete prescription (59.6% of all errors) and labelling errors (95.2% of all errors). A total of 1313 opportunities for errors were observed and 398 administrations with one or more errors were detected. This gave a calculated error rate of 30.3% if wrong time error is excluded, the error rate reduced to 26.2%. The most common types of medication administration errors were wrong administration techniques (64.6%; mainly fast bolus administrations and wrong-technique errors (dietary restriction). In multivariate analysis, the occurrence of errors was associated with day of observation, patient age, administration route, ATC medication class, MOH drug category, and administration time. Medication administration errors are frequent and pharmacist involvement is critical to ensure the desired pharmaceutical care outcome.

HPO 048

FAPA2014000238 (Oral)

The Assessment on the Usage of Complementary and Alternative Medicine among People Living with HIV in Metro Manila

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HIV is a virus that suppresses the immune system of an individual who has the disease which could make them weak and susceptible to other infections. Antiretrovirals are often used as treatment for the disease but with the rising popularity of Complementary and Alternative Medicine (CAM) which is a group of diverse medical and health care system that are not part of conventional treatment, People Living with HIV(PLHIV) tend to use these systems to help them with their condition. This study aims to assess factors that affect the use of CAM by PLHIV. A cross sectional study was conducted and participants were from non-government organizations which caters PLHIV who gave their approval to conduct the study in their respective organisation. In order to assess the factors that may affect their use of CAM, an adapted questionnaire was used to conduct a survey in two NGOs in Metro Manila with total respondents of 91. The survey questionnaire was pre-tested and validated by people with expertise to CAM and HIV/AIDS. Data collected were analysed using SPSS for windows version 21. Results showed that there is no association with the socio-demographic factors to the use of CAM by PLHIV. Level of Benefit and Level of source of Awareness showed a significant effect on the reason of CAM use. CAM is used by PLHIV for promoting their health status and boosts their immune system. The level of benefit they get from using CAM specially on alleviating side effects from the conventional therapy provokes them to make use of this system, also their source of awareness to this medications and alternative systems affects their use of CAM while their socio demographic factors does not have a significant effect on why these people resort to using CAM.

COMMUNITY PHARMACY

CPO 01
FAPA2014000135 (Oral)

Profile Components of Drug Information Service by Pharmacists for Prescription Service in Pharmacy Klojen Subdistrict Malang

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Drug information service is a service activity that must be performed by pharmacists to provide accurate information and consultation. On prescription service, medicines given are not always accompanied by a package that includes drug information, so that the role of pharmacists in this aspect is very important in ensuring the goals of treatment and the correct use of the drug. This study was design to identify the components of drug information services and the existing obstacles in the implementation of drug information service by pharmacists on prescription in the pharmacy services. A prospective observational study was conducted at Pharmacy Klojen subdistrict Malang for 2 months, from February to April 2013. Apothecary that conducts service prescriptions of doctors and dentists for at least five sheets of prescription and any pharmacists in the pharmacy at the time of prescription service, were eligible for this research. The components of drug information services delivered by most of the pharmacists were the condition of use, duration of treatment, frequency of drug use, and drug dosing. In addition, 70% were related to information on side effects, 50% on activities that should be avoided during therapy, 30% on food and beverages which should be avoided during therapy, 10% on drug storage and contra indications. The most common obstacles in the implementation of drug information services were patient in a hurry (81.8%), educational background of patients (63.6%) and patient age (54.5%). In conclusion, a component of drug information services provided by pharmacists on prescriptions has not been fully conveyed in accordance with the existing regulations.

CPO 02
FAPA2014000030 (Oral)

Consumers Knowledge, Perception and Satisfaction towards the Role of Community Pharmacist as Healthcare Provider in Basco, Batanes

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Community pharmacists are the most accessible point in patient-centered healthcare. However, most Filipinos have the perception that community pharmacists are merely a vendor of drugs, making them as "underutilized" healthcare professionals. This study sought to determine the perception, satisfaction and knowledge of consumers towards the role of community pharmacists as healthcare providers in Basco, Batanes, and to compare the performance of the community pharmacists as healthcare providers with the mandated roles by the World Health Organization (WHO). Qualitative and quantitative sampling methods were done. Data were collected using self-administered questionnaires from six selected community pharmacies, 56 consumers and four randomly selected participants in the Focus Group Discussion. The questionnaire used was from a published journal that was translated into Filipino language, validated, pre-tested and reliability tested. The results indicated that respondents' age, educational attainment and gender did not significantly affect their levels of perception, knowledge and satisfaction. The results of the study showed that the consumers in Basco, Batanes have an overall positive perception (95%), satisfaction (57%) and knowledge (82%) towards the role of community pharmacists as healthcare providers. However, a majority of the consumers

perceived the pharmacist as merely a vendor of drugs. There was also an observed relationship between knowledge, perception and satisfaction. It can be concluded that despite the geographic isolation of Batanes, consumers in Basco had an overall positive knowledge, perception and satisfaction on the role of community pharmacists as healthcare providers. There were no gaps between the practices in the island with that of the mandated roles by the WHO. Moreover, as the consumers' knowledge increases, the more their perception increases, therefore satisfaction also increases. Patient-centered approach programmes should be developed to improve consumers' impression towards the proper utilization of community pharmacists to achieve better health outcomes.

CPO 03
FAPA2014000134 (Oral)

Comparing the Onset of Action and Duration of Action of Available Topical Patches to Ease Muscle Strain in Groups of Subjects between 20-40 years old

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The Indonesian market is flooded with products used to treat or ease muscle strain, and most of them are topical including patch. Patch is likely to become the consumer's choice because it is easy to use with earlier onset and longer duration of use compared with gel or cream. The aim for this study was to determine which available analgesic patch with active ingredient capsaicin that has the earliest onset and the longest duration of action by a consumer test done to a particular group of subjects. Subjects (n = 237) between 20-40 years old were assigned to three different hot patch groups, patch A vs B, A vs C and A vs D. Subjects were chosen randomly and patch was assigned to each subject using double-blinded to minimize bias. Subjects were asked to apply the patches on their back, which is a body area that often has muscle strain, and then fill the questionnaire to determine which patch has the earlier onset of action and the longest duration of action. The method has been approved by Health Research Ethic Committee, Medical Faculty of University of Brawijaya. Hypothetical analysis using Mann-Whitney U test showed that there were statistically significant differences between onsets of action of hot patches in group A vs B ($p=0.012$), A vs C ($p=0.000$) and A vs D (0.006), but there were no significant differences in duration of action for the three groups. There were statistically significant differences in onset of action of available analgesic patches in the market but there were no differences in duration of action from a consumer test done to a particular group of subjects. Those differences can happen due to different formulation of each patch and also different characteristics of active ingredients and excipients from different suppliers.

CPO 04
FAPA2014000114 (Oral)

Evaluation of Drug Information Services in Community Pharmacies using Simulated Patient Method: Amoxicillin Antibiotic and Oral Corticosteroid

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Drug information services have become an integral part of community pharmacy practice. In providing information to consumers with prescriptions, pharmacists have to fulfill the minimum practice standards, such as information request (questions pharmacists should ask the patients) and information provision (information on medicine that pharmacists should give to the patients). The aim of the research was to measure the quality of drug information services given by the community pharmacists in amoxicillin antibiotic and oral corticosteroid prescription-based products. The research

was assessed using simulated patient method. Trained simulated patients, instructed to play their roles according to a scenario, visited 55 voluntarily participating community pharmacies in Banyumas Region, Central Java States, Indonesia. They requested a prescription-based product: amoxicillin antibiotic and oral corticosteroid. The pharmacists drug information services recorded in audio taped. Immediately after each visit, the researcher filled a check list form to measure the quality of drug information services given by the pharmacists based on simulated patients information recall. The evaluation criteria were the information content, where the pharmacist's information request and provision. The pharmacists rarely asked the simulated patients any questions. The simulated patients were asked what is the symptoms (49,09%), for whom the product was for (23,64%), allergy status (9,09%) and the medication they have used before (9,09%). However, information provision was more common. The most frequently provided information was the dosage (92,73%) and antibiotic information (80,00%). The quality of drug information services given by the pharmacists was good as classified for 28 of the 55 participating pharmacists. The information request was less than provision information that should be asked by pharmacists to patients. The information of antibiotic amoxicillin is more frequently provided by pharmacists than oral corticosteroid.

CPO 05
FAPA2014000226 (Oral)

Pharmacists Counselling Advantages on Medication Adherence and Non-Pharmacologic Interventions

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Patient counselling ensures the safe and effective use of medicines by providing a framework to allow an in-depth exploration of the patient experiences, views and medication use. Interventions were performed in a community-based hypertension programme model. The aim of this study was to evaluate the effectiveness of face-to-face counselling on medication adherence and lifestyle improvements of patients. The patients were assessed at baseline and at several phases of interventions. Patients' demographics, family/social history, blood pressure (BP) and medications were noted. Lifestyle interventions (exercise/nutritional seminar) were delivered as well as pharmacy care and counselling. The pharmaceutical care counselling template documented the improvement on medication adherence and patients' lifestyle. Patient satisfaction survey was conducted. After 5-phases intervention, there were a total of 30 patients. Seventeen (57%) patients had significantly decreased BP. Of the 7(23%) known smokers, 4(57%) ceased the habit while the rest continued smoking. Of the 11(37%) known alcoholic drinkers, 5(45%) stopped drinking habits; 10(33%) patients lessened salt and oil consumption while 6(37%) patients completely avoided it. Sedentary lifestyle was not noted within the community. Based on the Morisky Medication Adherence Scale, 24(80%) patients adhered to their medication regimen. After counselling, their implementation was associated with improved lifestyle and the modifications were acceptable. Most stated that they have adopted the changes. Pharmacist-led face-to-face counselling had a positive impact on patients' medication adherence and lifestyle modification. It is effective in controlling BP and improving self-efficacy in the management of condition and quality of life.

CPO 06
FAPA2014000249 (Oral)

Evaluation of Different Inhalational Delivery Devices Techniques among the Community Pharmacists in Urban Areas in Selangor, Malaysia

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The right inhalational delivery devices techniques are vital to ensure the inhaled drug particles reached the targeted site to produce desired therapeutic action. As one of the front-line health professionals, pharmacists must be able to directly demonstrate and educate correct technique of using various inhalational delivery devices to patients with respiratory diseases especially asthma and chronic obstructive pulmonary disease. This study determined the knowledge level of the community pharmacists regarding their ability to educate patients on how to use the metered dose inhaler (MDI) and dry powder inhalers (DPIs), mainly accuhaler and turbuhaler. Data were collected from January until May 2013. Post signed consent, the community pharmacists completed the given questionnaires which consisted of study socio-demographic data. The verbal demonstrations of the respective study inhalers were recorded and transferred to inhaler checklist for scoring. Descriptive and inferential statistical analysis using SPSS (version 19) were employed where appropriate with p value of < 0.05 as statistically significant. This observational study recruited 81 community pharmacists from various urban areas (n = 6) in Selangor, Malaysia. The overall mean (±SD) scores for MDI, turbuhaler and accuhaler were 6.67 (±0.88), 6.40 (±0.73) and 5.79 (±0.83), respectively. These were the mean scores for the inhaler techniques which were answered sequentially. There were significant relationships between ethnicity and different categories of scores for MDI ($p = 0.037$) and turbuhaler ($p = 0.011$). The study showed that the overall level of knowledge in demonstrating inhaler techniques amongst urban community pharmacists was moderate (5 – 7 score). Many respondents were unable to obtain good score (8 to 10). Additional training via continuous professional development programmes should be provided to further equip the respondents with proper inhaler techniques for them to demonstrate the best inhaler techniques to the patients.

CPO 07
FAPA2014000323 (Oral)

Response of Community Pharmacists to Request for an Oral Contraceptive

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Oral contraceptive (OC) is one of the common contraception methods used for family planning. It can be purchased at a community pharmacy with proper consultation by community pharmacist to ensure its effective and safe usage. Thus, this study aimed to assess the response of community pharmacists to request for an oral contraceptive. This study used a stimulated-customer method, conducted at 100 community pharmacies located in Klang Valley. The researcher who posed as a customer approached the community pharmacist and requested an OC for her family planning purposes. Consultations were documented in a pretested data collection form. In 99% of the consultations, the pharmacist asked at least one question and the most common question asked was the customer's previous OC usage (85%) followed by her last menstrual period (22%). A majority of the pharmacists (95%) provided some counselling to the 'customer'. A median of seven counselling elements were addressed out of 22 recommended and they were mainly on the dose (85%), dosing frequency (85%), route of administration (81%) and duration of therapy (79%). The number of counselling elements addressed

was significantly associated with gender, age of the pharmacist, location of the pharmacy and duration of the consultation. Overall, 83% of the consultations ended with the 'customer' buying an OC while the rest referred the 'customer' to a doctor. All OCs recommended were combined oral contraceptive (COC). This study showed that extent of information gathering during patient counselling varied among the community pharmacists in the Klang Valley. Community pharmacists should step up further and portray themselves as a competent first line health educators in providing thorough consultation and counselling to the general public.

CPO 08
FAPA2014000312 (Oral)

Pharmacists and General Practitioners Collaborative Practice: A Survey of Attitudes, Current Practice and Barriers to Interprofessional Care

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Interprofessional collaboration between pharmacists and general practitioners (GPs) has proven to enhance patient care and outcomes. Yet, research into factors influencing collaborative practice remains limited. The aim of the present study was to investigate collaborative working relationship between pharmacists and GPs in terms of their attitudes, role perceptions, experiences with collaborative practice, preferred method of communication, areas of current and further collaboration, and perceived barriers to interprofessional collaboration in a sample of Iranian population. A total of 243 surveys were distributed among community pharmacists and GPs attending different continuous medical education programs from all over the country. The survey questions were designed to address the research questions. The study was conducted during winter and spring 2014. Results of each group were analyzed separately, and comparisons between groups were made in order to compare responses of both groups. Both groups had positive attitudes towards collaboration. However, the majority of pharmacists and GPs reported only occasional experience with collaborative practice. For both groups, communication via telephone or face to face communication was preferred. Both groups were found to have different role perceptions regarding perceived roles of a community pharmacist. The most significant perceived barriers to collaborative practice were found to be possible fragmentation of patient care due to involvement of multiple health care providers and lack of face to face communication. The present study suggested that there are different factors contributing to current level of collaborative practice between community pharmacists and GPs in Iran. Diverse perceptions of the roles of community pharmacists in health care settings, and lack of face to face communication were found as possible contributing factors. Moreover, lack of interprofessional collaboration education and joint programmes for both pharmacy and medicine students were suggested.

CPO 09
FAPA2014000307 (Oral)

Caffeine Habit: A survey on the use and effects of caffeine-containing beverages among university students

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Like any morning ritual, drinking coffee has been a routine for most students wanting an extra jolt of alertness and performance boost to face the day and perform efficiently in academic activities. Students often abuse caffeine, and often than not, they take it lightly. With this mentality, they may

actually end up overdosed. Caffeine as a pharmaceutical entity is not safe when abused. Counseling is needed to inform students on safe and effective caffeine use. This study aimed to find which caffeinated beverage is commonly preferred by students; to find the common side effects experienced by the students after taking a dose of caffeine into their system; and to know the reasons for drinking such beverages. The study was conducted on November 2013 at a tertiary education institution. Respondents were randomly selected from freshmen taking Bachelor of Science in Pharmacy, Medical Technology and Biochemistry. The survey tool consisted of demographics, caffeine source preference and any unpleasant effect they experienced after taking caffeinated products. The researchers used percentage to analyze the data. Among the choices of coffee, chocolate drink, milk tea, soda and energy drinks, coffee stands as the prime source of caffeine. Among the side effects, the symptoms of nervousness, insomnia and palpitations were experienced by the students and were often complained as troublesome as it hindered functioning and attention as opposed to the perceived benefit of alertness and endurance. Notably, the main purpose as to why students consumed caffeine was to boost energy during any school works. Surveyed students' lack of understanding regarding caffeine and its varied side effects and how the irresponsible use of caffeine may lead to various complications. Consequently, a seminar on proper information dissemination is recommended to inform them regarding its rational use.

CPO 10
FAPA2014000284 (Oral)

Community Pharmacy Dispensing Practice of Non-steroidal Anti-inflammatory Drugs by Pharmacists and Pharmacy Assistants in Manila City

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In community pharmacy practice, recommendation of over-the-counter (OTC) Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) is influenced by several factors: knowledge, attitude and factors that affect decision making. The aim of the study is to measure those factors. The popularity and increasing use and demand of Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) as over-the-counter drug warrants further surveillance and avoidance of unwanted events. A survey will be conducted on a sample size of 90 community pharmacies within the 6 districts of Manila city. The respondents will be a pharmacist and a pharmacy assistant, whom will be randomly selected by the researchers, for each community pharmacy drugstore. A 95% CI and a 10% margin of error were used in the calculation of the sample size from a population size of 945 community pharmacies within Manila city. The knowledge and the attitude will be measured and correlated using the Pearson Correlation Method, where the researchers will determine if the data has a statistically significant correlation. The factors will be quantitatively analyzed by obtaining the mean and the standard deviation of the result that will be gathered.

CPO 11
FAPA2014000294 (Oral)

A Comparative Analysis of the 8-Item Morisky Medication Adherence Scale before and after a Pharmaceutical Care Program among Chronically Hypertensive Elderly Patients

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Problems with non-adherence to treatments are risk factors that highly contribute to total reduction in the control of blood pressure (BP). Adherence to prescribed medication regimens is difficult for all

patients and particularly challenging for the elderly. This study aimed to determine the relative significance of the scores in the 8-item Morisky Medication Adherence Scale (MMAS-8) before and after a pharmaceutical care intervention and its association to BP control of chronically hypertensive geriatric patients. It also aimed to evaluate the effects in adherence and BP control of the intervention made by the Clinical Pharmacy students of the University of Santo Tomas, Philippines. Data were collected from chronically hypertensive geriatric respondents of St. John's Home for the Elders in Quiapo, Manila, Philippines between September 7, 2013 and December 8, 2013. The geriatric patients were subjected to MMAS-8 and measurement of BP before and few weeks after the intervention. The data also included their age, gender, height, weight, and visual acuity. Data from the MMAS-8 were analyzed and scores of more than 2 were recorded as low adherence, 1 or 2 as medium adherence and a score of 0 as high adherence. 83.33% of the patients were adherent (MMAS-8 = 0) and 16.67% were non-adherent (MMAS-8 >2). One out of three (33.33%) patients with uncontrolled BP did not adhere to antihypertensive treatment, while 88.89% with controlled BP were adherent. The effect of the intervention to BP control and medication adherence was found to be inconclusive since a small population was involved in the study. The medication adherence rate was found to be high among patients after an intervention. A poor adherence rate was found to affect BP control. The effect of the intervention program is necessary to improve adherence and in turn, to improve BP control.

CPO 12
FAPA2014000235 (Oral)

The Behavioral Intention of Thai Community Pharmacist to Provide Medicine Use Review (MUR)

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Community pharmacy is the setting that plays a vital role in seamless patient care. National Health Security Office (NHSO), Thailand created the standard of primary pharmaceutical care services, which consists of four types of services - Medicine Use Review (MUR), Prevention & Promotion, Behavioral modification, and Health consumer protection. MUR is the first service that was introduced to some communities as an expanded pilot service model. This research was therefore carried out to identify what are the factors that contribute to the behavioral intention of Thai pharmacists in providing MUR. The sample for this cross-sectional study was all Thai community pharmacists (n=1,284). The questionnaire was developed based on the Theory of Planned Behavior. Besides, we also measure 3 variables - reimbursement, good drugstore image, and self-esteem. Multiple linear regression (MRA) was used to predict the behavioral intention. The intention to provide MUR was positive with a mean score of 7.1 ±1.9 out of 10. The MRA found the constructs of attitude, subjective norm, perceived behavioral control and self-esteem to be significant predictors of behavioral intention ($P < 0.01$). Pharmacists with stronger intention to provide MUR were those who felt they had more control over providing MUR, felt their peers' approval of engaging in MUR, had a positive attitude towards MUR, and felt self-esteem from providing MUR. Perceived behavioral control is the strongest predictors (standard coefficient beta = 0.349, adjusted $R^2 = 0.613$). The 68 percent of respondents expressed that "time" is an important barrier to provide MUR. Other barriers such as lack of staff, essential skill, knowledge, instrument or technology support, and good corporation were also reported. Therefore, strategies to help pharmacists provide MUR should focus on increasing the confidence of Thai pharmacists in their potential to provide MUR and finding time and support to provide medical use review services.

CPO 13
FAPA2014000329 (Oral)

Transforming Malaysian Community Pharmacists' Role in Wellness and Health-care

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In the last decade pharmacy profession in Malaysia had transformed, with 155% increase in registered pharmacists, 300% more local tertiary pharmacy institutions, and there were more public sector pharmacists than private community pharmacists. Such rapid changes risked disrupting the livelihood and future of pharmacy practitioners unless it came with new practice frontiers and a major overhaul of the colonial-era health-care delivery system. Overall transformation requires a suitable pharmacy legislative framework, new professional roles for community pharmacists, equitable distribution and adequate financing of community pharmacies. Public sector excels in the transformation processes as they are not constrained by legislation, manpower resources and finance consideration. Appropriate strategies to transform the most vulnerable community pharmacy sector include incorporation of various practice guidelines and standard operating procedures to ensure consistent pharmacy professionalism to bring greater health-care benefits to the patients and consumers. Successful transformation of Malaysian community pharmacists' role will contribute immensely to pharmacy profession and the nation. Partnership of the Government and pharmacists is an essential ingredient in the process. Neither party can afford to fail.

DRUG MARKETING & SOCIO-ECONOMIC PHARMACY

SEO 01
FAPA2014000127 (Oral)

Cost-Effectiveness Analysis (CEA) of Antihypertensive Drugs in Patients with Type 2 Diabetes Mellitus in Lahad Datu Hospital

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Hypertension with type 2 diabetes mellitus (T2DM) is a prevalent non-communicable disease that leads to morbidity and mortality. Malaysian Statistics on Medicines reported that RM508 millions were spent on antihypertensive drugs, purchase by public and private sectors in 2008. There is a need for efficient selection of antihypertensive drugs due to the escalating costs of drugs and scarce resources available. This study aimed to determine the cost-effectiveness of different classes of antihypertensive drugs and to evaluate adherence to the current Malaysian Clinical Guidelines for antihypertensive agents use in diabetes patients. This was a retrospective review, from May 2010 to April 2011, where records of outpatients with T2DM in Lahad Datu Hospital were evaluated. All T2DM outpatients who were on antihypertensive agents for more than 3 months were included in the study. Costing was undertaken from providers' perspectives. Direct costs such as drug acquisition costs, laboratory costs and salaries of health professionals were included. The Incremental Cost-Effectiveness Ratio (ICER) was determined by comparing the extra monthly mean cost of two antihypertensive alternative groups to the additional proportion of diabetes patients with controlled BP. A total of 135 patients were included in the analysis, with 30 and 42 patients who received angiotensin converting enzyme inhibitor (ACEI) monotherapy and combination therapy, respectively. This was in concordance with the guidelines. In this population, 63 patients (46.67%) achieved ideal BP control of less than 130/80 mmHg. ACEI monotherapy (RM45) were the most cost-effective drugs to control BP among diabetes patients, followed by calcium channel blockers (CCBs) (RM81). In addition, ACEIs + diuretics (RM84) and ACEIs + CCBs + beta-blockers (RM120) were the most cost-effective double and triple drug combination regimens, respectively. In conclusion, the most cost-effective therapies were ACEIs and ACEIs combination therapies. Both utilisation of ACEIs monotherapy and combination in hypertensive patients with T2DM are consistent with evidence-based clinical practice guidelines.

SEO 02
FAPA2014000105 (Oral)

Wellness in Smallness

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The buy and sell of one sachet of health supplement is the smallest degree of retail. Even in this repack commerce we can still imbibe wellness. Health supplements in the market are outmoded since we do not move on to a next phase. We have not developed the braveness to discard the obsolete kind of mentality. We fear bigness, we fear of moving on. That is why up to this time, the heritage of smallness is very significant. The challenge was not met. Wellness and good health have been well promoted. In fact, this is the trend in these modern times. Despite much effort to advocate wellness, smallness prevails because we work on small scale. The challenge to promote wellness is inherent in me being a Pharmacist by profession. The depressing fact is the way of thinking - of thinking poor. This clinging to smallness was inherited from our pagan forefathers. We are on a threshold to great achievement as we continue to embrace the challenge to promote wellness despite smallness. Consumers will be enjoying new launched supplements manufactured in the state of the art technology which will give not only economic revival but more productive and healthy lives. Today, we should be able to ignore the pagan evidence and have the push towards larger effort.

INDUSTRIAL PHARMACY

IPO 01
FAPA2014000045 (Oral)

'Halal Pharmaceuticals' - A Way Forward

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In terms of achieving concordance in medicine taking, fulfilling the religious needs of a patient is paramount. For Muslim patients, the need of 'halal pharmaceuticals' is in accordance to the Syariah laws that requires medicines to be both produced with 'Halalan and Toyibban' principles. At present, Malaysia is the only country in the world that provides a standard for the production of halal pharmaceuticals designated as MS2424:2012 - Halal Pharmaceuticals: General Guidelines. Drug manufacturers that comply with this standard will be given halal certificate and halal Malaysia logo by the Department of Islamic Development, Malaysia (JAKIM). The production of halal pharmaceuticals in this standard follows the Pharmaceutical Inspection Convention and Pharmaceutical Inspection Co-operation Scheme (jointly referred to as PIC/S). Therefore, it complies with Good Manufacturing Practice (GMP). For products to obtain MS2424:2012, it must first be registered with the National Pharmaceutical Control Bureau under the Drug Control Authority of Malaysia. This is followed by an online submission to the Halal Hub Division, JAKIM who will then carry out the halal audit. Upon compliance to the halal audit, the drug manufacturer will then be awarded a halal certificate and the usage of the Malaysia halal logo. JAKIM has the capability to audit drug manufacturers in and outside Malaysia. They also have collaboration with about 75 Islamic competent authorities throughout the world. Halal pharmaceuticals are not only intended for the Muslim population but to the entire human population as it upholds the highest quality standard in drug manufacturing process.

IPO 02
FAPA2014000003 (Oral)

Investigation of the Efficiency and Mechanism of Gelation and Degelation of Three Positional Isomers of Aminobenzoic Acid

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Hydrogels produced from small molecules have gained much attention due to their potential use for various applications including tissue engineering and controlled drug release. Three positional isomers of aminobenzoic acid (AB): oAB, mAB and pAB are antimutagenic, oAB is vitamin L and pAB is part of the vitamin B complex. In this study, the efficiency and mechanism of gelation and degelation of the three positional isomers of AB and melamine (M) were investigated. This may provide a more detailed understanding of the gelation/degelation of different isomers of a compound. Rheological and DSC methods were used to examine the gelation and degelation of each system. FTIR and computational methods were employed to understand the mechanism of gelation/ degelation of the systems. These AB/M systems existed as a gel at low temperature and these gels melted at higher temperatures. Based on the rheological measurements, the gel strength at the lower temperatures was in the order of pAB/M>mAB/M>oAB/M. This agreed with the computational analyses according to the presence of stronger hydrogen bonding and the lower energy of each cluster. When heated, the sequence of the degelation temperature was in the order of pAB/M>oAB/M>mAB/M. This degelation temperature was consistent with the DSC measurements which also revealed the thermoreversibility of these gel systems. It was surprising that the mAB/M which is a stronger gel than the oAB/M could be more easily converted to a sol than the oAB/M.

FTIR demonstrated that during heating, the mAB from the mAB/M changed from the uncharged form to the zwitterionic form (mABz). In addition, the computational results pointed out that the hydrogen bonding between the mABz and M was much weaker than that between the mAB and M. This may result in the lower degelation temperature of the mAB/M system.

IPO 03
FAPA2014000139 (Oral)

Effect of Vitamin E *(D-Tocopheryl Polyethylene Glycol 1000 Succinate)* in Enhancing Absorption of Lisinopril 10 mg Tablet Formulation

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Lisinopril is a long acting, oral angiotensin converting enzyme (ACE) inhibitor, based on its biopharmaceutical characteristics. Lisinopril has high solubility but low permeability which limit its bioavailability. The aim of this study was to develop formulas that could repair its biopharmaceutical properties and increase its permeability with the addition of permeability-enhancing substance such as Vitamin E TPGS NF *(d-tocopheryl polyethylene glycol 1000 succinate)*, in various concentrations. The process used wet granulation method and evaluation of mixture lisinopril and Vitamin E TPGS characteristics was done using DTA (differential thermal analysis). After all the formulas met the requirements of physics, chemistry and comparison dissolution test against its innovators, one formula followed pilot bioequivalence test. The research activity was carried out in the Research and Development Unit, PT Kimia Farma and PT Equilab in Indonesia. There is a positive correlation between Vitamin E TPGS as a solubility and absorption enhancer and lisinopril (BCS III). Vitamin E TPGS is expected to increase the absorption of lisinopril which was seen from the results of the pilot bioequivalence test, with an increase in the pharmacokinetic parameters (AUC_t, AUC_{inf}, Cma_x). The conclusion from this study is Vitamin E TPGS in Formula Lisinopril 10 mg tablet, can increase its absorption based on the bioequivalence test parameters.

IPO 04
FAPA2014000019 (Oral)

Development of Multiparticulate Tablet from Alginate Microparticles Prepared By Spray Drying Technique

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The objectives of the study were to develop multiparticulate tablets from alginate microparticles prepared by spray drying technique and to achieve zero order release from the tablets. The influence of alginate concentrations, pharmaceutical excipients, model drugs on morphology of microparticles and the influence of formulating parameters on drug release from multiparticulate tablets were investigated. Alginate microparticles were prepared by spray drying technique. Multiparticulate tablets from alginates microparticles were fabricated by direct compression with the aid of diluent. 1% w/v alginate and the addition of lactose and trehalose led to smooth surface and spherical shape of microparticles. The good morphology can be explained by higher viscosity and appropriate heat and mass transfer. The different direct compression fillers and ratios of alginate microparticles and fillers were studied. Theophylline release from multiparticulate tablets was slow and showed two phase release manners. The first was fast release followed by the slow release due to gel formation of alginate in the acid condition. The second fast release was observed when the tablet was soaked into

the basic medium. A zero order release of theophylline from the multiparticulate tablet was obtained from the blend of alginate microparticles: Avicel PH 102 in the ratio of 1:1. The difference in the direct compression filler did not affect theophylline release. By contrast, the different properties of model drugs have an impact on the drug release profile. The drug release from multiparticulate tablet containing mefenamic acid (low water-soluble model drug with acidic properties) was slower in comparison to theophylline release. A lag time at first few hours in the acid medium was observed.

IPO 05
FAPA2014000018 (Oral)

Development of Alginate Microparticles using Polymer Blend Technique for Drug Delivery System

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The aim of this study was to develop alginate microparticles by using polymer blend technique in order to enhance encapsulation efficiency and retard drug release from alginate microparticles. Alginate microparticles were prepared by cross linked emulsification. Particle size and shape, surface morphology, entrapment efficiency and *in vitro* drug release were studied. Theophylline and mefenamic acid with different solubilities were used as model drugs. Types of polymer blends and the blend ratios were independent variables. The results demonstrated that the poorly water-soluble drug showed lower encapsulation efficiency than highly water-soluble drug because of incomplete microparticles formation and drug dissolution to the external phase. The suitable type of polymer blends and polymer blend ratios increased encapsulation efficiency and delayed theophylline release from microparticles. This can be explained by the higher viscosity of the polymer solution of polymer blends. The diffusion of the drug into the external phase was more difficult. In addition to the higher viscostiy, the ionic interaction between cationic charge of chitosan and anionic charge of alginate or cross linking of pectin with calcium ion can help enhance the properties of polymer blend microparticles.

SCIENTIFIC

SPO 01
FAPA2014000319 (Oral)

Metabolic Therapy: A New Paradigm for the Management of Diabetic Hearts?

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One of the leading causes of mortality in diabetic patient is cardiovascular heart disease, with growing evidence linking abnormal cardiac substrate metabolism to the ensuing diabetic cardiomyopathy. Diabetic hearts are metabolically remodelled, with increased fatty acid metabolism at the expense of glucose utilisation for energy production. This is associated with increased circulating free fatty acid and activation of PPARα - a key nuclear transcription factor modulating fatty acid oxidation. These abnormal metabolic changes have been shown to decrease cardiac recovery following ischemia in diabetic patients, with a reduced tolerance to oxygen-limited conditions. Our data have shown that when healthy mice were exposed to hypoxia (11% oxygen for 3 weeks), their hearts must metabolically adapt by inducing a switch away from fatty acid oxidation towards glycolysis in order to maintain ATP production and contractile function. Pharmacological *in vitro* studies indicated that the adaptive response was concerted by hypoxia inducible factor (HIF)-dependent PPARα-downregulation. HIF is the key modulator of the transcriptional responses to changes to oxygen availability, by regulating the expression of genes that control cellular adaption to hypoxia, including a switch from oxidative to glycolytic metabolism, and stimulation of oxygen delivery through increased angiogenesis. In contrast, it was found that isolated hearts in a pre-diabetic mice model of dietary induced obesity, achieved by high fat feeding (60% high fat) were unable to suppress fatty acid oxidation, which reduced ejection fraction by 9%, determined using *in vivo* cine-MRI. Moreover, high fat feeding prevented the accumulation of VEGF, a prominent HIF downstream target, which may have contributed to the maladaptive response to hypoxia in these hearts. Therefore, a therapeutic approach aimed at correcting metabolic inflexibilities through manipulations of the HIF pathway could increase hypoxic tolerance of the diabetic heart, providing a promising adjuvant therapy to improve recovery post-myocardial infarction.

SPO 02
FAPA2014000113 (Oral)

Acute Toxicity of Calabash Leaves Ethanol Extract in White Male Rats

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Calabash plant (*Crescentia cujete L.*) is traditionally and often used to treat various diseases such as fever, swelling and wound. Previous research showed that ethanol extract of calabash leaves have antibacterial activity, anti-inflammatory and external bleeding cessation. This plant has a large potential as an herbal remedy, but there are no reports of research on calabash plant about the safety properties. The method is an experimental method with two kinds of tests. First, sighting study with 2 doses of ethanol extract of calabash leaves 300 mg/kg and 2000 mg/kg for 24 hours with observation by counting the number of deaths of the rats. Second, main study with 1% Na - CMC as a control and ethanol extract of calabash leaves dose 2000 mg/kg treatment was observed for 14 days. Each group consisted of 5 male white rats. As a result, there was no death of test animals in the sighting study. In the main study, there was no significant difference between the treatment and control group ($p<0.05$)

on the symptoms of toxic effects, body weight, haematology, blood biochemistry, organ weights and histopathology of liver and kidney. However, the inter-treatment group showed a significant difference in the value of GPT enzyme ($p>0.05$), because one of the mice showed abnormal values and liver histopathology showed fatty degeneration and foki necrosis.

SPO 03
FAPA2014000222 (Oral)

Effects of Storage Condition and Preparing Processes on Stability of Recombinant Human Growth Hormone

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Recombinant human growth hormone (rhGH) is a sensitive therapeutic protein. Many effects can influence the stability of rhGH. This research objective was to find a suitable storage condition for rhGH solution before drying using lyophilization. The effects of dialysis to the different solutions and pre-freezing conditions were also studied. rhGH was produced using *Pichia Pastoris*. The rhGH solution in Tris-HCl buffer pH 7.8 was obtained. The rhGH solution in Tris-HCl buffer was storage at the temperature of -20°C and then thawing (one cycle). The rhGH solution was dialyzed into distilled water or phosphate buffer pH 7 to find the better solution for rhGH. The pre-freezing in the freezer or in the freeze dryer was studied. rhGH was then determined qualitatively and quantitatively using size exclusion chromatography, SDS PAGE and native PAGE. The result showed that rhGH in Tris-HCl buffer pH 7.8 was not stable after 2 cycles of freezing and thawing due to the high pH. The dialysis of rhGH from Tris-HCl buffer pH 7.8 to distilled water resulted in the better quality and quantity of rhGH than the dialysis to phosphate buffer pH 7. The addition of some excipients helped increase the stability of rhGH after the dialysis to distilled water. The pre-freezing in the freezer at the temperature of -80°C caused the degradation of rhGH, while the pre-freeze in the freeze dryer at the temperature of -60°C did not affected rhGH. In conclusion, the rhGH solution in Tris-HCl buffer pH 7.8 could be stable after freezing at the temperature of -20°C and thawing for only one cycle. The dialysis into water and the immediate addition of some excipients were infinitely preferable. The pre-freezing in the freeze dryer at the temperature of -60°C was chosen as the process for lyophilization.

SPO 04
FAPA2014000099 (Oral)

Hypolipidemic Activity of Senna Occidentalis (L.) Link. (Fam. Fabaceae) Methanolic Extract in Atherogenic Diet Induced Hyperlipidemia in Sprague-Dawley Rats

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Hyperlipidemia is the greatest risk factor of coronary heart disease. The study focuses on the antihyperlipidemic activity of methanolic plant extracts of *S. occidentalis* (L.) Link. against atherogenic diet induced hyperlipidemia in rats. The aim of the present study is to evaluate the effect of the plant in reducing cholesterol levels of experimentally induced hyperlipidemic rats. Healthy 36 male albino rats were divided into six groups. Group I (normal control) received standard chow diet,

Group II (negative control) received atherogenic diet, Group III (positive control) received atherogenic diet + atorvastatin (Lipitor), and Group IV-VI (treatment Groups) received atherogenic diet + methanolic extract of *S. occidentalis* (L.) Link. at doses of 500mg/kg body weight (BW), 800mg/kg BW and 1000mg/kg BW respectively. The parameters used are the serum lipid profile (TC, TG, HDL, LDL) and body weight of rats. The results were statistically analyzed using ANOVA. This showed that the plant extract was exhibiting a hypolipidemic activity in a dose dependent manner. The administration of *S. occidentalis* (L.) Link. methanolic extracts to the hyperlipidemic rats provides significant reduction in serum level of TC, TG and LDL level. Serum level of HDL was also increased upon administration of the methanolic extract of the plants. *S. occidentalis* methanolic extract is exhibiting a hypolipidemic activity in a dose dependent manner, where 1000 mg/kg body weight of the methanolic extract exhibited the highest effect in lowering serum level of TC, TG and LDL and highest in increasing HDL level. It can be concluded that the methanolic extract of *S. occidentalis* (L.) Link. is effective against hyperlipidemia and can be a potential hypolipidemic agent.

SPO 05
FAPA2014000095 (Oral)

Non-Invasive Measurement Method of Skin Conditions by using Dermalab® Combo

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Skin is a protective barrier from exogenous substances. The aim of the study was to evaluate the reliability of the DermaLab Combo in measuring trans-epidermal water loss (TEWL) and skin hydration. Fifty male and 50 female students from the International Islamic University Malaysia (IIUM) volunteered to participate in this study. The readings were taken on the volar forearm of the volunteers using TEWL probe and hydration pin probe. A set of questionnaire was also distributed to obtain information about the skin care regime and their daily habits. Most students who often use moisturizers have lower TEWL value than those who do not use it. A low TEWL reflects the skin barrier integrity. Skin hydration is also correlated with the use of moisturizers. This is supported by Rosado et al. (2009) who proved that the application of moisturizers can increase stratum corneum hydration. The hydration state of the skin was also higher in volunteers who consumed water of more than 1L per day. It has been reported that fluidity has a positive correlation with stratum corneum hydration. This is because water content at tissue level might redistribute up to the stratum corneum which ultimately hydrates the skin. In this study, it can be concluded that DermaLab® combo is a reliable skin analysis instrument that offers high precision, accuracy and reproducibility on all the measuring parameters.

SPO 06
FAPA2014000262 (Oral)

A Study on the Potential of Kappa-carrageenan and Carboxymethylcellulose in Extended Release Potassium Chloride Capsules

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The drug of choice in preventing and treating hypokalemia is Potassium chloride (KCl). Extending the release of KCl is intended to slow down and prolong the release of potassium in order to reduce the gastrointestinal irritation brought about by KCl. This study aims to discover the feasibility of an extended release KCl capsule formulation using the ideal 1:2 cellulosic ratio of CMC and Kappa-Carrageenan obtained from a previous study, Comparative Study of the Cellulosic Ratio of Carboxymethylcellulose: Kappa-Carrageenan As A Potential Drug Delivery System (Cruz et. al,

2012) by means of compatibility determination, actual formulation of drug product and testing for compliance to monograph specifications for dissolution. The extended release KCl formulation in this study was prepared by means of microencapsulation, oven drying at 85^{o}C and particle size reduction through sieving prior to capsule filling. A sample of the granules from the prepared formulation and the chief ingredients (including CMC, KC and KCl) each underwent Differential Scanning Calorimetry performed by professionals in RCNAS for compatibility determination. The capsules were tested for dissolution by employing the procedures and specifications of USP for extended release KCl capsules. The aliquots were diluted for preparation for AAS to determine the absorbance of the samples necessary for the computation of sample concentration. The data collected were analyzed by using One-Way ANOVA F test and Pearson r correlation. No significant change was seen in the data. It was concluded that the said formulation poorly exhibited extended release property.

SPO 07
FAPA2014000224 (Oral)

In vivo Study of the Anti-angiogenic Property of the Ethanolic Extract of Annona muricata Linne in the Chorioallantoic Membrane (CAM) of the Duck Embryo

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Angiogenesis, the process of forming new blood vessels, has been the focus for testing numerous natural compounds from plants with underlying angiogenic or anti-angiogenic properties. *Annona muricata Linne*, locally known as Guyabano, has been given importance for its purported use in treating tumors and various forms of cancers. The present work deals with the evaluation of the anti-angiogenic property of *A. muricata L.* using the Chorioallantoic Membrane (CAM) of the duck embryo. Selected mature leaves of *A. muricata L.* were harvested, air dried and extracted by percolation using 50% Ethanol. The crude extract was evaporated of the solvent and was diluted to 25, 50, 75 and 100% concentrations. The resulting solutions were tested by administering to the egg samples at day 1 of development, wherein anti-angiogenic activity will be observed at days 8, 9, 10, 11 and 12 of development and compared to the untreated, NSS Control, and positive control (Docetaxel). The extracts, importantly the 50% extract concentration, showed a significant anti-angiogenic activity due to the decrease in area of the CAM on the samples specifically on Day 9 of development. Thus, these findings showed that the ethanolic extract of the mature leaves of *A. muricata L.* has a potential anti-angiogenic property.

SPO 08
FAPA2014000051 (Oral)

Nevirapine metabolites ratio at steady state in Malaysian population

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Nevirapine is extensively metabolized via cytochrome P450 isoenzymes CYP2B6 and CYP3A to 3-hydroxy nevirapine (3-OH NVP) and to 2-hydroxy nevirapine (2-OH NVP). The present analyses aimed to characterize two main nevirapine metabolites: 2-OH and 3-OH nevirapine at steady-state in 80 HIV-infected Malaysian adults. Nevirapine and the metabolites were extracted from plasma by

liquid-liquid extraction method and assayed using high-performance liquid chromatography (HPLC). The metabolite ratio for each metabolite was defined as the ratio of the metabolites area under the concentration-time curve (AUC) to the nevirapine AUC. The metabolites concentrations were much lower than the parent nevirapine concentration. The 2-OH NVP was detected in all patients while 3-OH NVP was detected in 67 patients. The predominant metabolite at steady state was 2-OH NVP with the AUC of 20 times lower from nevirapine while the 3-OH NVP AUC was 333 times lowers than the parent drug. There were positive correlation between nevirapine AUC and the metabolites AUC; however strong correlation was observed only with 2-OH NVP. Significant differences in AUC of both metabolites between genders were also observed. Concentration of nevirapine was slightly higher in patients' presence with both metabolites but the difference was not significant. It is maybe due to the small number of patients without 3-OH NVP detected in the study. Consequences of the findings warrant further investigation.

SPO 09
FAPA2014000261 (Oral)

Diclofenac Sustained Release Tablets using Novel Coprocessed Excipients of Crosslinked-Amylose and Xanthan Gum as Matrix

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In previous study, we produced the novel modified excipients which were coprocessed excipients of crosslinked-amylose and xanthan gum in the ratio of 1:1, 1:2 and 2:1. We obtained 4 excipient types, which were Co-CLA6-XG, Co-CLA12-XG, CL6-Co-A-XG and CL12-Co-A-XG, each type had 3 ratio of CLA-XG or A-XG; totally we produced 12 types of new excipients. All the resulted excipients had good swelling index, high viscosity and good gel strength, which are suitable to be used as matrix for sustained release tablet dosage form. In this present study, diclofenac sustained release tablets are formulated using the 12 types of coprocessed excipients of crosslinked-amylose and xanthan gum. The produced diclofenac sustained release tablets were studied for the *in vitro* drug release, swelling index and others evaluation for tablets within the acceptable standard. The drug release profile from the diclofenac sustained release tablets using matrix of the Co-CLA6-XG, Co-CLA12-XG, CL6-Co-A-XG and CL12-Co-A-XG showed the retarded drug release during 8 hours. The release study revealed that drug release kinetic follow the zero order kinetic. The results suggested that the controlled release matrix tablets could retard drug release up to 16-32 hours. It may be concluded that applying the coprocessed excipients of crosslinked-amylose and xanthan gum as controlled release matrix can control and retard drug release following the zero order kinetic.

SPO 10
FAPA2014000177 (Oral)

Research and Development of Weight Loss Product with Lipase Inhibitory Activity

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Obesity is becoming one of the most important global health problems. The application of a lipase inhibitor is a useful medication for the treatment of obesity. In order to find new pancreatic lipase inhibitors from natural sources, eighteen selected Thai medicinal plants were extracted with 95% ethanol and screened for their potential inhibition of lipase activity using the BALB-DTNB method. Orlistat, the most common anti-obesity drug, was used as a positive control. *In vitro* study showed that the extract of *Ocimum basillicum Linn*., *Citrus hystrix DC*. and *Solanum torvum Sw*. have potent pancreatic lipase inhibition while the extract of *Quercus infectoria G*. Olivier showed significant

reduction in triglyceride concentration in animal study. The weight loss supplement has been developed by using *Q infectoria* extracts. The physical, chemical and biological activities of this product have also been examined in order to control the quality. The safety evaluation of the product was investigated. Acute oral toxicity showed that LD_{50} of the product was above 15,000 mg/kg body weight. This result confirmed that the product studied is effective and safe for use as another weight loss supplement.

SPO 11
FAPA2014000321 (Oral)

The effect of CYP2C9 polymorphisms: Orang Asli Jahai is poor metabolizer to warfarin compared to Malay in Malaysia

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Warfarin therapeutic is characterized by inter-individual variations in dose requirements and a narrow therapeutic index. Accurate dosing is critical for safety patient management on this drug. Polymorphisms in *CYP2C9* gene have been found to play big role in determining the effect of warfarin therapy on coagulation. However, the information of polymorphisms in *CYP2C9* gene amongst the indigenous populations including in Malaysia is still unclear. The objectives of the study were to determine the main variants of *CYP2C9* gene (**2* and **3*) in one of the Malaysia's indigenous populations, Orang Asli (OA) Jahai and in ethnic Malays; and compare the alleles' prevalence between these two ethnic groups, also with available data from other indigenous populations around the world. This study was approved by the Research and Ethics Committee of Universiti Sains Malaysia. 10mL blood of a cohort of 155 OA Jahai and 183 Malays were collected after the informed consents were obtained. The DNA from the bloods was extracted and was genotyped for *CYP2C9* polymorphisms by using nested multiplex allele-specific polymerase chain reaction technique. The subsets of results were confirmed by DNA direct sequencing. Genotyping results showed *CYP2C9*2* and *CYP2C9*3* in Malays was 0.011 and 0.036 respectively. However, the variant of *CYP2C9*2* was absent in OA Jahai but significantly high in *CYP2C9*3* with a frequency of 0.34, making them the most highest carriers of the allele reported thus far in any ethnics in Southeast Asia and other indigenous population in the world. It can be concluded that 18% of OA Jahai were poor warfarin metabolisers while 41% were intermediate between extensive and poor metabolisers. It is important to reduce dose requirement in poor- or intermediate-metabolisers. Therefore, to ensure better clinical outcomes, understanding the genotypes of *CYP2C9* alleles amongst ethnics is critical for patients receiving drugs metabolized by the gene.

SPO 12
FAPA2014000001 (Oral)

Stability Indicating Chiral HPLC Method for the Estimation of Zaltoprofen Enantiomers in Pharmaceutical Formulations

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A stability indicating chiral high performance liquid chromatographic (HPLC) method was developed and validated for the separated (S) and (R) Zaltoprofen in raw material and its determination in the presence of degradation products formed during forced degradation studies. In the present study an isocratic NP-HPLC method was developed with stationary phase as ACI Cellu 1 (150 x 4.6 mm i.d., 5 µ) column and acetonitrile: 25 mM sodium perchlorate (80:20, v/v) as mobile phase. The entire study was performed using 1.0 mL/min as flow rate and the detection wavelength at 254 nm. The zaltoprofen (R and S) was exposed to various stress condition such as hydrolytic (acid and base), neutral, oxidative and photolytic. The stressed samples were analyzed by the proposed method. The described method was linear over the range of 2 - 4 µg/mL for S-Zaltoprofen and 3 - 5 µg/mL for R-Zaltoprofen. The limit of detection and limit of quantification of S-Zaltoprofen and R-Zaltoprofen were found to be 4.16 µg/mL and 12.61 µg/mL respectively. The recovery of S and R-Zaltoprofen from tablet formulations was around 98.04 %. The method provides good sensitivity and excellent precision and reproducibility. The developed method can be applied in the quality control of drug products.

PHYTOPHARMACY & PHARMACOPEIA

PPO 01
FAPA2014000107 (Oral)

Antioxidant Activity of Philippine Jasmine Jasminum Sambac Linn, (1789) Leaf Extract using 2,2-Diphenyl-1-Picrylhydrazyl (DPPH) Free Radical Scavenging Assay

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In the Philippines, heart disease and cancer are the leading causes of death. Among the triggers and accelerators of these diseases are the free radicals found in environmental exposures like tobacco smoke and radiation. The use of synthetic antioxidants available in the market such as vitamin C and E is not favored by others due to their tendency to cause adverse effects. Philippine Jasmine leaves, abundant in the archipelago, have folkloric uses of alleviating various diseases but has no established studies on antioxidant activity. The spectrophotometric DPPH free radical scavenging assay was used to establish the antioxidant activity. The study aimed to establish the percent inhibition on DPPH molecule, percent antioxidant activity relative to the positive control and established the median effective concentration (EC50) of test solutions of Philippine Jasmine leaves. Another parameter used was the color change from violet to yellow and the decrease of absorbance at 517 nm indicating antioxidant activity. The leaf extract was obtained through maceration with 95% alcohol and was subjected to vacufuge to obtain a solvent-free leaf extract. The concentrations of the test solution were 100% (w/v), 75% (w/v), and 50% (w/v). The positive control was ascorbic acid USP grade (5 µg/mL), and DPPH-ethanol solution (39.43 µg/mL) as blank. The 100% test solution had the highest decrease in absorbance and its antioxidant activity was 78.79%. The median effective concentration (EC50) was 65%. The test solutions exhibited the positive color change from violet to yellow and a decrease in absorbance value. The test solutions derived from Philippine jasmine leaf extract indicates remarkable potential as a source for antioxidants. The phytochemical screening revealed that leaf extract possess flavonoids, phenols, alkaloids and tannins which have antioxidant activity.

PPO 02
FAPA2014000104 (Oral)

Polysaccharide-Rich Fraction of Noni Fruit (*Morinda citrifolia L.*) as Doxorubicin Co-Chemotherapy: Evaluation on Catalase, Macrophage, TCD8+ Lymphocyte, Vero, HeLa and T47D Cells

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This study explored the potency of the polysaccharide-rich fraction of Noni juice (PF) combined with doxorubicin (DOX) against *in vivo* macrophage activity (MA), including phagocytosis index and ratio, CD8+ T lymphocyte proliferation (TCD8+P), catalase enzyme concentration (CEC), also *in vitro* Vero, HeLa and T47D cells growth. MA was evaluated with latex bead method, CEC was evaluated using commercial assay kit, while TCD8+P was evaluated using flow cytometry method following *in vivo* administration. Thirty six Wistar rats were divided into normal control, negative control (DOX i.p. 4.67 mg/kg BW on day 1 and 4); 25, 50, 100, and 200 mg/kg BW of PF p.o. daily and DOX i.p. 4.67 mg/kg BW (day 1 and 4) for 7 days. *In vitro* PF+DOX cytotoxicity assay was performed using MTT reduction method on Vero, HeLa and T47D cells. The data were statistically analyzed at 95% confidence level. PF has been proven to increase TCD8+ cells proliferation in combination with DOX. Phagocytosis index was not altered significantly. Nevertheless, the phagocytosis ratio increased on 100 mg/kg BW PF treatment. CEC was significantly increased on the

same dose. PF could increase the cytotoxicity of DOX towards HeLa and T47D cells and less toxic towards Vero cells. Therefore, PF is a potential candidate to be used as DOX co-chemotherapy.

PPO 03
FAPA2014000241 (Oral)

Macronutrients Content, Glycaemic Index and Anti-Ulcerogenic Effect of Ganyong (*Canna edulis Ker.*)

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Rhizome of Ganyong or canna rhizome (*Canna edulis Ker*.) contains higher level of carbohydrate than in rice. Nevertheless, glycaemic index of canna rhizome is relatively low because of the type of carbohydrate content, which is starch. Therefore, canna rhizome can be developed as an anti-ulcerogenic agent. Analysis of macronutrient content, which included carbohydrate, starch, fiber, protein and lipid, were conducted using chemical reactions according to AOAC procedure. Glycemic index was determined by *in vivo* method. Anti-ulcerogenic effect was determined by scoring of ulcers and histopathological studies. Rats induced with aspirin in dose of 200 mg/kg BW were used as models. After inducing, the rats were divided into five groups, i.e. negative control, positive control, group I, group II and group III. Each group was given different treatment, that is without treatment, with sucralfate, ethanolic extract (EE), hot water extract (EAP), cold water extract (EAD) with doses of 360, 100.5, 4621.5, 4621.5, 360 mg/kg BW respectively for five days. After treatment, rats were dissected, their stomachs were removed, followed by scoring ulcers and histopathological studies. The results showed that canna rhizome contained reduced carbohydrate, unreduced carbohydrate, starch, protein, fiber and lipid in concentration of 3.25 ± 0.04%; 2.55 ± 0.01%; 7.32 ± 0.09%; 0.23 ± 0.01%; 3.84 ± 0.34%; and 1.01 ± 0.08%, respectively. The glycaemic index was 20.8. Therefore, canna rhizome is possible to be used as a carbohydrate source for diabetes mellitus patient. Ethanol, hot water and water extracts of canna rhizome have anti-ulcerogenic activity, because they can improve ulcers of induced rat models. The water extract was the most potent compared to other extracts.

PPO 04
FAPA2014000006 (Oral)

Simultaneous Estimation of Quercetin and Rutin in *Aganosma dichotoma* [Roth] K. Schum by HPLC Method

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A simple, specific, accurate and precise high performance liquid chromatography method was developed for the simultaneous estimation of quercetin and rutin in *Aganosma dichotoma*. The chromatographic separation was achieved by using C18 column, 150 x 4.6mm i.d., 5µ Hibar Lichrospher, mobile phase containing acetonitrile:25mM ammonium acetate pH 3 (40:60 v/v). The flow rate was 1 ml/min and the absorbance was monitored at 259 nm. The retention time of quercetin and rutin was found to be 4.30 min and 1.71 min respectively. The proposed method was validated in terms of the analytical parameters such as accuracy, linearity, precision, robustness, limit of detection (LOD), limit of quantification (LOQ) and were determined based on the International Conference on Harmonization (ICH) guidelines. The detector response was linear in the range of 1-5 µg/ml, 0.1-0.5 µg/ml for quercetin and rutin respectively. The proposed method was successfully applied for the simultaneous estimation of both constituents in *Aganosma dichotoma*. This study established a

quantitative method for the simultaneous determination of quercetin and rutin from *Aganosma dichotoma*.

PPO 05
FAPA2014000026 (Oral)

Phytosomes: A Valuable Phyto-Phospholipid Carriers

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A phytosome is a complex between polar polyphenolics and dietary phospholipids that shows definite physicochemical and spectroscopic features. Phytosomes are superior forms of herbal products that are better absorbed, utilized and produce better results than conventional herbal extracts due to increased bioavailability. These are formulated by using natural or synthetic phospholipid along with active components. Phytosomes are complexes of phospholipid as phosphatidylcholine and phosphatidylethanolamine with polyphenolic component. Polyphenolic component are simple flavonoids, with or without natural mixture in aprotic solvent like simple flavonoids, phosphatidylserine with polyphenolic component. Phytosome is different from the liposome according to the physicochemical properties giving rise to better absorption than that of liposomes. Phytosomes are also superior to liposomes in skin care products. Thus, this article also presents an overview of the techniques of preparation of phytosome, characterisation and their applications.

PPO 06
FAPA2014000178 (Oral)

Determination of Cordycepin in *Cordyceps militaris* (Linn.)

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Ophicordyceps sinensis (Berk.) Sace. (*Cordyceps sinensis*) is a medicinal mushroom, naturally distributed in Tibetan Plateau and Bhutan. It was used in traditional Chinese medicine as a tonic, immunomodulator and other medicinal purposes. Due to its natural occurrence, *O. sinensis* are very rare, needed and of high value. *Cordyceps militaris* (Linn.) is mostly artificially cultivated and was claimed to possess a variety of therapeutic activities. Cordycepin, naturally abundant in *O. sinensis*, is the main compound and largely responsible for pharmacological effect. The objective of this study was to develop a reversed-phase high performance liquid chromatography method for quality control by determination of cordycepin in *C. militaris. C. militaris* were collected in June 2013 (1st crop), and Jan 2014 (2nd crop) from mushroom farms in Chiang Mai Province, Thailand. Both crops were in the same medium and condition. The separate preparation of *C. militaris* were extracted with MeOH:H_2O (1:1) to obtain 2 extracts for cordycepin analysis which were performed by HPLC (Waters, alliance 2695), equipped with photo-diode array. The methods validation of HPLC were examined in term of specificity, precision, accuracy, limit of detection and limit of quantification. Cordycepin was identified as the main compound of both extracts. The linear equation y = 30216x+11692 and R^2 = 0.9998. The LOD and LOQ were 0.866 and 2.887 µg/ml. The percentage recovery range was from 98.0-102.0. The content of cordycepin in both extracts were 0.370 ± 0.002 %w/w and 0.134 ± 0.001 %w/w respectively. The analytical method is suitable for quality control of cordycepin in *C. militaris.* The results of cordycepin content in both crops of *C. militaris,* which were cultivated from the same condition, are much different in percentage. It should be realized that the cultivation processes must

be improved to get higher content of cordycepin which further can be cultivated for large production to meet the world demand and substituted for *O. sinensis*.

PPO 07
FAPA2014000223 (Oral)

Effect of Piperine, Piperine Free Non-Hexanic Fraction of Ethanolic Extract of *Piper retrofractum* Vahl on Sexual Behavior, Blood Testosterone Level, and Sperm Quality of Wistar Male Rats

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The fruits of *Piper retrofractum* Vahl are traditionally used as aphrodisiac in Indonesia and some researches have been reported. The ethanolic extract had androgenic effect on male chicks and it increased blood testosterone level in male hypogonadism. Non-hexanic fraction of ethanolic extract had aphrodisiac effect, while the hexanic fraction was inactive. Piperine had stimulant, vasodilator and antidepressant effects. Based on those researches, it is relevant to observe the aphrodisiac effect of piperine and piperine free non-hexanic fraction of ethanolic extract of *P. retrofractum* fruits. Twenty five Wistar male rats aged 2.4 - 3 months were divided into 5 groups. Tested substances were andriol (2.88 mg/kg BW), CMC-Na 1%, piperine (1.6 mg/kg BW), piperine free non-hexanic fraction (29.1 mg/kg BW) and non-hexanic fraction of ethanolic extract of *P. retrofractum* fruits (31.72 mg/kg BW) given orally once daily for 30 days. Every rat in each group was placed together with female rat in individual cage. Sexual behavior including introduction and climbing were observed at day 0, 1, 3, 5, 7, 11, 15, 19, 23, and 27. At the end of the treatment, the quality of spermatozoa was observed and the blood was collected for testosterone level measurement. The results showed that piperine, piperine free non-hexanic fraction and non-hexanic fraction of ethanolic extract of *P. retrofractum* fruits, as well as andriol, had significant effect for the frequency of introduction and climbing, but did not change testosterone level compared to CMC-Na group. All tested substances had significant effect on the improvement of quality of spermatozoa including reproductive organ weight, motility, and score of spermatozoa. The piperine free non-hexanic fraction had the highest effect in decreasing double head and broken tail sperms, diameter of tubulus seminiferus and on the other hand the enhancement of spermatocytes-spermatids thickness.

PPO 08
FAPA2014000109 (Oral)

The Anti-Mutagenic Activity of Labanos *Raphanus sativus* L. var. Longipinatus Vegetable Juice on Male Albino Mice

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Cancer is the third leading cause of mortality in the Philippines and studies have shown that people who consume a diet high in fruits and vegetables reduce their risk of cancer. Radish, a crucifer, has gained prominence in the field of cancer prevention because it contains many beneficial phytochemicals. In this study, Labanos, the Filipino radish, is tested as a functional food and as a potent phytomedicine to prevent cancer by studying its anti-mutagenic activity. The anti-mutagenic activity of Labanos was examined through an *in vivo* micronucleus assay in treatment-free Labanos test juice form. The micronucleus assay detects freshly- induced structural chromosomal damages in bone marrow cells and administration of the Labanos test juice is tested for the ability to lower the

incidence of induced micronuclei which serve as the index for genetic damage. Mutation was induced through intraperitoneal administration of Mitomycin C. The Labanos juice was tested using four doses: 1000 mg, 500 mg, 250 mg, and 150 mg doses per 20 g body weight (BW). The untreated group was not administered with the test juice while the negative control was given water for injection. The mice given 1000 mg dose developed an average of 81 Micronucleated Polychromatic Erythrocytes (MPCEs) per 1000 Polychromatic Erythrocytes (PCEs) translating to a 69.99% reduction of MPCEs. As the dosage further decreased, there was a respective decrease in the percent reduction thus showing a linear, dose-dependent anti-mutagenic activity. The one-way analysis of variance ($p > 0.01$) and post-hoc analysis showed that all variables have significant differences. The results suggest that the Labanos test juice is anti-mutagenic, with an ED50 (median Effective Dose) of 510 mg. Saponins and phenolics were found in the Labanos test juice in the phytochemical screening through the test tube method.

PPO 09
FAPA2014000025 (Oral)

Ethosome: A Versatile Tool for Novel Drug Delivery System

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Several approaches have been developed for increasing the skin penetration of drugs and many cosmetics by the use of vesicular systems, such as liposomes and ethosomes. Ethosomal drug delivery system is one of the approaches that have various application in pharmaceuticals. Ethosomes were developed by Touitou in 1997 as additional novel lipid carriers composed of ethanol, phospholipids and water. Ethanol is used as one of the efficient permeation enhancer in ethosomes generally in concentration of 20 - 45%. Ethosomes were prepared by very simple methods such as Hot and Cold methods, the products of which were characterised by vesicular size, entrapment efficiency, transition temperature and vesicle stability. The major advantages of ethosomes were low toxicity and better stability than liposomes, as well as better patient compliance. Ethosomes have wide applications in drug delivery in treatment of AIDS and Parkinsonian syndrome and also in diabetes. Ethosomes hold a promising place in the development of novel improved therapies.

PPO 10
FAPA2014000183 (Oral)

Screening of Ribosome-Inactivating Proteins (Rips) from Indonesian Fruits and Vegetables and Effect of Processing on its Stability

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Some plants are identified to contain *Ribosome-inactivating proteins* (RIPs) which have been demonstrated to possess activities such as antitumor, anticancer, antivirus and anti-inflammation. There is limited information on the presence of the RIPs of Indonesian local fruits and vegetables. This research was therefore aimed to screen the presence of the RIPs in the fruits and vegetables and to study stability of the proteins during processing. Protein from plant samples was extracted using phosphate buffer. This protein extract was then analyzed using activity assay of cleaving of supercoiled double stranded plasmid DNA, in order to identify the presence of RIPs in the extracts. Stability of the protein after storage for 3 days at room temperature and after boiling for 5 minute was then tested based on the activity. The results demonstrated that there was presence of RIPs in some Indonesian vegetable samples such as leunca, Indonesian spinach and kenikir and fruits (banana,

guava and apple). Storage of the samples for 3 days at room temperature has a little effect on stability of the RIPs, while boiling prosess has an effect on the protein stability.

PPO 11
FAPA2014000287 (Oral)

In Vivo Haemostatic Activity Screening of the Decoction of the Peel of Musa Errans (Blco.) Teod. Var. Botoan Teod. on Sprague-Dawley Rats

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Haemostasis is important in maintaning homeostasis and preventing systemic damage caused by severe bleeding. Plant sources have been utilized to promote haemostasis. Thus, the researchers chose *Musa errans*, a species of wild banana endemic to the Philippines, as a target haemostatic agent. This study aimed to determine the haemostatic potential of *Musa errans* and devise a way of utilizing plants endemic to the country in arresting bleeding. Phytochemical screening, specifically the Goldbeater's Test has proven the presence of tannins in the extract indicating its ability to precipitate proteins, contributing to its haemostatic activity. Acute toxicity test following the Up-and-Down Method from OECD guideline was used to determine the LD_{50}. After performing the Limit Test, the decoction was proven to be safe for oral administration. Three groups of five Sprague-Dawley rats each were given different amounts of extract (100mg/kg, 199.53 mg/kg, and 398.11mg/kg) and a group of five rats was administered with distilled water for a period of 10 days. In order to assess the haemostatic potential, bleeding parameters such as Bleeding Time (BT), Clotting Time (CT), Prothrombin Time (PT) and Activated Partial Thromboplastin Time (aPTT) were measured before and after the administration period of the decoction. Statistical analysis has proven that there is a significant difference from the four different parameters measured before and after decoction administration. The results observed after the administration proves the haemostatic activity of *Musa errans*, affecting both the platelets, as seen with the decrease in BT and CT, and the Intrinsic and Extrinsic Pathway, as seen with the decrease in aPTT and PT, respectively. Further statistical analysis also revealed that there was no significant difference among the three different concentrations administered, thus the effect is not dose-dependent. This study establishes the dose-independent haemostatic activity of *Musa errans* in Sprague-Dawley rats via various mechanisms.

PHARMACY EDUCATION AND STUDENT AFFAIRS

PEO 01
FAPA2014000116 (Oral)

Cyberjaya University College of Medical Sciences (CUCMS) Pharmacy Graduates Career Choices

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Traditionally, the standard career choices for pharmacists were in the hospital and community settings. However, nowadays career opportunities have expanded. In Malaysia, pharmacy liberalization has prompted this by offering pre-registration training in recognized government hospitals, private hospitals, government polyclinics, community pharmacies and pharmaceutical companies. This study aimed to identify preferred future career choices of CUCMS graduates and the factors that influence their career choices. It was a cross-sectional study from June-September 2013, conducted among graduates of 2009-2012 (n=67). The questionnaire was adopted and adapted from "A Longitudinal Cohort Study of Pharmacy Careers Early Choices Questionnaire" and sent to the respondents via email and social networking. Descriptive statistics were used to describe all categorical data. Chi-square analysis was employed to identify the association between gender and ethnicity with future career choices. Likert scale quantified the factors influencing their decisions. The results indicated that the respondents were more interested in practicing in the hospital settings compared to other practice settings. The findings also showed an association between gender and future career choices as females seemed to prefer a more stable environment. An association was found between ethnicity and future career choices as certain ethnic groups were risk averse. The top factors influencing their career choices were their love for sharing their knowledge in related areas, exposure to practicals during undergraduate years, desire to investigate new things, implementation of liberalization and opportunities for advancement. It is recommended that more interest be created in other areas of the pharmacy curricula to encourage career uptake in community pharmacy and pharmaceutical industry.

PEO 02
FAPA2014000164 (Oral)

Self-Medication Practice Among Allied and Non-Allied Health Students of the University of Santo Tomas, Manila, Philippines

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Self-medication is presumed to be widely practiced around the world. This can be defined as the use of drugs to treat self-diagnosed disorders or symptoms, or the intermittent or continued use of a prescribed drug for chronic or recurrent disease or symptoms. High level of education and professional status has also been mentioned as predictive factors for self-medication. Students from the allied and non-allied health institutions of the University of Santo Tomas were assessed for the factors of self-medication practices. A total of 66 graduating students were asked to complete the questionnaire. To ensure valid responses, the researchers supervised the respondents in completing the questionnaires. Mean and range summarized the age while counts and percentages summarized the gender, school, practice of self-medication, therapeutic classes, health conditions, reasons and sources of self-medication. A total of 55 reported that they practice self-medication. On the total 66 respondents practicing self-medication is antibiotics, anti-allergic and antihistamine, and

decongestants. The 55 respondents documented headache to be the most self-treated health condition followed by cough and cold, toothache, muscle pain pimples, back/chest pain, dizziness, and diarrhea/constipation. Significantly greater percentage of females ($p=0.038$) used antibiotics. Respondents with high self-care orientation are self-medicating on antibiotics ($p=0.027$), anti-allergic ($p<0.001$), and herbal medicine ($p=0.001$) than respondents with low self-care orientation.

PEO 03
FAPA2014000179 (Oral)

Enhancing Pharmacy Students Learning with Audiovisual Educational Tool on Issues Regarding Generic Medicines

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The use of multimedia such as animated videos/cartoons, in teaching and learning has been stated as an effective tool to enhance learning. Many disciplines have been using animated modules to explain complex subject matters to build interest in the learning process. This study was to test the effectiveness of the developed animated educational video regarding issues related to bioequivalence of generic medicines. A cross sectional, intervention study was conducted on 111 senior year pharmacy students of Universiti Sains Malaysia with a valid ethics committee approval. Students showed interest in learning with animated video and significant improvement in the knowledge and attitude towards generic medicine and bioequivalence was observed with 95.6% respondents agreeing that the animated video enhanced their understanding of bioavailability and bioequivalence. None of them thought of generic medicines to be less effective than innovator brands after watching the video compared to 3.6% before the intervention. The intervention incremented the knowledge of generic medicine bioequivalence parameters to 91.2% as compared to 0.9% pre-intervention ($p<0.05$) and 76.3% as compared to 31.5% ($p<0.05$) in the confidence of study participants regarding generic medicine substitution. A 31% improvement was also observed in the study respondents' perception of safety standards for generic medicines after the intervention. It can therefore be concluded that new media technologies such as animation/cartoon is an effective tool that can be used to bridge different complex subject matters in pharmacy education.

PEO 04
FAPA2014000210 (Oral)

Perceptions, General Health Knowledge and Health-seeking Behaviour of Outpatients in Two Chinese Medicine Treatment Centres in Kuala Lumpur

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Traditional Chinese medicine (TCM) with origin in China is more than 2,000 years' old. Today TCM is practiced in China and almost all countries in the world. In the West, it is viewed as complementary and alternative medicine (CAM). In Malaysia, the government has incorporated integrated healthcare in many public hospitals since 2006 and has passed the Traditional and Complementary Medicine (T&CM) Act in 2012 in order to regulate the training and practice of T&CM. The aim of this study was to evaluate whether outpatients of two TCM treatment centres in Kuala Lumpur: Chinese Medicine Aid Department (CMAD) a non-profit organisation and the International Medical University Chinese Medicine Centre (IMU CMC), a for-profit organization were different in their

perceptions (P) and health-seeking behavior (HSB). A cross-sectional study was conducted through a self-designed questionnaire on 175 patients from CMAD and 175 patients from IMU CMC. Data was analysed with the help of Excel and SPSS. Perceptions of outpatients among CMAD and IMU CMC were not different (P>0.05). However, perceptions were found to be correlated with patients' education level and their estimated monthly income in both centres. There was a significant difference (P<0.05) in general health knowledge between CMAD and IMU CMC outpatients and this was dependent on patients' age. Health-seeking behaviour of outpatients in CMAD and IMU CMC was not different and was not correlated with gender, age, highest education level and estimated monthly income (P>0.05). There was a significant difference in general health knowledge of outpatients in CMAD compared to IMUCMC. However, there was no difference between their perceptions and health seeking behavior.

PEO 05
FAPA2014000070 (Oral)

Design and Evaluation of the Pharmacovigilance Course in a Pharmacy School (Kulliyyah) In Malaysia

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Deficiencies in pharmacovigilance education may contribute to low involvement and ADR underreporting among pharmacists. Pharmacy students need to be adequately trained and exposed to the challenges in pharmacovigilance. The objectives of this study were to describe the development and evaluate of new pharmacovigilance course for undergraduate pharmacy program in Malaysia and students' evaluation of the course. Three hours face-to-face lectures and 2 hours tutorial base have been integrated in required 3 –credited-hours course (research in pharmacy and pharmacoepidemiology). The training provides hands-on training on adverse drug reactions reporting and undertaking causality assessment. An assessment approach using *pre-* and *post-course evaluations* has been made. Descriptive and inferential statistics using SPSS 20.0 were undertaken. Ninety one self-completed questionnaires were returned out of 104 (response rate: 87.6%). the majority of respondents were female (n=67, 73.6%), the mean age of students was 21.9SD±0.43. The overall perception of the students regarding the course was positive. All of the respondents believed that the knowledge gained from the course would be required in their future practice of pharmacy (n=91, 100%). The majority (n= 81, 89.0%) of the students indicated that they understood the role of pharmacist in pharmacovigilance on safety of vaccines activities after attending the course. A pharmacovigilance course was successfully designed and implemented in the BPharm curriculum. Additional and procedural amendments to the course content should be done.

PEO 06
FAPA2014000038 (Oral)

Curricular Directions for a B. S. Pharmacy Course in Response to the K-12 Program

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In the Philippines, pharmacy education is governed by the Commission on Higher Education (CHED) which requires a four-year baccalaureate degree. The Department of Education (DepEd) launched K-12 curriculum which will result to the downloading of subjects from CHED to high school that will affect the pharmacy course due to the less number of subjects and the number of years a B. S. Pharmacy course be offered. Document analysis was performed on K-12 primer, CHED Memorandum Orders (CMO), pharmacy curriculum of other countries, and related studies. The result

was provided to population groups, graduating pharmacy students, faculty members, and industry partners, in a form of a document before the survey was conducted. The survey was conducted to determine whether the subjects in the currently existing Pharmacy curriculum in the country should be retained, transferred to high school, removed, or replaced, and for professional subjects, either change the number of terms or modifying the number of units, or to trim down the number of years the course be offered in light of the full implementation of K-12. Faculty members and industry partners were given the opportunity to list down subjects that are deemed necessary to be taken by students but are not yet included in the existing curriculum. Triangulation methodology was used to validate, through cross verification, the data obtained in the survey. Except for Chem 1, Ethics, and Statistics, all general education subjects, and mandated subjects were considered by the majority of the respondents to be transferred to high school. All core and professional subjects are to be retained in college without alteration in the number of terms and units. Nuclear Pharmacy, Complementary and Alternative Medicine, Cosmetic Pharmacy, Pharmbiotechnology, Drug Interactions & Monitoring Skills, and Chemical Instrumentations were deemed necessary but are not yet included in the existing curriculum.

PEO 07
FAPA2014000170 (Oral)

Students' Views about Problem-Based Learning Facilitators: A Qualitative Insight

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Facilitators in problem-based learning act like a pedestal in strengthening the collaborative learning approach of students. The current research aimed to explore the role of facilitators from the students' standpoint. A qualitative approach was adopted to obtain in depth information from the respondents. A purposive sampling approach was used. Thirteen students were selected from final year class and semi-structured, face to face interviews were conducted with an interview guide. Questions mainly pertaining to the role of PBL facilitators, their approach towards managing the case and style of facilitation were incorporated in the interview guide. Interviews were conducted till the point of saturation achieved. Thematic content analysis generated three main themes: (i) Lack of punctuality among facilitators; (ii) improper facilitation style; (iii) Lack of engagement. Respondents reported that the facilitators were not aware of how to carry on with the discussion among the group. It was also reported that generally one PBL which comprises of two sessions with 15-days interval in between the two sessions was curtailed into one session only. Students also reported that a couple of the facilitators did not utter a single word during whole one session. The current research findings reported that facilitators must be trained properly for their roles which in turn improvise the intellectual ability and critical reasoning of the students.

PEO 08
FAPA2014000310 (Oral)

The Relationship of the Pharmacy Licensure Examination Scores with the University of Santo Tomas Entrance Test (USTET) IQ Scores, Course Preference and General Weighted Average (GWA) of Pharmacy Students of the University of Santo Tomas Batches 2010

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Every year, a new batch of student graduates takes their respective licensure examinations to acquire a license to practice their profession and be given the confirmation that they are competent enough to perform the duties their profession requires. Although most takers do pass or become top-notchers, but still there are those who unfortunately do not. This study focused on discovering the University of Santo Tomas Entrance Test (USTET) IQ scores, Course Preference, and their General Weighted Average (GWA) could serve as determinants of the increase or decrease in the scores of Pharmacy Licensure Examination Scores of Pharmacy students and Clinical Pharmacy students of UST Batches 2010-2013. The acquired data were gathered from the Guidance office (USTET and Course Preference), Registrar's office (GWA) and Dean's office (Pharmacy Licensure Examination Scores). Consequently, the data were encoded and organized in Microsoft Excel and analyzed using Multiple Linear Regression in SPSS (Statistical Package for the Social Sciences). Only the correlation observed in batch 2012 was significant for the IQ (p-value = 0.02). As for the course preference, only the batch 2010 was significant (p-value= 0.01). Meanwhile, the GWA in all the batches were significant except for the Clinical Pharmacy batch 2012 (p-value= 0.06). These results state that the most consistently significant variable was the GWA. This in turn would mean that the GWA can be considered as a determinant in passing the Pharmacy Licensure Examinations. Since Pharmacy Licensure Examinations aim to ensure that every individual who is granted a license to practice the pharmacy profession is competent enough to perform their tasks as pharmacists, the examination's observed direct relationship with the GWA would mean that the Pharmacy Licensure examination is greatly dependent on the student's knowledge and skills acquired and applied through the academic program.

PEO 09
FAPA2014000311 (Oral)

Qualitative Research: Recent Application to Study Patients Lived-Experience of Using Insulin Treatment to Manage Type 2 Diabetes Mellitus

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Quantitative research has a long tradition in gathering scientific knowledge, epidemiological knowledge, and clinical knowledge on diseases and treatment interventions. However, quantitative method such as randomised controlled trial or cross-sectional survey has a limited role when trying to explain a social phenomenon or to give an insight of peoples' experience such as why patients do not adhere to their medication. Furthermore, the advancement in medical treatment and exposure of the public to modern technology, subsequently patient expectations of treatment and health outcomes are rising. In order to cater for the rising complexity of patients' experience with different health issue, a different approach in conducting research is required to gain deeper understanding of these phenomena. This is critical when a piece of research is trying to draw the attention of policy makers, who are looking for evidence such as patients' views and context in order to make decisions to

improve health services and health outcomes. Malaysian patients' experience has seldom been investigated; using quantitative method has a limited role, as there is no firm foundation to build upon and over-dependent on the researcher's assumptions. Pre-determined assumptions therefore would be based on findings in other countries with different cultures; thus they might not be able to reflect the complexity of health issues faced by Malaysian patients. This study employed qualitative approach to explore patients' lived-experience of using insulin treatment to manage type 2 diabetes mellitus in Malaysia. This study utilised an interpretative phenomenological analysis approach. Purposive sampling method was used to select patients for interviews. Interviews were transcribed verbatim and coded using NVivo® software. Thematic analysis is used to identify and categorise emergent themes. The principle features of grounded theory were adopted particularly in the process of theory generation, theoretical sampling, and constant comparative method of data analysis.

PEO 10
FAPA2014000189 (Oral)

Causes of Stress and Management Approaches among IIUM Pharmacy Students

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Stress is one of the psychological problems that affect one's mental and physical condition. In today's era, students seem to be in stress continuously which affects their academic performance as well as participation in non-academic activities. The aims of the current research were to explore the different causes of stress among pharmacy students and to identify different ways of managing stress. This is a cross-sectional study design in which all the undergraduate pharmacy students of International Islamic University Malaysia (IIUM), registered in semester 1, 2013/2014 were recruited. A total of 300 students from 1st to 4th professionals participated in the study. The survey instrument was designed on the basis of previously published research and subjected to face validity and content validity. The questionnaire consists of three main domains; demographics, causes of stress and managing approaches towards stress. The data was subjected to International Business Machine Statistical Package for the Social Sciences Statistic version 21 (IBM SPSS) and descriptive and inferential statistics applied. In the current research, a majority of students (n=258; 89%) reported quizzes as the main cause of stress. A significant correlation can be observed between age range (p=0.009) and year of study (p=0.006) to quizzes. On the contrary, inadequate support from teachers was stated as the minimal cause of stress (n=22; 7.3%). A majority of respondents agreed (210 students; 70%) that sleeping is the best way to relief stress. Keeping in view the competitive environment among students, management of stress cannot be sidelined. Counseling programmes can be instituted in each semester which highlight to inculcate managing approaches in daily activities.

PEO 11
FAPA2014000259 (Oral)

Pharm.D Programme in India: Changing Scenario of Pharmacy and the Pharmacist's Role

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The origin of pharmacy education in India dates back to 1899 with syllabus more focused towards pharma industry. The UG and PG programmes designed to cater the needs of the industry and become successful in making India number 3 in the world and contributed for the development of Pharmacy profession in India. The education system in several countries has undergone major initiatives to update the Pharmacy programme a more clinical and service oriented programme with practice based

approach reflecting the vision for pharmacy practice and education. Though there are more than one million registered Pharmacists in India, Pharmacist and Pharmacy services were not evident as the students were not trained in practice oriented areas.. As a major breakthrough in the history of Pharmacy education in India, a 6 years Pharm.D programme was introduced from 2008 with a vision to train the pharmacy students in clinical and practice oriented areas. At present there are 175 Institutions offering Pharm.D programme with intake of 5,250 students in India. Some of the Teachers from India has undergone training programmes with the help of experts from developed countries like U.S, U.K and Australia in practice oriented areas. The value added services provided by Pharm.D students to the patients started recognizing the role of Pharmacist services which was not seen earlier by the physicians and patients. Intervention of Pharm.D students at various capacities proved vital and well accepted by the physicians in India. The first batch of Pharm.D will be completing their programme in 2014 and going to pave the way to the new generation Pharmacist with new role and responsibility of the future pharmacists of India.

PEO 12
FAPA2014000157 (Oral)

Integrating Academic Services into Health Consumer Protection Course: A Community-Based Learning at Satit-Walailak-Pattana Community for the Fifth-year Pharmacy Students, Walailak School of Pharmacy, Thailand

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School of Pharmacy (SOP), Walailak University (WU) aims at nurturing a new generation of Thai pharmacists who work competently in primary care pharmacy service. As an academic blueprint, a six-step competency for WU-SOP students was used as aguide in educating all students with relevant knowledge and skills. Regarding that WU-SOP blueprint, results of integration of academic services into Basic Health Consumer Protection course were described. A mixed-method was applied that instructor's scoring assessment and after action review (AAR) by students were used as data sources. Two main course activities were assigned by the course director--finding community health problems related with health products or health needs, planning and then implementing academic services in the study community. Results showed that students raised 2 health product problems--steroidal contaminated products and harm contamination in food and cosmetics, while, chronic disease screening was a health need from this community. According to health product problems, self-steroidal testing in food and cosmetic, hypertension and diabetes screening, medication counseling and health education among chronic ill patients were provided as academic services. Most students pursued "very good" level (scored 4.6/5) in integrating data to identify community problems. In addition, the value of academic service media are "good" for people in understanding self-health care (scored 3.9/5), as well as, given academic activities were "strongly interesting" (scored 4.3/5). From AAR, all students perceived the roles of consumer protection pharmacist. Over 80 per cent of students understood the principle of consumer protection, collaborated well with primary health care professionals, and gained more confidence to work in primary care pharmacy service. Integrating academic service to health consumer protection course is obviously benefits to the fifth-year WU pharmacy students in applying knowledge to solve community health problems, which is one of required competencies declared in the WU-SOP blueprint.

PEO 13
FAPA2014000187 (oral)

Opportunities for pharmaceutical care education in the Greater Makong Subregion: A preliminary study

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Pharmaceutical care practice has been the worldwide upward trend in the pharmacy profession. Preparedness in pharmacy education should be carefully planned to support this globalization. Collaboration among countries would be an effective strategy to strengthen and rapidly build up professional expertise in the pharmacy schools. This approach may be beneficial for the Greater Mekong Subregion (GMS) countries. Therefore, the objectives of this study were 1) to identify essential health care needs of the individual countries, 2) to determine the opportunities in pharmaceutical care education in this subregion. The documents were reviewed for the 20–year trends toward public health care statistics, including specific population characters and leading causes of death of each country during 1990–2010. Pharmacy education system, number of pharmacy schools, and number of registered pharmacists were compared among the countries. The countries with the highest percentage of aging population were Thailand (9.8%), the People's Republic of China (PRC) (9.4%), and Vietnam (5.6%). Non-communicable diseases (NCDs) were the causes of death with increasing trends in all six countries. However, communicable diseases (CDs) were still the heavy burden in Cambodia, Lao PDR and Myanmar. The most advanced pharmaceutical care education was in Thailand, including the 6-year curriculum for the entire country and the pharmacy residency program while the other countries had various systems and absolutely no residency program. The largest numbers of pharmacy schools and registered pharmacists were in PRC (74 and 200.000), Thailand (17 and 23,272) and Vietnam (7 and 12,000). On the demand side of the specialty pharmaceutical care education, PRC and Vietnam exploited the arising opportunities while TH exploited on the supply side in providing training the trainers programmes. Specialty residency in geriatric and cardiology has considered the priorities based on population characteristics and causes of death.

PHARMACEUTICAL LEGISLATION, ETHICS AND REGULATORY AFFAIRS

PLO 01
FAPA2014000264 (Oral)

Trial Plan for Prescription Release from Primary Care

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The separation policy of dispensing from prescription has not been adequately implemented especially in primary care clinics where the pharmacist, usually only one, is hired. The problem would be caused when such only one pharmacist would like to take leave. The aim of this study was to explore ways to avoid the lack of professional pharmaceutical service that may happen in primary care clinics in pharmacist's absence. The Taipei Pharmacists Association and Taipei Physicians Association joined together to initiate the trial plan to maintain adequate pharmaceutical service for clinics in pharmacist's absence. The methodology of the plan included: clinics release prescription to community pharmacies assigned by Taipei Pharmacists Association and the information of drug needed should be provided by clinics in advance. The conduction of the plan didhelp to solve the problem of lack of professional pharmaceutical service that happened in primary care clinics in the pharmacist's absence. The patients' drug use safety can be secure. In conclusion, the collaboration between primary care clinics and community pharmacies has been well established through the trial plan will definitely benefit patients, clinics and community pharmacies.

PLO 02
FAPA2014000217 (Oral)

Knowledge, Attitude and Perceptions of Pharmacists in Government Service Towards Adverse Drug Reaction Reporting in Kelantan

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Medication safety plays an important role in ensuring patient's therapeutic outcome. Any unwanted, negative consequence after the administration of a medication is termed adverse drug reaction (ADR) and the surveillance of ADR is called pharmacovigilance. Pharmacists play an important role in ensuring ADR is being reported to the Malaysian Adverse Drug Reaction Advisory Committee (MADRAC). The objective of this study was to investigate the knowledge, attitude and practices (KAP) of pharmacists in government service in Kelantan regarding adverse drug reaction (ADR) reporting. A cross sectional questionnaire based study was carried out on all government hospital and health clinics pharmacists between August 2013 and October 2013. All pharmacists in government facilities in Kelantan were included. Out of 163 questionnaires given out, a total of 102 questionnaires were returned. The majority of pharmacists were female (84.3%) and had below 10 years experience in practising pharmacy (88.2%). 56.9% were from hospitals and the remaining from health clinics. Only half of the respondents (54.9%) had reported ADR in the past one year. The overall knowledge of ADR reporting for the respondents fell into the high (59.8%) and medium (40.2%) category while 50% of respondent achieved high score in the attitude section of the questionnaire.The main factor influencing non-reporting was lack of time to actively look for an ADR and to lodge a report during working hours. In conclusion, the pharmacists are aware of ADR and the importance of their reporting. However, lack of reporting was clearly evident. Creating awareness about ADR reporting and making it more convenient may improve the rate of reporting.

PLO 03
FAPA2014000122 (Oral)

A Randomized Controlled Study on Compliance towards MASA 1956 among Retail Pharmacists in Sabah

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The objective of this study was to evaluate the improvement of compliances towards MASA 1956 after intervention and to determine the correlation between KAP score and noncompliance towards MASA'56. This was a randomized controlled study. All retail pharmacies in Sabah with illegal advertisement (n=88) were randomized into the control and intervention after baseline inspection. Study tools included Knowledge, Attitude, Practice (KAP) questionnaire and checklist to quantify advertisements that contravene MASA 1956. The study was conducted from 01 August 2013 to 17 February 2014. Intervention done included dialogue session, personal coaching and visitation over a period of 1 month. Second phase study was done 1 month post intervention. Independent t-test was used to analyse number of illegal advertisements between groups as well as KAP scores. Chi-square was used to compare offence and no offence between groups. Correlation between KAP and number of illegal advertisement was analysed using Pearson correlation. There was significant improvement on KAP score of intervention group compared to the control group, $p \leq 0.01$. There was a significant difference in terms of compliance towards MASA'56 for the intervention group compared with the control group, x^2 statistic (df) = 23.768 (1), $p \leq 0.01$. There was a mean difference of 4 illegal advertisements between the intervention group (95% CI 2.676, 5.3296, $p \leq 0.01$) and the control group. Practice score from KAP has moderate negative correlation with the number of illegal advertisement (correlation coefficient (r) value of -0.512). In conclusion, the new form of intervention successfully reduced offence of MASA'56 as well as number of illegal advertisements.

PLO 04
FAPA2014000143 (Oral)

The Policy Framework that Supports Community Pharmacists' Practice

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The framework that supports pharmacists' practice consists of numerous interlinked policies, regulations and philosophies developed by global and national health agencies, international pharmacy organisations, national pharmacists' associations and lead practitioners. Examples that have been analysed for this study include WHO's policy of Universal Health Coverage, various national medicines policies and medicines scheduling regimes, the philosophy of pharmaceutical Care, the concepts of clinical pharmacy, rational use of medicines and medication safety and FIP's Good Pharmacy Practice Guidelines and Seven Star Pharmacist concept. Understanding the principles and purpose of each statement and the relationship between them is critical to their successful implementation. This presentation will describe and map a number of these policies and philosophies in relation to community pharmacists' practice and will include discussion of how they either restrict or support the advancement of practice. Major issue in contemporary practice including the separation of prescribing and dispensing, the supervision of supply by pharmacists and compliance with prescription-only supply will be assessed within the context of these policies, regulations and philosophies.

EMERGENCY MEDICINE AND OTHERS

EMO 01
FAPA2014000124 (Oral)

Effectiveness and Tolerability of Hyaluronic Acid for Chronic Wounds Healing: A Systematic Review

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Hyaluronic Acid (HA) plays a critical role in maintaining the structure and integrity of the skin as well as in wound healing process. Despite the increasingly used of dressings containing HA and topical HA to treat chronic wounds, the evidence of its effectiveness remains inconclusive. The aim of this study was to examine the effectiveness of HA (either as dressing or topical agent) for promoting healing in chronic wounds through a meta-analysis of the available evidence. Several databases including the Cochrane Library, CINAHL, Medline, Ovid, Embase and online publishing site were searched to identify relevant studies. The search was supplemented by hand searches of conference proceedings and reference lists. Twelve randomised controlled trials (RCTs) involving 985 participants were included. Compared to the non-HA group, both HA dressings and topical HA groups showed statistically significant reduction in wound area [WMD -3.61; 95% CI -6.62 to -0.61]. However, in terms of the number of wounds healed, there was no significant difference between the two groups [RR 1.43; 95% CI 0.93 to 2.22]. Two out of the twelve trials did not provide quantitative data. For the outcome healing time, only one trial showed a significant effect. As for the safety profile of HA, only one trial reported its safety. Evidence to guide decisions regarding the use of dressings containing HA and topical HA to promote wound healing is still limited because the included trials were of moderate quality. More good quality trials are warranted.

EMO 02
FAPA2014000136 (Oral)

A Systematic Review of the Efficacy and Tolerability of *Saccharum officinarum* for Hypercholesterolemia

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Saccharum officinarum commonly known as sugar cane is believed to be useful for hypercholesterolemia. Results of several trials assessing the effectiveness of *Saccharum officinarum* for cholesterol levels are contradictory. The aim of this study was to assess the efficacy and tolerability of *Saccharum officinarum* for hypercholesterolemia. Databases searched included Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, Wiley Online Library, and Academic Search Premier. There was no language restrictions. We also conducted hand searches and examined grey literature such as conference proceedings and references lists for additional trials. Two review authors independently selected studies, extracted data and assessed risk of bias. Only randomised control trials involving *Saccharum officinarum* compared with placebo of at least two weeks study duration were included. Weighted mean difference (WMD) was calculated for total cholesterol (TC), low density lipoprotein-cholesterol (LDL), high density lipoprotein-cholesterol (HDL), and triglyceride (TG). Seven randomised controlled trials involving 508 hypercholesterolemic patients were included. Compared to placebo, *Saccharum officinarum* did not produce any significant effect on any of the outcomes examined: TC (WMD = -0.14; 95% CI -1.14, 0.86), LDL (WMD = -0.40; 95% CI -1.29, 0.49), HDL (WMD = 0.15; 95% CI -0.14, 0.44), and TG (WMD = 0.08; 95% CI 0.01, 0.15). Overall, *Saccharum officinarum* was well tolerated. Current available evidence based on

trials of moderate quality does not support the efficacy of *Saccharum officinarum* for lowering cholesterol levels. Further rigorously conducted trials are needed to confirm the effects of *Saccharum officinarum* on hypercholesterolemia.

EMO 03
FAPA2014000159 (Oral)

Research and Development of Herbal Cosmeceutical for the Prevention of Keloid and Hypertrophics Scars

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Lico-scars cream developed in this research was a topical product for external use in the treatment of keloid and hypertropic scars. This product had passed efficacy and safety evaluation with clinical testing for safety. Research and development of the Lico-scars cream began with selection of potential herbal extracts. *In vitro* studies of a total 30 herbal extracts indicated that Licorice extract had inhibitory activities on the proliferation of keloid fibroblast and the secretion of IL-6. The inhibitory activity on keloid fibroblast and IL-6 production was found to be 45.5 and 62.9% at the concentration of 1x 10-4g/mL. The Licrorice extract possessed anti-inflammatory activity that helps wound healing and thereby reduction of keloid and hypertrophic scars. In addition, the extract exhibited antioxidant activity that aids in skin smoothing and had anti-tyrosinase activity in improving texture of hypertrophic scars. With above mentioned properties of the extract, it was then developed to topical cream with subsequent animal test for anti-hypertrophic scars using surgical excision model. The scar thickness observed in the intervention group (1.56±0.16 mm) was significantly lower than that of the control group (2.17±0.19 mm). Our results showed that the Lico-scars cream was effective in reducing hypertrophic scarring in the rabbit ear model which was statistically significant compared with a base cream. The cream was considered safe when evaluated for acute dermal toxicity, acute dermal irritation and skin sensitisation testing. Moreover, in the human volunteer study, it revealed that the cream was non-irritating to human skin. According to the questionnaire survey of focus group to the Lico-scars cream, 210 study participants reported the overall product likeness after testing at a high level of satisfaction.

EMO 04
FAPA2014000291 (Oral)

A Preliminary Survey of the Penetration and Application of Mobile Health Apps in Malaysia

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Healthcare related applications (apps) for smartphones provide the general population and healthcare professionals with a convenient source of information and advice. Some of these apps have been designed specifically for healthcare professionals, while others are aimed at the general public and can range from reference books to exercise aids. This study aimed to examine how readily accepted these apps are and to observe any patterns in medical related mobile application usage within Malaysia. A survey was handed out to members of the general public and healthcare professionals in Malaysia. Participants were asked a total of 33 questions which were centered on the issue of health related apps, including how and when the apps were used and their opinions of these apps. 175 participants completed the survey, of which 16% (n=28/175) were healthcare workers and 54% (n=94/175) were students. Only 4% (n=7/175) of the participants did not own a smartphone. Most of the participants had between 1-5 health related apps on their phone, only 7% (n=18/175) having more than this, of which 67% (n=12/18) were students or healthcare professionals. Out of the health related apps that

participants possessed, a significant number had apps relating to drug information and diet. Healthcare professionals used apps that provide drug information, while students tended to use the calculators and diet and exercise related apps. When asked about the negative aspects of health apps, the reliability and lack of detailed information provided by apps was the most common complaint. This study found that a large number of people used health apps and some of this use was casual, while others used these apps for study or to assist in their work. There is room for the development of reliable drug formation apps by people in the pharmacy profession for the general population.

EMO 05
FAPA2014000199 (Oral)

Systematic Review and Meta Analysis on Brain Derived Neurotrophic Factor and Major Depressive Disorder: An Evidence-based approach

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The objective of this study was to perform a systematic review and meta-analysis to assess the role of Brain Derived Neurotrophic Factor (BDNF) in Major Depressive Disorder (MDD) patients to determine the efficacy of antidepressant treatment. We also assessed the impact of antidepressant treatment on Hamilton Rating Scale for Depression (HRSD) in MDD patients. Meta-analysis was performed using the software 'comprehensive meta-analysis' which gives a thorough summary of several studies that have been done on the same topic and provides the reader with extensive information. We conducted search in PUBMED database using key words "BDNF" and "Depression" and "Antidepressants". On the basis of the inclusion and exclusion criteria, studies were filtered and finally shortlisted 6 articles for the study. Using the random effect model, comparison of serum BDNF in Major Depressive Disorder (MDD) patients before and after antidepressant treatment was performed [CI,-1.299 to -0.254; SMD-Standard Mean Difference, -0.776] with $p>0.05$, which indicates that no significant impact of antidepressant on BDNF. The HRSD Score before and after antidepressant treatment was also compared by using random effect model [CI= 1.719 to 3.707; SMD=2.713] with $p <0.05$, which reveals significant decrease in HRSD score and thereby it may improve the quality of life. The result shows that antidepressant treatment does not significantly affect BDNF levels. In addition the Hamilton Rating Scale for Depression (HRSD) score gets reduced significantly after antidepressant treatment. This leads to the suggestion that BDNF cannot be used as a reliable marker for assessing the effect of antidepressant treatment.

EMO 06
FAPA2014000115 (Oral)

Hydroxyethylrutosides for Signs and Symptoms of Chronic Venous Insufficiency: A Systematic Review

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Hydroxyethylrutosides is a standardised mixture of semi-synthetic flavonoids believed to be beneficial for signs and symptoms of chronic venous insufficiency (CVI). However, the evidence is inconclusive. The aim of this systematic review was to evaluate the evidence of efficacy and tolerability of hydroxyethylrutosides for CVI. We searched electronic databases such as Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, EMBASE and CINAHL; publisher databases, conference proceedings and references lists for both English and non-English randomised controlled trials. We also performed hand searches for additional trials. Two review authors independently selected studies, extracted data and assessed risk of bias of included trials. The search

produced 1466 records. Only 15 trials involving 1648 participants met our inclusion criteria and thus included in the review. Results of meta-analysis showed that hydroxyethylrutosides was significantly superior compared to control for reducing the number of oedema (RR 0.69, 95% CI 0.58 to 0.82), venous ulcers (RR 1.7, 95% CI 1.24 to 2.34), pain (SMD -1.07, 95% CI -1.44 to -0.70), swelling (RR 0.76, 95% CI 0.36 to 1.63) and cramps (SMD -1.07, 95% CI -1.45 to -0.69). No serious adverse effect due to hydroxyethylrutosides was reported. The findings showed beneficial but modest effects of hydroxyethylrutosides for improving signs and symptoms of CVI. All the included trials were of moderate quality and therefore better quality trials are still required to make a firm conclusion on the usefulness of hydroxyethylrutosides.

EMO 07
FAPA2014000137 (Oral)

Efficacy and Tolerability of Micronized Purified Flavonoid Fractions (MPFF) for Haemorrhoids: A Systematic Review

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Haemorrhoids are a common condition with estimates suggesting a prevalence of 4% in the adult population. Reports on the beneficial effects of micronized purified flavonoid fractions (MPFF) in the management of haemorrhoidal symptoms are contradictory. The aim of this study was to assess the efficacy and tolerability of MPFF in the management of haemorrhoidal symptoms. We included randomized controlled trials evaluating the efficacy and tolerability of MPFF in the management of haemorrhoidal symptoms. Electronic databases such as CENTRAL, CINAHL, EMBASE and MEDLINE as well as other publisher databases were searched for eligible trials. No language or publication restriction was applied. Two review authors independently selected trials, extracted data and assessed the risks of bias of included trials. The quality of the selected trials was assessed using the Cochrane Risk of Bias Assessment Tool. The treatment effects of similar outcomes were pooled whenever appropriate. We included twelve randomized controlled trials involving a total of 1807 participants. The evidence showed that MPFF was well tolerated with minimal gastrointestinal effects. The pooled data showed that MPFF produced beneficial effects on bleeding, pruritis, symptoms recurrence, discharge and overall symptoms improvement. However these effects were not statistically significant between the MPFF and comparator groups. The available evidence based on trials of poor to moderate quality does not support the efficacy of MPFF for managing haemorrhoids symptoms. Further rigorously designed trials with larger sample size are required to confirm the benefits of MPFF for haemorrhoids.

POSTER PRESENTATIONS

Hospital and Clinical Pharmacy

No	Presenting Author	Title
HPP 01	YC Hung	The Antibiotic Resistance among Serogroups of Non-Typhoidal Salmonella
HPP 02	P Phueanpinit	Survey of Hospital Pharmacists Monitoring and Assessment of Adverse Drug Reactions from Non-Steroidal Anti-Inflammatory Drugs
HPP 03	P Plibai	Improvement of Repackage Labeling of the Drugs in Pharmacy Unit: Somdech Phra Debaratana Medical Center Experience
HPP 04	NI Penwalla	Safety and Efficacy of Basal-Bolus and Premixed Insulin Intensification Regimens in the Management of Type 2 Diabetes Mellitus: A 13-Year Narrative Review of Literature
HPP 05	R Pannarunothai	Pharmaceutical Care for Children with Type 1 Diabetes, Buddhachinaraj Hospital, Phitsanulok, Thailand
HPP 06	YW Shim	Validation of the Simplified Chinese Version of the Malaysian Medication Adherence Scale (MALMAS) on Elderly Patient
HPP 07	RM Dallumal	Adherence to Sitagliptin Using Medication Possession Ratio (MPR) and Its Effects on Glycaemic Control
HPP 08	LY Wong	Asthma Control of Adults in Public Health Clinics: Preliminary Results
HPP 09	HL Lee	Co-Prescribing of Gastroprotective Agents with Nonsteroidal Anti-Inflammatory Drugs in a Tertiary Hospital: Preliminary Results
HPP 10	SM Junoh	Unclaimed Prescriptions at the Outpatient Pharmacy of a Teaching Hospital
HPP 11	RW Zhang	The Analysis of the Different Treating Dosage Regimen of Inhaled Colistin Methanesulfonate in Treating the Acinetobacter Baumanni Pneumonia
HPP 12	S Ruengsawad	The Impact of Imipenem Shortage for the Clinical Utility of Anti-Pseudomonal Carbapenems: A Cross Sectional Analysis
HPP 13	SY Liang	Trend of Drug Utilization Pattern with the Anatomical Therapeutic Chemical (ATC) Classification in a Tertiary Teaching Hospital from 2006 To 2013
HPP 14	SF Huang	Applying the Quality Control Method to Decrease the Prescribing Errors of Emergency Department
HPP 15	S Wachira	Effectiveness of Intervention among Patients with Diabetes and Hypertension by Pharmacist and Health Care Professionals in Nongku Primary Care Unit, Sisaket Province, Thailand
HPP 16	T Sumaporn	Pharmacist's Role in the Development of Pharmaceutical Management System under Limited Budget: A Case Study in Saraburi Hospital
HPP 17	TS Wang	Evaluation of Clinical Efficacy and Safety of Switching from Twice-Daily to Once-Daily Tacrolimus Formulation in Liver Transplant Patients
HPP 18	T Asawutmangkul	The Quality of Life of Dementia Caregivers before and after Patients Receiving Pharmaceutical Care

HPP 19	TH Yeh	The Effect of Pharmacists' Interventions in Acute Myocardial Infarction Patients as a Part of the Cardiovascular Care Team
HPP 20	U Wanakamanee	Survey of Drug Related Problems Identified from Home Visiting by Thai Pharmacists
HPP 21	WJ Chen	A Case Report of Suspected Vinorelbine-Induced Pulmonary Oedema Worsen
HPP 22	WH Chen	Analysis of the Use of Secondary Prevention Drug Therapy in Patients with Acute Myocardial Infarction after Discharge from Hospital
HPP 23	W Santimaleeworagun	The Measures of Adherence to Antiretroviral Therapy in Thailand: A Survey Study
HPP 24	W Warathanakul	Save Drug, Save Cost, Save Life
HPP 25	KZ Zhou	Evaluation of the Extent and Impact of Oncology Clinical Pharmacy Service in a Tertiary Hospital in Hong Kong: First Ten-Month Experience
HPP 26	YM Hsu	Lenalidomide Treatment for Relapsed/Refractory Multiple Myeloma: The Experience from a Medical Centre in Taiwan
HPP 27	CP Ho	The Relationship between Medication Possession Ratio and Medication Regimen Complexity among Hypertensive Patients: A Population-Based Study
HPP 28	YC Hung	Susceptibility of Ciprofloxacin-Sensitive and Resistant MRSA Isolates to Non-Beta-Lactam Antibiotics
HPP 29	YL Chang	Joint Commission International Accreditation Standards for Hospitals its Impact and Analysis on Hospital Drug Safety Use
HPP 30	YL Chang	Analysis of the Effectiveness of the Quality of Outpatient Pharmacy Service
HPP 31	M Noraini	Transformation of Clinical Pharmacy Activities in Ministry of Health Hospitals in Malaysia
HPP 32	CS Zin	Effect of a Home Medication Review Program on Medication Adherence, HbA1c, Fasting Blood Sugar, Blood Pressure and Lipid Profiles in Patients with Type 2 Diabetes Mellitus: A Randomized Controlled Trial
HPP 33	N Jangkong	The Impact of Pharmacodynamically-Optimized Carbapenems Dosing for Hospital Acquired Infection Treatment: A Cross Sectional Analysis
HPP 34	CL Fang	Using Quality Control Circle Analysis to Improve Dispensing Errors in an Outpatient Pharmacy
HPP 35	JY Kao	Drug Use Evaluation of Rivaroxaban in Atrial Fibrillation
HPP 36	J Anansushatgul	Antibiotic Use in Upper Respiratory Tract Infections in Ambulatory Patients in Tertiary Care Hospital, Thailand
HPP 38	M Suzuki	An Evaluation of Efficacy and Safety of Long-Term Use of Generic Pravastatin Sodium in Hyperlipidaemia
HPP 39	MT Li	A Comprehensive Analysis of Outpatient Duplicate Prescribing Errors in a Regional Teaching Hospital
HPP 40	MW Sung	Use of a new chemotherapy-specific CPOE system to improve chemotherapy safety?
HPP 41	MM Manan	An Evaluation on the Effects of Vaminolact® in the Parenteral Nutrition on Physical Changes of Very Low Birth Weight Preterm Neonates

HPP 42	P Khunsakdeeyodom	The Incidence of Severe Cutaneous Adverse Drug Reactions in Thai Population
HPP 43	AY Kang	Analysis of Dyslipidemia Caused by L-Asparaginase in Paediatric Acute Lymphoblastic Lymphoma Patients
HPP 44	A Tienchairoj	Pharmacy Drug Care Center: Beyond Pharmacy Service
HPP 45	K Areerud	Provision Pharmaceutical Care with Sticker Tools Reduced Incorrect Dose Problem and Its Root Causes in the Elderly
HPP 46	B Booddawong	Sources and Distribution of Unlawful Medicines in 8 Provinces of Thailand: To Inform The Public Policy Change
HPP 47	CL Chou	A Risky Practice of Tablet Splitting: an Example of Drugs with Narrow Therapeutic Index
HPP 48	CW Kuo	Drug Utilization Evaluation of ACEI and ARB at the Regional Hospital in Central Taiwan
HPP 49	C Veerapong	Haematological and Thromboembolic Adverse Events of Lenalidomide in Siriraj Hospital, Thailand
HPP 50	CP Hsin	Drug Utilization of Rabies Virus Vaccine in Outpatients in a Medical Centre of Taiwan
HPP 51	CY Shih	Aflibercept-Induced Hyperpigmentation in Patient with Metastatic Colorectal Cancer
HPP 52	CC Hsu	Effectiveness of Computerized Decision Support System in Preventing Inappropriate Pill Splitting of Prescription Medications
HPP 53	CK Huang	A Case of Improper Treatment Course: Baclofen for Hiccups
HPP 54	Y Choe	Perlis Warfarin Clinic: A Study on the Effects of Evolution in the Model of Care
HPP 55	SWH Lee	Identifying and Evaluating Potential Drug-Related Problems: Medication Review in Elderly Residents of a Care Home
HPP 56	CW Tu	Bar-Code Technology Implementation on Paediatric Vaccines to Reduce Dispensing Error
HPP 57	D Raja	Evaluation of Beneficial Effect in Adding the Nilavembu Kudineer Chooranam (Siddha Formulation) to Metformin in Treatment of Type 2 Diabetes Mellitus
HPP 58	H Fahmi	A Retrospective Comparison of the Mortality of Critically Ill Patients Receiving Prolonged and Standard Infusion of Meropenem
HPP 59	H Rashwan	Knowledge, Attitude and Vaccination Status of Influenza among Healthcare Workers
HPP 61	HH Lin	Medical Warehouse Room Quality Indicator Management Monitoring
HPP 62	HL Lin	Palivizumab Injection Use and Safety Assessment of a Medical Centre in Taiwan
HPP 63	HJ Lin	Increment of Grade 3 or 4 Adverse Reaction Reporting Rate from Chemotherapy Agents
HPP 64	LT Hsu	Simvastatin/Ezetimibe Induced Hand Eczema
HPP 65	HC Lo	A Case Report of Suspected Inflammatory Polyarthritis and Delayed Infusion Reaction After TrastuzumabTherapy
HPP 66	HP Liu	Suspect Ceftriaxone-Induced Neurologic Adverse Effects: Case Report
HPP 67	HC Lo	Impact of a Pharmacist Intervention on Medication Discrepancies and Clinical Outcome in Home Care

HPP 68	IC Chen	Analysis of the Styles and Pharmacological Classifications for Adverse Drug Reaction in a Medical University Hospital
HPP 69	J Aporn	A Comparative Study of Changing Penfill Insulin to Conventional Syringe Insulin
HPP 70	JH Kuo	Effectiveness of Clinical Pharmacist Visit among Hospitalized Elderly Patients
HPP 71	TH Ke	Subcutaneous Versus Intravenous Administration of Bortezomib in Patients with Multiple Myeloma: A Retrospective Review Study
HPP 72	K Theangjit	Drug Related Problems in Geriatric Clinic
HPP 73	MC Lin	Evaluation on the Use of Febuxostat
HPP 74	N Basariah	The Effectiveness of Adult Epilepsy-Medication Therapy Adherence Clinic (Epi-MTAC)
HPP 75	M Chaemchaeng	Comparison Haematologic Adverse Effect between R-CHOP, CHOP, CVP and ESHAP Regimens in Non - Hodgkin's lymphoma Patients at Saraburi Hospital, Thailand
HPP 76	K Tungtragool	Pharmacist-led Home Healthcare Increased Medical Appointment Adherence and INR Level
HPP 77	C Siriwong	Drug Use Evaluation of Restricted Antibiotics in Hospitalized Patients at Phangnga Hospital
HPP 78	N Inwan	The Prevalence and Types of Prescribing Errors (PE) in the Outpatient Pharmacy Unit of an Academic Hospital
HPP 79	D Ledesma	The Geriatric Clinic Care Program: An Approach to Maintaining Good Health and Quality of Life
HPP 80	N Azlean	Predictors of Adherence to Calcium Carbonate as Phosphate Binder among Dialysis Patients in Hospital Raja Perempuan Zainab II
HPP 81	S Rattanawai	Risk Factors of Anti-tuberculosis Drugs-Induced Hepatotoxicity in Central of Chest Institute of Thailand
HPP 82	SW Kang	Using the Quality Control Circle Approach to Reduce Resupply Rate in Pharmaceutical Inventory Control
HPP 83	A Irawan	Using Comic, Pictograms and Table Sticker to Improve Knowledge and Medication Adherence in Children with HIV/AIDS

Community Pharmacy

No	Presenting Author	Title
CPP 01	A Sermhutthakit	The Clinical Effectiveness of Clinical Scoring System for Pharyngitis Diagnosis Leading to Antimicrobial Selection in Community Pharmacies
CPP 02	E Chang	The Projection of Community Pharmacy Service in Diabetes Care
CPP 03	M Fan	Build a Supporting System of Drug Supply for Community Pharmacies by Taipei Pharmacist Association
CPP 04	E Chang	Development Programs of International Meeting Participation for Community Pharmacies of Taipei Pharmacist Association
CPP 05	DLC Pradana	Correlation of Diabetes Treatment Satisfaction and Quality of Life in Outpatient Elderly at RSUP Dr Kariadi Semarang

CPP 06	SS Chua	Health Supplements used by Pregnant Women
CPP 07	K Saramunee	Unit Cost Analysis of Managing Common Illness in the University Health Services
CPP 08	Moe Hosaka	Investigation of Actual Conditions about Mixture of External Medicines in Japanese Health Insurance Pharmacy: Questionnaire Survey in Japan
CPP 09	JN Adilla Hayat	Knowledge, Attitude and Practice (KAP) towards Human Immunodeficiency Virus (HIV)/ Sexually Transmitted Illnesses (STIs) among Secondary School Students in Kota Damansara, Selangor
CPP 10	P Sachinkumar	Look Alike Sound Alike (LASA) Medications
CPP 11	S Yamamura	Barriers to Implementing Practice Research in Japanese Community Pharmacists
CPP 12	SL Leong	Practices of Remote and Modernised Indigenous People towards Minor Illness: A Comparison
CPP 13	CT Lin	Survey of Community Pharmacies conducting Chinese Medicine Business in Taichung
CPP 14	I Siti Nooruhani	Knowledge, Attitude and Practices of Contraception among Rural Women in Banting, Selangor
CPP 15	S Baadilla	Analysis of Factor Affecting Therapy Adherence in Systemic Lupus Erythematosus (SLE) Patients
CPP 16	M Fan	The Milestone of Pharmaceutical Service in Taiwan ~ Be Part of Consumer Protection ~ 2013 Intercity Pharmacy Forum
CPP 17	CY Ting	Awareness on the Use of Medicine and Know Your Medicine Campaign by Sarawak Consumers: A Comparison between Urban and Rural Population

Drug Marketing and Socio-Economic Pharmacy

No	Presenting Author	Title
SEP 01	M Masro	A Study on Cost Effectiveness, Reduction in Pack Per Year and Peak Flow Analysis of Electronic Cigarette Users in Klang Valley, Malaysia
SEP 02	W Chaisiripenpak	Cost-effectiveness Analysis of Medication Reconciliation at Female Medical Ward in Chonburi Hospital, Thailand
SEP 03	A Idha	Comparison of Cost Analysis and Usage Effectivity of Repacked Meropenem and Non Repacked Meropenem in Paediatric Patients
SEP 04	CC Chew	Validation of Questionnaire Assessing General Knowledge about Features of Registered Healthcare Products (VALKORP)

Industrial Pharmacy

No	Presenting Author	Title
IPP 01	BVS Nallamolu	Solubility Enhancement and Formulation Development of Aprepitant Using Self-Micro Emulsifying Drug Delivery System
IPP 02	S Rattanakiat	The Microbiological Quality of Herbal Cosmetics
IPP 03	V Senthil	Formulation and Characterization of Acyclovir Loaded Nanostructured Lipids with Polysorbate 80
IPP 04	P Boonme	Effects of Cosolvent in Water Phase on Microemulsion Regions of Nonionic Systems and Antioxidant Efficacy of Topical Nicotinamide Microemulsion
IPP 05	AMuhardiansyah	Effect of Changes in the Characteristic of the Mixing Crystalline Atorvastatin Calcium Directly With Tween 80 (Co-Crystal) which can Increase Atorvastatin Tablet Dissolution
IPP 06	Y Mardianti	Effect of Pregabalin Intra and Extra Granular to Comparative Dissolution Test with its Originator

Scientific

No	Presenting Author	Title
SPP 01	R Oka	The Hospital Formulation of Levetiracetam Suppository and Evaluation of the Pharmaceutics
SPP 02	MIA Lazhari	The Impact of High Dose Green Tea Polyphenol Extract and Vitamin C on Blood Pressure and Renal Haemodynamics in Cisplatin-Induced Renal Failure in Spontaneously Hypertensive Rats
SPP 03	H Amekyeh	Using Marker Drugs to Study the Gastrointestinal Transit Behavior of Amphotericin B-Containing Solid Lipid Nanoparticles
SPP 04	AT Jacinto	Comparative Antibacterial Property of the Matured Trunk and Stem Bark Extract of Tamarindus Indica Linn, Preformulation, Development and Quality Control of Cream
SPP 05	Y Yuliandra	The Hypotensive Activity of Defatted Crude Extract, Ethyl Acetate and Butanolic Fractions of Cassytha filiformis L. on Prednisone-Saline and Prednisone-Saline-L-NAME Induced Hypertensive Rats: A Comparative Study
SPP 06	A Ahmad	Functional Contribution of α1D Receptors in Renal Vasculature of Left Ventricular Hypertrophy Induced by Isoprenaline and Caffeine in Wistar Kyoto Rats
SPP 07	CH Chang	NMDA Receptor Antagonism in the Hippocampus Ameliorates Acute Stress Potentiation of Aggressive Behaviors in the Post-Weaning Isolation-Reared Mice
SPP 08	E Uemura	Improvement of Dispersibility of Fullerene C60 Derivative by Pluronic F-127 and the Potential to Enhance Anti-inflammatory Effect of C60 Derivative

SPP 09	F Hashemian	Investigating Regulatory Role of Prolactin in Parental Behavior in Male Parents
SPP 10	FUD Ahmad	Exogenous Hydrogen Sulfide Up-Regulates the NO/eNOS System in Spontaneously Hypertensive Rats
SPP 11	M Gazo	Acute Toxicity and the In Vitro Determination of the Contractile Effects on the Locally Administered Ethanolic Extract of the Leaves of Strophanthus cumingii (Apocynaceae) on the Isolated Skeletal Muscle of Female Sprague-Dawley Rats
SPP 12	WS Hong	Hydrolase Activity of Bacteria Isolated from Pristine Mangrove Soil
SPP 13	HC Hung	Learning Induces Sonic Hedgehog Signaling in the Amygdala Which Promotes Neurogenesis and Long-Term Memory Formation
SPP 14	RI Elina	Evaluating the Potential of Buprenorphine to Reduce Relapse to Morphine/ Methamphetamine Addiction
SPP 15	K Sagami	Anti-Inflammatory Mechanism of C60 Pyrrolidine Tris-Acid (C60-P) on Caco-2 Cells
SPP 16	KB Liew	Investigation of Taste Masking Techniques for Drug Causing Mucosal Irritation
SPP 17	CH Khiew	Effect of Bromelain from Pineapple Fruit Stem on Motility of the Gastrointestinal Tract of the Rat
SPP 18	K Tanaka	Analysis of Neurological Effects After Exposure to Silver Nanoparticles via Intranasal Route
SPP 19	JM Muarip	Formulation and Evaluation of Extended Release Microencapsulated Mefenamic Acid Using the Oil of Cocos nucifera (Coconut Fruit) and Liquid Paraffin (50:50) as Oil Phase in Solvent Evaporation Method
SPP 20	M Rahmani	Investigating the Effects of Novel Wound Dressings Based on Chitosan, Sodium Alginate, and Gelatin
SPP 21	CW Mai	Anticancer Activity and Apoptotic Induction of Chalcones against TRAIL Resistant Cancer Cells
SPP 22	M Yamaguchi	Size Effects of Gold Nanoparticles on the Tissue Distribution and Retention
SPP 23	N Nishijima	Amorphous Silica Nanoparticles Induce Size-Dependent Inflammation
SPP 24	OE Puspita	Preparation and Characterization of Diclofenac Sodium Loaded Solid Lipid Nanoparticle
SPP 25	PS Rajinikanth	Preparation and Characterization of Water-in-Oil Nanoemulsion of 5-Fluorouracil to Enhance Skin Permeation for Treatment of Skin Diseases
SPP 26	P Mittal	Effects of Black Pepper on Pharmacokinetics of Glimepiride in Type 2 Diabetic Rats
SPP 27	VNR Lim	Characterisation and Optimisation of Hydrolase-Producing Bacteria Strains Isolated from Non-Pristine Mangrove Soil
SPP 28	R Ishimoto	The Basic Analysis for the Evaluation of Nanomaterials Excretion
SPP 29	SK Verma	Molecular Docking Based Screening of Natural Products as Potential Aldose Reductase Inhibitor for the Management of Diabetic Complications

SPP 30	SA Khan	Effect of Renal Denervation on the Sensitivity of Cardiopulmonary Reflex Mechanism in Cisplatin-Induced Acute Renal Failure Rats
SPP 31	T Mori	Optimization of an Immune Method to Shorten Time for Inducing High-Affinity Antibodies
SPP 32	T Handa	The Correlation Analysis between the Size of Silica Nanoparticles and Their Acute Toxicity for Making Safer Nanomaterials
SPP 33	YF Tan	Synthesis and Redox Potentials of Copper Dithiocarbazates Complexes as Potential Radiopharmaceuticals
SPP 34	KY Tye	Antimicrobial Activity of Dichloromethane Extract of Turbinaria ornate
SPP 35	YJ Yu	AMPA Receptor Endocytosis and NMDA Receptors in the Amygdala is Involved in the Destabilization of Methamphetamine-Associated Memory
SPP 36	PP Yen	Influence of Tempol and Losartan on Sensitivity of Renal Vascular Responses to Adrenergic Agonists and Angiotensin II in DOCA-Salt Treated Rat Model of Hypertension
SPP 37	Y Iwahara	Depletion of Neutrophil Could Exacerbate Fetal Death Induced by Silica Nanoparticles
SPP 38	Y Namba	Transgenerational Effects of Silica Nanoparticles Focused on Paternal Exposure
SPP 39	Y Nishikawa	Silver Nanoparticles Induced Inflammatory Response in Human Pulmonary Cells
SPP 40	Y Takimura	Distribution of Gold Nanoparticles to the Breast Milk in Mice
SPP 41	V Asati	Synthesis and Evaluation of Antimicrobial Activity of Some 6-Chlorobenzothiazole-2-yl-hydrazones Derivatives
SPP 42	B. Babu	Development and Validation of a Stability Indicating RP-HPLC Method of Pemetrexed API from Its Forced Degradation Products
SPP 43	K Sugibayashi	Contribution of Hair Follicular Pathway of Topically Applied and Exposed Chemicals for the Total Skin Permeation
SPP 44	M Liau	The Potential of Phyla nodiflora as Chemopreventive Agent in Human Breast Cancer Cell Line, MCF-7
SPP 45	N Dwivedi	Synthesis of Amino Acid Conjugates of Dopamine for the Enhancement of Brain Targeted Delivery of Dopamine
SPP 46	S Afzal	Effect of Peroxisome Proliferator-Activated Receptor (PPAR) Agonist, Pioglitazone on Vasopressor Responses to Adrenergic Agonists and Angiotensin II in Diabetic and Non-diabetic Spontaneously Hypertensive Rats
SPP 47	WR Wan Rosalina	Tracking Cardiovascular Disease (CVD): Development of Genotyping Methods for Various Polymorphism Implicated in CVD Therapy
SPP 48	YH Hsiao	Social Interaction with a Helper Rescues Memory Deficit in an Animal Model of Alzheimer's Disease by Increasing BDNF-dependent Hippocampal Neurogenesis
SPP 49	SC Yang	Palladium-Catalyzed Allylation of Indoles with Allylic Acetates in PEG-Water System

SPP 50	HJ Oh	Hydrochlorothiazide and Candesartan Treatment Improves Blood Pressure, Renal Haemodynamics and Renal Function in Spontaneously Hypertensive Rats

Phytopharmacy & Pharmacopeia

No	Presenting Author	Title
PPP 01	CT Kumarappa	Inhibitory Effects of Polyphenolic Extract of Ichnocarpus frutescenes on Carbohydrate Digestive Enzymes
PPP 02	CC Chang	Acylated Flavonoids as α-Glucosidase Inhibitors from Tinospora crispa Leaf
PPP 03	M Taher	Antinociceptive Effects of Alkaloids Rich Fraction of Aidia densiflora in Mice
PPP 04	J Wannachot	Inhibitory Effect of Some Herbal Extracts against Streptococcus mutans
PPP 05	H Balakrishnan	In vitro Antibacterial Effects of Alteranthera sessilis Leaves Extracts on Common Bacteria Associated with Wound Infections with Emphasis on Methicillin-Resistant Staphylococcus aureus
PPP 06	MJ Siddiqui	Chemometric Analysis of Labisa pumila (Kacip Fatimah) Variants by Fourier Transform Infrared (FT-IR) Spectroscopy

Pharmacy Education and Student Affairs

No	Presenting Author	Title
PEP 01	A Hidayati	Analysis of Student Satisfaction on Service Quality in the Faculty of Pharmacy Universitas Ahmad Dahlan Yogyakarta
PEP 02	E Chang	Fun Competition of Public Education on Drug Use Safety
PEP 03	S.Karthiyayini	Breat Cancer Knowledge and Attitude, Self-efficacy and Practice of Screening Methods Among Female Students in a Private University
PEP 04	ML Tsai	Student's Perception of Objective Structured Clinical Examination (OSCE) among Taiwan Pharmacy Students
PEP 05	P Boonmuang	Needlestick Injuries among Six-Year Pharm D Students during Pharmaceutical Care Clerkships: A Survey Study
PEP 06	WZW Sazrina	The Roles of Clinical Pharmacists: Knowledge and Perceptions of Malaysian Medical Students Receiving Education in Various Countries
PEP 07	MTA Rashidi	Knowledge about Sexual Transmitted Disease (STD) Among CUCMS Medical and Pharmacy Students and in Comparison with Public in Putrajaya and Cyberjaya
PEP 08	PI Chen	The Analysis of the Training Effectiveness of Professional Seminar Performed By Post-Graduated Year Pharmacists
PEP 09	AK Mohd Tahir	Dispensing Separation Policy: Attitudes of Future Physicians and Pharmacists For Inter-Professional Collaboration

PEP 10	MZ Baharuddin	To Validate the Scale of Attitudes Towards Physician-Pharmacist Collaboration (SATP2C) Questionnaire on Medical and Pharmacy Students
PEP 11	F Muthalib	The Impact of Facebook on the Academic Performance among Pharmacy Students of International Islamic University Malaysia Kuantan
PEP 12	H-C Chou	Continuing Education for Young Pharmacists in Taiwan: the Experience from Taiwan Young Pharmacists' Group
PEP 13	S Simansalam	Integrated Behaviour Model and Pharmacy Students Intention to Provide Smoking Cessation Counselling

Pharmaceutical Legislation, Ethics and Regulatory Affairs

No	Presenting Author	Title
PLP 01	N Jinachai	ASEAN Harmonisation; Compliance of Cosmetics Regulatory Scheme in Thailand within 5 Years
PLP 02	YT Hong	Reducing Medication Supplementing Errors by a Quality Improvement Program
PLP 03	CYS Ting	Public Accessibility and Preference Towards Media Channels in Delivering Drug-Related Information: Comparison of Urban and Rural Pupulation in Sarawak

Emergency Medicine and Others

No	Presenting Author	Title
EMP 01	MA Adnan	The Haiyan Super Typhoon in Philippines: Malaysian Military Pharmacist Experience

HOSPITAL AND CLINICAL PHARMACY

HPP 01
FAPA2014000067 (Poster)

The Antibiotic Resistance among Serogroups of Non-Typhoidal Salmonella

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The salmonella are divided into over 50 serogroups based on somatic (O) antigens present. The most common O-antigen serogroups are A, B, C, D and E. Strains in these serogroups cause approximately 99% of salmonella infections in humans. The earlier drugs chloramphenicol, trimethoprim-sulfamethoxazole and ampicillin could be used for salmonellosis treatment. However, resistance to these drugs has increased significantly in recent years. Fluoroquinolones have been recommended for the treatment of salmonella infections for adults and third generation cephalosporins are the drugs of choice to treat very young patients or when fluoroquinolone resistance is present. The present study describes the antibiotic resistance of ciprofloxacin, ceftriaxone and other commonly used antibiotics among serogroups of non-typhoidal Salmonella isolates. During 2010 to 2013, the non-duplicated non-typhoidal Salmonellas were isolated from the patients. Antibiotic susceptibility was performed by the disc diffusion method according to the criteria of NCCLS. Statistical analysis for comparison of data on resistance was done by the Chi-square and Fisher`s test. Of 458 strains of non-typhoidal Salmonella were isolated from the patients. Overall antibiotic resistance among the strains belonging to serogroup B(72.5%) was significantly higher than serogroup C1(46.9%), serogroup non-C1(26.4%), serogroup D1(42.0%) and serogroup F or G(28.0%) ($P \leq 0.007$). All the resistance trains to ciprofloxacin were belonging to serogroup B. Resistance to nalidixic acid were significantly more common among the strains belonging to serogroup B and non-C1. It is demonstated that the association between nalidixic acid-resistance and reduced susceptibility to ciprofloxacin among the Salmonella Typhi isolates, and nalidixic acid-resistance might be an indication of decreased susceptibility to ciprofloxacin. In our study the resistance rate of serogroups B to ciprofloxacin was 8.8% but to nalidixic acid was 29.4%. Obviously, the resistance of salmonella strains to ciprofloxacin has been underestimated.

HPP 02
FAPA2014000083 (Poster)

Survey of Hospital Pharmacists Monitoring and Assessment of Adverse Drug Reactions from Non-Steroidal Anti-Inflammatory Drugs

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Monitoring and assessment of potential adverse drug reactions (ADRs) are important keys in evaluating the safety and benefit of drug treatment. The present study aimed to explore the roles of hospital pharmacists in ADR monitoring, including methods used and information sources for ADR assessment. This study was a cross-sectional survey. A total of 761 pharmacists, working in 287 hospitals in North-eastern Thailand, were selected by stratified random sampling in general hospitals and community hospitals, but all tertiary hospitals were included. Self-administered questionnaires

were sent by post, followed by postcard reminders to nonrespondents. The response rate was 54.8% (n=417). Pharmacists commonly reported patients' experiences of gastrointestinal irritation (71.5%) for gastrointestinal system, high blood pressure (35.9%) for cardiovascular system, and renal impairment (39.3%) for renal system. The common methods of ADR detection and assessment by pharmacists were as followed: asking patients whether they experienced any ADR symptoms (98.8%), checking patients' physical examination (24.5%), and their levels of serum creatinine (19.9%) from medical records. Most pharmacists (95.0%) assessed ADRs by themselves, in which the Naranjo's algorithm was frequently used (85.8%). However, some pharmacists referred their patients to doctors for check-up (46.6%) or to ADR specialised pharmacists for further evaluation (35.8%). Pharmacists working in community hospitals were more likely to ask patients (98.7% vs 89.3%, $p<0.001$) and refer them to doctors (58.3% vs 36.9%, $p=0.004$) than those in tertiary hospitals. Regarding ADR assessment, the Drug Information Handbook (94.2%) and Micromedex (31%) were the most frequently used sources of information. Hospital pharmacists often screened potential ADRs by asking patients about ADR symptoms experienced. Further investigations through the use of clinical parameters were uncommon. ADR assessment was commonly performed by using standardized assessment tools and reliable information sources.

HPP 03
FAPA2014000242 (Poster)

Improvement of Repackage Labeling of the Drugs in Pharmacy Unit: Somdech Phra Debaratana Medical Center Experience

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At present many drugs from manufacturers are available in bulk bottles. Repacking into smaller quantity is a big job in pharmacy unit of busy hospital. Repack and labelling in advance will shorten patient waiting time. In the past, the labelling process was done by using handlabeler. This caused several disadvantages such as no lot number indicated, and error in drug name and expiry date. The aim of this study is to find out the better labelling process. Present study was conducted at outpatient pharmacy unit of SDMC. We design software for make the right and limit number of labels, and contain essential information according to good practice standard. The contents in repackage labelling sticker are drug name, strength, Lot No., quantity, packing date, expiry date, and location. The software produces summary report daily and monthly. We started to use this program from early 2012. Since 2012-2013, 57 items of drugs were repacked. The number of drug under repacking and labelling process was over 48 million tablets. No error on the labelled description produced by the software was founded. The new label process has many advantages including 1) eliminate errors in drug name and expiry date labelling, 2) produce complete label and report, 3) help detect counting machine defects, 4) reduce working time, 5) be able to indicate dispensary room, and 6) be able to trace back if the medicine is reported product problem. The new labelling process achieves more quality and safety of drug used. The process has been expanded to the nearby pharmacy units. In the future, we plan to expand to hospital production unit.

HPP 04
FAPA2014000247 (Poster)

Safety and Efficacy of Basal-Bolus and Premixed Insulin Intensification Regimens in the Management of Type 2 Diabetes Mellitus: A 13-Year Narrative Review of Literature.

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Type 2 Diabetes Mellitus (T2DM) is a chronic condition due to insulin resistance or relative insulin deficiency. Although insulin intensification regimens are commonly prescribed for the management of T2DM, there is uncertainty regarding their optimal use. We conducted a 13 Year narrative review to compare outcomes of these regimens in the treatment of T2DM. We searched electronic databases (PubMed, Scopus, Proquest and Google Search), and "grey literature" from January 2000 to December 2013 to identify studies comparing insulin intensification regimens. Out of 17 studies identified, we only included 10 studies specifically comparing Basal-Bolus regimens (BB) versus Premixed Insulin Regimens (PM). Seven trials comparing regimens other than the studied regimens; with study duration lesser than 12 weeks; or involving Type 1 diabetes mellitus patients were excluded. The outcomes measured were divided into safety and efficacy parameters. Among the safety parameters measured were Hypoglycaemia, Weight Gain, Quality of Life (QoL), and other Adverse Events (AE). Whereas, efficacy parameters measured were Glycosylated Haemoglobin (HbA1c), Fasting Plasma Glucose, Daily Plasma Glucose, Post Prandial Plasma Glucose, Carotid Intima Media Thickness (IMT), Adinopectin Level, 1,5-anhydroglucitol (1,5-AG), Total Daily Insulin (TDI) Dose and Cost. Mixed results were discovered among all the parameters measured favouring in between BB and PM regimens. We found that BB regimens showed better glycaemia control especially in terms of primary endpoint of HbAlc but at the expanse of significantly higher TDI dose, weight gain, and further increase in cost of treatment. Whereas, all other parameters measured were comparable between regimens. Locally, conventional human insulin is still the mainstay of therapy in health facilities nationwide. Yet, none of the reviewed studies were fully conducted locally nor compared human insulin in both arms. Thus, this review highlights the need and relevancy of future researches comparing non-analogue insulin intensification regimens, locally.

HPP 05
FAPA2014000108 (Poster)

Pharmaceutical Care for Children with Type 1 Diabetes, Buddhachinaraj Hospital, Phitsanulok, Thailand

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Type 1 diabetes is a long-term condition requiring intensive daily self-management, high-quality education and training is essential. Among children with established type 1 diabetes, ketoacidosis and severe hypoglycaemia are potentially avoidable if exogenous insulin is administered appropriately. Providing pharmaceutical care for children with type 1 diabetes includes comprehensive diabetic care, individual counselling concerning motivational aspects, psychosocial problems, coping strategies and patient education camp could help children manage their diabetes and live better. Aim of the study was to determine the impact of providing pharmaceutical care on glycaemia control and hospital admission with acute complication (ketoacidosis and severe hypoglycaemia) in children with type 1 diabetes. A twelve-month prospective study was conducted from October 2012 to September 2013.

Thirty-six patients with type 1 diabetes were included in present study. The mean age at diagnosis was 9.2±3.3. Mean HbA1c was 9.56±2.3 and only 8 children had HbA1c close to target. In study period (Oct1, 2012-Sept 30, 2013), three cases of hospital admission were found, one from ketoacidosis and two from severe hypoglycaemia. All patients could correctly use insulin injection and do home monitoring blood glucose. Twenty- two patients with their families had participated in yearly education camp. In conclusion, this study demonstrates providing pharmaceutical care for children with type 1 diabetes could help patients and their families understand how to self-manage their diabetes. However, the way to control glucose level should be improved.

HPP 06
FAPA2014000106 (Poster)

Validation of the Simplified Chinese Version of the Malaysian Medication Adherence Scale (MALMAS) on Elderly Patient

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Poor medication adherence is a common concern among elderly patients. However, there is currently no gold standard for assessing medication adherence. Therefore, this study aimed to examine the psychometric properties of the Simplified Chinese version of the Malaysian Medication Adherence Scale (MALMAS). MALMAS consists of 8 items which measures one domain. It was translated into Simplified Chinese version and validated on a convenience sample of 100 elderly outpatients in a public hospital in East Malaysia. Data was collected from April to June 2013. Internal consistency of the MALMAS was evaluated based on Cronbach's alpha value. A retest was conducted a month later to assess its stable reliability. Validity was assessed using convergent validity by comparing MALMAS to the Simplified Chinese translation of Morisky Medication Adherence Scale (MMAS-8) and criterion validity was confirmed by comparing the levels of medication adherence measured using MALMAS with pill count. MALMAS has an acceptable internal consistency with Cronbach's alpha of 0.586 and a test-retest correlation of 0.405 (p<0.001), indicating fair correlation. A good correlation between MALMAS and the Simplified Chinese version of MMAS-8 was found (Spearman's rho = 0.717; p<0.001). A significant association between levels of medication adherence based on the MALMAS and pill count was observed (p=0.011). The MALMAS has a sensitivity and specificity of 80% and 67.3%, respectively, with positive and negative predictive values of 33.3% and 94.3%, respectively. The Simplified Chinese version of MALMAS is a reliable and valid instrument for measuring the medication adherence of elderly patient with good sensitivity and specificity.

HPP 07
FAPA2014000117 (Poster)

Adherence to Sitagliptin Using Medication Possession Ratio (MPR) and Its Effects on Glycaemic Control

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This study was conducted to assess the adherence and one-year persistence of type 2 diabetes patients to sitagliptin, and its association with glycaemic levels. This retrospective study was conducted in a major teaching hospital in Malaysia. Medication refill data were obtained from the pharmacy

information system for a one-year period and both patients' persistence and adherence was calculated for the first six months and the next 7 to 12 months. Patients with medication possession ratio (MPR) of at least 80% were deemed to be adherent. Possible association between adherence to sitagliptin and patients' glycated haemoglobin (HbA_{1c}) values was analysed for the same period of time. Amongst the 420 patients included in this study, 73.1% were persistence on sitagliptin for at least one year. However, only 55.5% of the patients were adherent to sitagliptin during this one year. A higher percentage of patients achieved the targeted MPR of 80% or more during the first six months (62.1%) than the latter six months (50.5%). A significant association was found between adherence to sitagliptin and the achievement of target HbA_{1c} of less than 7% (p=0.008). Patients who were adherent were two times more likely to achieve HbA_{1c} of less than 7% compared to patients who were non-adherent (Odds ratio, OR=2.11; 95% confidence interval, CI = 1.21-3.68). Only 50% of the patients were adherent to sitagliptin although more than 70% were persistent over a one-year period. Poor medication adherence was significantly related to lower achievement of HbA_{1c} less than 7%.

HPP 08
FAPA2014000198 (Poster)

Asthma Control of Adults in Public Health Clinics: Preliminary Results

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Although guidelines are available for the management of asthma worldwide, this disease is still poorly managed in many countries. Several studies showed high prevalence of symptoms and low level of asthma control among patients in Europe, the United States, Australia and Asia Pacific region. The aim of this study was to assess the level of asthma control in adults. This study constituted the baseline data obtained from a randomised controlled trial (RCT) on a Pharmacy Management Service provided to asthma patients. Participants were recruited from April 2014 to July 2014. Two government health clinics from Muar and another two from Ledang were selected as the study sites by using proportionate stratified randomisation based on patient workload. Participants were recruited based on convenience sampling. Any asthma patient who seek treatment at the study sites and met the inclusion criteria, was recruited. Asthma control was assessed using the Asthma Control Test (ACT) while the medication adherence was evaluated using the Malaysian Medication Adherence Scale (MALMAS). A total of 91 participants were recruited. Only 31.9% of the participants have controlled asthma, while partly controlled and uncontrolled asthma accounted for 34.05% and 34.05%, respectively. The mean (standard deviation, SD) inhaler technique score was 3.8 (1.5), which is considered as incorrect technique. The mean (SD) medication adherence score was 4.9 (1.7), which indicates low adherence while the mean (SD) knowledge score was 55.6 (22.0)%. In addition, the mean (SD) PEFR was 269.8 (91.64), which seemed much lower than the expected PEFR. In conclusion, the baseline results show that asthma is poorly managed in both districts. The asthma control level, inhaler techniques and medication adherence of asthma patients were low, with poor knowledge of asthma medications. Further research is warranted to investigate the effects of a pharmacy management service on asthma patients.

HPP 09
FAPA2014000243 (Poster)

Co-Prescribing of Gastroprotective Agents with Nonsteroidal Anti-Inflammatory Drugs in a Tertiary Hospital: Preliminary Results

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The need for gastroprotective agents (GPAs) in managing nonsteroidal anti-inflammatory drug (NSAID)-induced gastrointestinal adverse effects has been widely recommended in clinical guidelines. However, the utilization of GPAs is still suboptimal in most countries. Therefore, the present study aimed to investigate the co-therapy of GPAs with NSAIDs in Malaysia. A prospective cohort study was conducted in the outpatient pharmacy of University Malaya Medical Centre. Patients who filled their NSAID prescriptions to be taken on a regular basis, for a minimum of two weeks, were recruited via convenience sampling. Data was collected via interviews and the occurrence of dyspepsia was assessed using the Modified Leeds Dyspepsia Questionnaire. Participants were followed-up via telephone interviews for the duration of their prescribed NSAIDs or up to three months. By July 2014, 205 patients had been recruited. The mean age (standard deviation) of the participants was 51.5 (14.4) years, and comprised of 58.5% females. In terms of ethnicity, there were Malays (46.3%), Indian (32.7%), Chinese (19.5%) and others (1.5%). In addition, 18% of the participants were found to have dyspepsia at baseline. The most common NSAIDs prescribed were diclofenac sodium (98 participants; 47.8%), followed by celecoxib (63 participants; 30.7%), meloxicam (29 participants; 14.1%) and etoricoxib (13 participants; 6.3%). Two of the participants received a combination of two NSAIDs: diclofenac sodium plus meloxicam, and diclofenac sodium plus indomethacin. The co-prescription of GPAs was low (10.2%), with mainly standard-dose ranitidine and omeprazole. There were also two prescriptions with magnesium trisilicate. Of those co-prescribed with GPAs, 19% did not cover the entire duration of the NSAID use. In conclusion, the rate of co-prescribing of GPAs with NSAIDs was low. However, further study should also assess the risk factors of the patients on NSAIDs to ensure that GPAs are used appropriately.

HPP 10
FAPA2014000244 (Poster)

Unclaimed Prescriptions at the Outpatient Pharmacy of a Teaching Hospital

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Non-adherence to medications is a common phenomenon that limits the effectiveness of prescription medications. Most studies focused on secondary non-adherence where the prescriptions were not refilled on time or when patients discontinued their medications whereas, primary non-adherence occurred when filled prescriptions were not claimed by the patients. Primary non-adherence is not commonly studied and hence, the aim of this study was to investigate the incidence of unclaimed prescriptions at the pharmacy of a teaching hospital. This prospective study was conducted from April to May 2014 at the Outpatient Pharmacy of University Malaya Medical Centre. All unclaimed electronic prescriptions were screened at the end of each working day. Patients' particulars were obtained from the prescriptions, as well as from the pharmacy information system (PIS) and electronic Health Records (eHR). Unclaimed prescriptions were classified into two groups: prescriptions for acute and chronic conditions. A total of 15,765 electronic prescriptions were received by the pharmacy for a 38-day working days. A total of 500 prescriptions (3.2%) were not claimed that is, an average of 13.2 unclaimed prescriptions per day. Females comprised of 54.8% of those who did not

claim their prescriptions. The unclaimed prescriptions comprised of 59.8% acute medications and an average of 2.4 medications per prescription. Further studies should determine the reasons for patients not claiming their prescription so that appropriate strategies can be implemented to address or minimise such problem.

HPP 11
FAPA2014000278 (Poster)

The Analysis of the Different Treating Dosage Regimen of Inhaled Colistin Methanesulfonate in Treating the *Acinetobacter Baumanni* Pneumonia

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Acinetobacter baumanii (AB) and Multidrug-resistant *Acintobacter baumanni* (MDRAB) from the respiratory secretions posed a great challenge for infection control. Colistin mehanesulfonate (CMS) was the drug of choice of MDRAB. To maximize target concentration, we tried to find the least toxic and the most effect dosage of inhaled CMS to treat MDRAB pneumonia. Patients who were admitted during January to August 2011 and had sputum culture of AB or MDRAB and treated with inhaled CMS were included. People who received intravenous CMS only and those who received CMS inhalation < 3 days were excluded. We defined the day of first isolation of AB or MDRAB as index day and at least 2 consecutive cultures revealed no growth in 7 days as early eradication. Clinical outcomes were assessed by SPSS. We enrolled 113 cases (79 men and 34 women) including 16 cases of 2 million international units (IU) (=160 mg CMS) daily, 94 cases of 4 IU daily and 6 cases of 6 IU daily. The early eradication rates of the three groups were 81.25%, 91.49% and 33.33%. We traced one month from the index day to record as the recurrence rate. The recurrence rates of the three groups were 25%, 11.70% and 66.67%. The MDRAB rates were 93.75%, 90.43%, and 66.6%. The renal failure cases during drug usage time were only recorded 2 cases in 2 IU group and 6 cases in 4 IU group. No neurotic adverse effect was recorded. We analyze 2 IU and 4 IU groups by Chi-Square analysis and there no significant between these two groups. We found the inhaled CMS might be another choice of eradication AB pneumonia. However, inhaled daily CMS dosage of 4 IU might have lower recurrence rate.

HPP 12
FAPA2014000195 (Poster)

The Impact of Imipenem Shortage for the Clinical Utility of Anti-Pseudomonal Carbapenems: A Cross Sectional Analysis

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Anti-pseudomonal carbapenem, imipenem and meropenem, have played an important role in nosocomial infection treatment. To improve the use of carbapenems, several initiatives should be considered, increase awareness about appropriate treatment and cost containment issues. In our setting, meropenem is more economical than imipenem and imipenem was withdrawn from the hospital formulary and replaced by generic meropenem. Thus, this study is to assess the impact of the imipenem shortage on the clinical use and costs of alternative anti-pseudomonal carbapenem antibiotics. A retrospective cohort study of critically ill patients with infections diagnosed in medical wards, Ratchaburi Hospital, between May 2012 - May 2014 was undertaken. The mortality and bacteriological eradication rate was evaluated over the first 14 days of treatment in comparable between those receiving imipenem and meropenem treatment. Cost containment of anti-pseudomonal

in medical ward between 2 periods was compared. For clinical evaluation, the treatment of 112 was evaluable for clinical and bacteriological efficacy. The duration of antibiotic treatment was 13.19 +/- 5.9 days and 11.3 +/- 4.74 days (mean +/- SD) for meropenem and imipenem respectively. 26 (46.42%) and 30 (53.5%) patients were receiving assisted ventilation and innotropic agents for meropenem and imipenem. Among patients who survived to 14 days, survival rate were similar, 98.2% vs 94.6% for meropenem and imipenem respectively but bacteriological rate were significantly difference, 78.5% for meropenem and 92% for imipenem. For economical issues, there was dramatically significant increase in the consumption of meropenem in medical ward with definitive interruption of imipenem supply. These shifts were associated with significantly higher overall costs, 4,008,691 vs 5,754,112 Bath, before and after imipenem withdrawal respectively. Imipenem shortage had no impact for clinical outcomes. For cost containment issues, an interruption of medication should be use with caution as alternative policy.

HPP 13
FAPA2014000269 (Poster)

Trend of Drug Utilization Pattern with the Anatomical Therapeutic Chemical (ATC) Classification in a Tertiary Teaching Hospital from 2006 To 2013

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In facing medical progress and finial imbalance of National Health Insurance (NHI), controlling the growth of pharmaceutical expenditures is a major challenge issue. In this study, we aim to know the trends of drug utilization pattern with the anatomical therapeutic chemical classification in a tertiary teaching hospital in southern Taiwan. We evaluate the percentage of cost of drugs in total medical cost 2006 to 2013. And we use the anatomical therapeutic chemical classification to know the trend of drug utilization in the study period. The proportion of NHI expenses on pharmaceuticals was increased from 24.2% (820 million TWD) to 29.2% (152 million TWD) (P<.001). The proportion of self-paid drug expenses was changed from 11.0% (70 million TWD) to 8.6% (100 million TWD) (P=0.112) The 3 highest expenses on pharmaceuticals in ATC subgroups (therapeutic subgroup) were determined in 2013. Antineoplastic agents was highest (23.1%), followed by antibacterial agents (9.8%) and antiviral agents (7.5%).The trend of expenses of antineoplastic agents significantly increased between 2006 and 2013 (P<.001). Using ATC code (chemical substance), the 3 highest expenses on pharmaceuticals was sorafenib (3.0%), gefitinib (2.1%) and piperacillin/tazobactam (1.9%). Among expenses on pharmaceuticals in antineoplastic agents in 2013, protein kinase inhibitors was highest (33.7%), followed by monoclonal antibodies (16.2%) and taxanes (10.8%). And the trend of expenses of protein kinase inhibitors and monoclonal antibodies significantly increased between 2006 and 2013 (P<.001). The findings related to antineoplastic agents were consistent with global prevalence of cancer and payment approval for cancer targeted therapy by Taiwan NHI. Although very high drug expense, oral targeted therapy had the advantage of cost savings on total inpatient expenditures and other medication costs due to quality of life improvement. Further cost-effectiveness assessment of targeted therapy such as protein kinase inhibitors and monoclonal antibodies is needed.

HPP14
FAPA2014000057 (Poster)

Applying the Quality Control Method to Decrease the Prescribing Errors of Emergency Department

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"Patient safety" is the fundamental quality of patient care. The Association For Healthcare Quality, Taiwan regularly announced the hospital patient safety goals, strategies, principles and suggested practice, reference to the annual target and strategies of Joint Commission on Accreditation of Healthcare Organizations (JCAHO). "To elevate medication safety" is the first goal. Prescribing errors are the most common type of medication error and are often preventable. Computerized physician order entry (CPOE) system has been used in almost all hospitals in Taiwan to reduce transcription errors by nonprofessional technicians. The prescribing error rates and types were collected by the pharmacist responsible for monitoring, and THIS (Taiwan Healthcare Indicator Series) indicator was calculated. If prescribing error rate is higher than the peer value in the same level of hospitals, we would try to improve the original cause. The prescribing error of emergency department (0.43%) was noticed higher than the peer value (0.19%) in November 2012. The causes were evaluated and 85.7% was related to wrong dosage form, as acetaminophen tablet was prescribed as syrup. In order to distinguish between the upper and lower rows of confusing medicines, changing the colour of certain dosage of medicine were discussed, resolved and developed. After that improvement, prescribing error of emergency department decreased to 0.05% in April 2014, lower nearly 8.6 times than in November 2012. Even CPOE could reduce transcription errors by non-prescribers, but "To Err is Human", it still can be improved continually to reduce self-input errors. In addition, pharmacist's cognitive service remains essential to protect patient safety.

HPP 15
FAPA2014000128 (Poster)

Effectiveness of Intervention among Patients with Diabetes and Hypertension by Pharmacist and Health Care Professionals in Nongku Primary Care Unit, Sisaket Province, Thailand

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The Sisaket Hospital team provides services for all patients attending the primary care unit. The number of patients suffering from diabetes and hypertension in Nongku primary care unit increases from 241 in 2008 to 304 in 2013. Although the team provided the adequate knowledge and advices, there were still several uncontrolled blood glucose and/or blood pressure levels. Seven colours ping-pong model was introduced to motivate the patients in controlling their diseases and self-care. The objective of the study was to assess the effectiveness of intervention, using 7 colours ping-pong model by Pharmacist and other health care professionals on blood glucose levels and blood pressure levels. Descriptive study consists of 156 diabetic or/and hypertensive patients were selected using purposive sampling. Comparison of blood glucose levels and blood pressure levels before and after the intervention were performed. Data were analyzed using percentage, mean, standard deviation, Paired sample t-test and Wilcoxon signed-rank test. The percentage of patients with diabetes, hypertension and diabetes with hypertension were 38.22, 36.94 and 24.20 respectively. Mostly were female (64.70%).The average age was 61 years. After intervention, the numbers of patients who can control blood sugar levels increased from 25.51% to 35.71%. The results revealed that fasting blood sugar decreased from 166±75 mg/dl to 149± 57 mg/dl, significantly ($p < 0.01$). The numbers of patient who

can control blood pressure have increased from 82.05% to 84.62%. Blood pressure decreased from 127± 16 mmHg to 126± 16 mmHg. (p = 0.049). The intervention provided to patients with diabetes and hypertension by Pharmacist and other health care professionals was effective in improving the process of care. The patients' blood glucose and blood pressure levels decreased significantly.

HPP 16
FAPA2014000094 (Poster)

Pharmacist's Role in the Development of Pharmaceutical Management System under Limited Budget: A Case Study in Saraburi Hospital

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Pharmaceutical management is one of the most important jobs under the responsibility of pharmacist which includes drug selection, procurement and distribution in order to promote reasonable use of pharmaceutical products. Pharmaceutical cost is the second highest in hospital, thus reducing it can significantly affect the quality of service, especially under limited budget. This was a descriptive study comparing the drug management data of Saraburi Hospital during budget years 2012 and 2013. As compared with budget year 2012, the cost of drug procurement dropped by 120,638,484.02 baht (22.26%) and drug stock was reduced by 59,123,334.74 baht (14.92%) with no negative impact on the quality of patient care. Pharmacist negotiated with related suppliers to reduce drug prices below the standard prices issued by Ministry of Public Health. Saraburi Hospital saved the drug cost by 3,665,734.77 baht, compared to the cost reduction in previous budget year 2013, 472,812 baht (14.81%). Pharmacist as a member in the Pharmacy Therapeutic Committee (PTC) helped define hospital drug-related policies which promoted reasonable use of pharmaceutical products. After the implementation of the policies, the use of carbapenems in fiscal year 2013 dropped by 17.25%, saving the cost of 24,249,809 baht (49.50%). Efficient pharmaceutical management not only guarantees quality, reasonable use and sufficiency of drugs, it can also give positive impact to hospital financial status especially under limited budget. Pharmacist's role is also important in the development of efficient pharmaceutical management system under regulations, good governance, transparency and accountability.

HPP 17
FAPA2014000219 (Poster)

Evaluation of Clinical Efficacy and Safety of Switching from Twice-Daily to Once-Daily Tacrolimus Formulation in Liver Transplant Patients

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Immunosuppressant non-adherence has contributed to a major problem in transplantation which leads to rejection and graft loss. In the previous studies, conversion to tacrolimus once daily in liver transplant patients seemed to be effective, safe, and improved adherence. In our hospital, we tried to switch from twice daily tacrolimus regimen to once daily in liver transplant patients in 2013. The aim of this study was to assess the efficacy and safety in liver transplant patients converted from twice-daily to once-daily tacrolimus. This was an observational study conducted from January 2013 to June 2014. Conversion from twice-daily to once-daily tacrolimus was based on a 1:1 mg proportion. All liver transplant patients with conversion formulation were eligible for the study. No monitoring procedures other than those required in the course of current clinical practice were applied to the liver transplant patients. The clinical practice included to evaluate tacrolimus trough level, liver and renal function, glucose, lipid, blood pressure, rejection episodes, and any adverse event at pre-conversion,

months 1, 3, and 6 after conversion. Eight patients were enrolled in the study (mean age 52±8 years). Median time since liver transplant was 23 months (range: 8 to 31 months). Mean conversion formulation time was 13±6 months after liver transplantation. Mean tacrolimus level concentration was 4.1±2.1 ng/ml at baseline, and tended to equal during follow-up (month 6: 3.7±2.0 ng/ml, P = 0.711). Liver function, glucose, lipid and blood pressure remained stable during the study. No rejection episodes or adverse events were occurred. There was no significant difference in renal function (calculated by MDRD equation) before conversion and at month 6 post-conversion (77.6±40.6 ml/min vs. 82.0±44.8 ml/min, P = 0.856). Conversion from twice-daily to once-daily tacrolimus in liver transplant patients is equivalent efficacy, adequate safety, and maintained stable renal function.

HPP 18
FAPA2014000034 (Poster)

The Quality of Life of Dementia Caregivers before and after Patients Receiving Pharmaceutical Care

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This study was aimed to investigate the quality of life of dementia caregivers and the changes in the caregivers' quality of life after providing pharmaceutical care for the patient. The studies were performed on the outpatient dispensary unit at the pharmacy department, Prasat Neurological Institute. The study was focused on caregivers who care for patients with moderate to severe dementia for at least 6 months. The quality of life of the caregivers was assessed using the SF-12 version 2 to evaluate their quality of life before and after providing pharmaceutical care. The research period was from October 2012 to September 2013. The results showed that the overall average qualities of life levels for caregivers both before and after providing pharmaceutical care are higher than the United States criteria 62.78±12.94 and 59.51±11.46, respectively, which indicated that the dementia caregivers have a good quality of life. A comparative study on the quality of life of the caregivers both before and after providing pharmaceutical care were done, and according to the result in terms of physical health, the score of caregivers with a lower quality of life reflects that they had cared for dementia patients for a long time. This shows an increase in the caregivers' physical burden. As for their mental health, the caregivers have a higher quality of life score after providing pharmaceutical care. The result also indicated that the caregivers whose status is the spouse of a patient will make the patient respond to the medication more effectively.

HPP 19
FAPA2014000093 (Poster)

The Effect of Pharmacists' Interventions in Acute Myocardial Infarction Patients as a Part of the Cardiovascular Care Team

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The ratio of male and female patients with acute myocardial infarction (AMI) at Far Eastern Memorial Hospital is 4:1, 32.5% of patients between 51-60 years of age. 13.2% patients may be readmitted due to another episode of MI or stent thrombosis. The pharmacists play an important role to ensure that MI patients receive the appropriate treatment including antiplatelet agents. Quality improvement indicators were created to ensure that patients received medication education prior to discharge and comprehensive care. The "cardiovascular care team" was established in 2011 to ensure that patients received comprehensive treatment and medication education. 12 items of quality

improvement indicators were created. For example, ensure dual antiplatelet agents were prescribed to appropriate patients. Pharmacists were invited to be part of the cardiovascular care team in the third quarter of 2011 to help to ensure that all patients received medication education prior to discharge from hospital. In the fourth quarter of 2012, pharmacists further improved comprehensive care by following up patients at least twice within six months of discharge. Patients' understanding of medication was calculated with the use of a questionnaire. Only 52.9% of AMI patients received medication-related education prior to discharge in 2011. This rose to 90.9% in 2012 with the use of computer software to identify all patients that require medication education. In drug awareness questionnaire, 70% of patients received full marks on medication storage, dosage and indication. During the first follow up, 57.1% of patients received full marks on NTG use on questionnaire as compared to 85.7% of patients in the second follow up. This shows that education helps with patient's NTG use. With the assistance of computer software and modifications in the standard operating procedures, nearly all AMI patients received medication education prior to discharge. NTG using cognitive scores improved 1.5 times.

HPP 20
FAPA2014000197 (Poster)

Survey of Drug Related Problems Identified from Home Visiting by Thai Pharmacists

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Patients with chronic diseases have higher risk to get drug related problems (DRPs) since majority of them need to take many medications. In addition, some of these medication regimens are complex. In Thailand, home pharmaceutical care has been provided for these patients for approximately 10 years. The aim of this study was to detect DRPs, their causes and problem management by home pharmaceutical care. This descriptive study was conducted in 28 home health care settings in Thailand, from July to December 2013. Information on each possible DRPs detected were recorded using structured questionnaire and observation during pharmacist home visiting. Prevalence, pattern, causes of DRPs and problem management/prevention were analyzed. A total of 743 DRPs were identified in 717 patients. The most common types of DRPs were failure to receive medication (212, 28.53%), followed by untreated indication (102, 13.73%) and adverse drug reactions (53, 7.13%). The major cause of these problems was inadequate knowledge of patients and their caregivers. Most patients and their caregivers did not understand the reason for taking medications continuously. Individual medication counselling and medication reconciliation should be given to every patient and their caregivers. Multidisciplinary coordination should be able to solve and reduce preventable DRPs. Pattern of DRPs was similar to previous studies in home care settings. These findings would guide to promote pharmaceutical care in primary care settings to improve medication management including adherence and DRPs prevention.

HPP 21
FAPA2014000062 (Poster)

A Case Report of Suspected Vinorelbine-Induced Pulmonary Oedema Worsen

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We display a case report of vinorelbine induced pulmonary oedema and probe the causes of pulmonary oedema and relevant clinical matters. A 56-years-old woman have been diagnosed with right breast cancer stage A, $pT_2N_0M_0$, ER, PR (-), HER/neu (-) and underwent modified radical mastectomy. She received D1 cisplatin 60mg/m^2, vinorelbine 35mg/m^2 , D8 vinorelbine 35mg/m^2 therapy. After received second cycle chemotherapy, the patient presented with shortness of breath. Chest X-ray showed pulmonary oedema and left ventricular ejection fraction (LVEF) was 51% by echocardiography examination. After treatment, pulmonary oedema was resolved. When she accepted third cycle chemotherapy, the patient suddenly became dyspnoea after 30 minutes of IV infusion vinorelbine. Follow-up by echocardiography, the LVEF rate decreased to 36.1%. Oxygen support with mechanical ventilator and furosemide 20mg Q8H was given, she was discharged after 3 days. Based on the presentation of this patient, vinorelbine-induced pulmonary oedema was suspected (Naranjo score is 4). Vinorelbine has more high lipophilic properties compared with others Vinca drugs, approximately 300 and 100 times more concentrated in heart and lungs, respectively, than in serum. The direct enhancing effects of the alkaloids on the coagulation mechanism lead to arterial occlusion. The other effects on the myocardium induce to cellular anoxia. These may lead to heart failure be exacerbated and induce clinical symptoms of pulmonary oedema. Cancer patient have heart failure combined with receiving vinorelbine should be closely monitored.

HPP 22
FAPA2014000065 (Poster)

Analysis of the Use of Secondary Prevention Drug Therapy in Patients with Acute Myocardial Infarction after Discharge from Hospital

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Acute myocardial infarction (AMI) patients still show high recurrence rate even after treatment. AMI patients after discharge from hospital are required to continue taking dual anti-platelet agents, oral β-blockers, statin drugs and an angiotensin II converting enzyme-inhibitor (ACEi) or angiotensin II receptor blocker (ARB) as secondary prevention of acute coronary event. We tried to follow-up the condition of these patients after physicians stopped prescribing β-blockers, statin and ACEi or ARB. A total of 98 patients were enrolled. After their discharge we checked their medications on the first, third and six months at our cardiovascular clinic (McNemar test). The most common drug that physician did not prescribed was ACEi/ARB followed by β-blocker and statin. Comparing drugs given at the time of discharge and during their visit at CV clinic, statin drug came in first (18.4%, 26.6% and 32.7%) ($p < 0.001$), followed by the ACEI / ARB (17%, 19.1% and 18.1%) ($p < 0.001$), and β-blocker (5.1%, 15.4% and 14.4%). Reason for not prescribing ACEI/ARB was due to its dry cough, elevated creatinine level, hypotension and intolerance. For β-blockers if patient developed bradycardia or asthma. For statin, a small number of patients complain of myalgia, elevated liver enzymes or the price of the drug but mostly the reason is not known. AMI patient stopping these drugs should be under the physician discretion. We also considered the recommendations from the latest treatment guidelines. Another reason is that government-run national health insurance system can also influenced the physician's decision on prescribing drugs.

HPP 23
FAPA2014000207 (Poster)

The Measures of Adherence to Antiretroviral Therapy in Thailand: A Survey Study

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A good adherence to antiretroviral therapy is an important issue to sustain HIV suppression, reduce risk of opportunistic infection and improve overall survival in HIV patients. Thus, the measures were widely used for adherent assessment. This study aimed to survey the type and number of adherent tools used by pharmacist at HIV/AIDS care clinic. This study was a survey study among the pharmacists by using a self-reporting questionnaire. We include the pharmacist participating in HIV/AIDS conference by PIPHAT group (Pharmacist Initiative for Patients Living with HIV/AIDS Thailand) in Bangkok, Thailand on the 11th- 15th February 2013. All interviewed pharmacists worked at HIV/AIDS care clinic or ambulatory care clinic and have used the measures of adherence to antiviral therapy. Out of 42 participants, 7 (16.7%) were males. 19 (45.2%) and 14 (33.3%) of the surveyed pharmacists worked in the community and general hospital, respectively. Most of them (n=27 participants, 64.3%) counselled their patient at HIV/AIDS care clinic. The use of mono-, dual-, and triple tools by pharmacist for adherent assessment was 42.9, 50 and 7.1%, respectively (n=18, 21 and 3 cases, respectively). With 18 pharmacists using 1 tool, they selected either the patient self-report or pill count for measurement (n=9; 50% and n=9; 50%, respectively). Patient self-report in combination with pill count was the most used method among 21 pharmacists using 2 tools (n=13; 61.9%). Most of interviewed pharmacists use more than 2 tools for adherent assessment. It seems to be an appropriate strategy to confirm the patient adherence by a different method. However, the nationwide survey is necessary for revealing the real situation on the use of adherent tools in Thailand.

HPP 24
FAPA2014000044 (Poster)

Save Drug, Save Cost, Save Life

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This study aimed to explore groups, items and values of leftover medicines of patients in Vachiraphuket Hospital, and to identify the cause and ways to reduce leftover medication cost. We anticipate the result of preventing any adverse drug events from leftover medication in patients. Data were collected during 2 years period from April 2012 to March 2014. The overall value of leftover medicines was 2,920,248 baht. The value of expired or deteriorate medicines was 458,114 baht. The highest value of returned medicines according to pharmacological group were central nervous system with 387,1670 baht, cardiovascular system 119,416 baht and nutrition and blood 117,642 baht. The highest amount of returned medicines according to pharmacological group were antidiabetic drugs 103,503 tablets, followed by vasodilator antihypertensive drugs 78,991 tablets and minerals 42,266 tablets. From 588,683 tablets of returned medicines, the top three drugs of highest amount were metformin 500 mg 63,533 tablets (10.79%), glipizide 5 mg 31,500 tablets (5.35%) and calcium carbonate 600 mg 31,187 tablets (5.29%). Whereas, the top three drugs of highest value were Keppra 500 mg tablet with a value of 93,580 baht, apresoline 25 mg tablet 89,653 baht and morphine 20 mg capsule 84,434 baht. Most of the leftover medicines were found in chronic disease. Reasons were

found to be overprescribing and overused medication by the physicians, patients forgot to take medicines, patient misunderstanding, physicians changed the treatment regimens and patients were transferred to other hospital. These results revealed the drug related problems especially in the diabetic group patients and lead to the intervention in patient education program among these patients. Especially the need for better care from pharmacists and healthcare practitioners in order to improve the patients' knowledge and understanding in rational use of medicines and to improve the medication utilization in hospital.

HPP 25
FAPA2014000023 (Poster)

Evaluation of the Extent and Impact of Oncology Clinical Pharmacy Service in a Tertiary Hospital in Hong Kong: First Ten-Month Experience

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Oncology pharmacist counselling service was launched at the Prince of Wales Hospital (PWH) since the end of 2011 for all patients who are newly starting on chemotherapy or other anti-cancer agents. This study aims to evaluate the extent and impact of pharmacists' intervention and to recognize the potential risk factors of DRPs in a local tertiary hospital. A retrospective review was carried out. Information regarding the service between February 2012 and December 2012 were collected. Drug Related Problems (DRPs) identified were classified according to the PCNE Classification V6.2. An independent oncology pharmacist was responsible for evaluating the clinical significance of individual DRPs. Potential risk factors leading to the occurrence of a pharmacist's intervention were also analyzed. A total of 842 patients were included in this study. DRPs were identified in 255 (30.3%) patients. Common problems identified fall under the "Treatment Effectiveness" and "Adverse Reactions" categories. Common causes of DRPs include concomitant drug-food interactions, inappropriate combination of drugs, and non-compliance issue of patients. There were 356 interventions performed at prescriber, patient/carer and drug levels. The majority (95.3%) of DRPs were "somewhat significant" or "significant" and the average Intervention Ranking Score was 3.13 (S.D=0.45). One or more concomitant diseases ($p<0.001$), hypertension ($p=0.026$), polypharmacy ($p=0.027$), type of treatment ($p=0.006$), and lung carcinoma ($p<0.001$) were found be significant positive risk factors to the occurrence of intervention in univariate analysis. In conclusion, the service was shown to be beneficial to patients as pharmacist was able to identify drug related problems to optimize drug therapy as a whole. Further studies are required to build a more comprehensive model of risk factors. Awareness of the various DRPs and the possible risk factors of the DRPs should be the key to a high-standard drug therapy.

HPP 26
FAPA2014000088 (Poster)

Lenalidomide Treatment for Relapsed/Refractory Multiple Myeloma: The Experience from a Medical Centre in Taiwan

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Lenalidomide is an immunomodulatory drug derived from thalidomide which has been used for the treatment of relapsed/refractory multiple myeloma (RRMM). We evaluated the efficacy and safety of lenalidomide in patients with RRMM at a medical center in Taiwan. We conducted a retrospective analysis of lenalidomide in patients with RRMM who were treated in Changhua Christian Hospital in Taiwan. Data was collected from electronic patient record which includes demographic data,

myeloma (M) protein levels, hospital admissions record and incidence of adverse events. A total of 15 patients (F:M ratio 2:3) included during Jan 2013 to May 2014. The average age was 63.7±10.2 years. The median time from diagnosis to lenalidomide treatment was 38.8 months (0.3 -100.9). Among these patients, 14 patients relapsed or progressed after two prior therapies, including bortezomib (100%) and thalidomide (85.7%). With an average time of 6.7 months after starting lenalidomide, the partial response (defined as a reduction in M protein levels of at least 15 percent) was observed in 10 (66.7%) patients. However, there were still 4 patients converted to other chemotherapy due to lenalidomide failure, and 3 patients died. During the study period, hospital admissions were observed in 7 patients, mostly because of infection problem. The most common adverse drug reactions were thrombocytopenia (40%), neutropenia (33%), leukocytes (20%), skin rash (13%), and fatigue (6%), all with mild degree. It seems that lenalidomide is effective and less toxic for RRMM in our patients. However, with the limitation of population size and follow-up period, we need more data to confirm the appropriate treatment regimens about lenalidomide until disease progression.

HPP 27
FAPA2014000204 (Poster)

The Relationship between Medication Possession Ratio and Medication Regimen Complexity among Hypertensive Patients: A Population-Based Study

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Studies focusing on the relationship between the medication possession ratio (MPR) and medication regimen complexity index (MRCI) have not been adequately described. This study aimed to explore the relationship between MPR and MRCI among hypertensive patients in Taiwan. A total of 10 descriptive statistics were performed for all measures as appropriate. The MPR was further divided into high (≥80%), medium (<80-60%), and low (<60%) groups, and Chi-Square test and analysis of variance were performed for comparisons of demography. A total of 598 hypertensive patients were selected from 800,000 random samples of the National Health Insurance Research Database (NHIRD) in Taiwan. The MPR and MRCI were analyzed using correlation coefficient. Multiple regression analysis was used to examine the relationship between MPR and MRCI with controlling for potential confounding factors. All data were analyzed using SAS 9.3 statistical analysis software. Among the total patients from 2007 to 2008, those who took antihypertensive medications had a mean number of taking 2.6 different kinds of antihypertensive drugs. The mean MPR was 36.83 (standard deviation, SD=28.43), with 1136 (10.7%), 1667 (15.7%), and 7795 (73.6%) in high, medium, and low MPR groups, respectively. The mean MRCI was 26.43 (SD=26.18). Significant difference was found among three groups according to age, gender, number of medical providers, comorbidities and MRCI. The MPR was positively correlated with MRCI (r=0.55, p=0.00). The R2 for the multiple regression analysis was 0.32, indicating that 32% of the variance in MPR was accounted for by MRCI. The MRCI was observed to be a reliable predictor of MPR (β=0.58, p=0.00). The MRCI is a useful predictor for the MPR of the hypertensive patients in Taiwan.

HPP 28
FAPA2014000060 (Poster)

Susceptibility of Ciprofloxacin-Sensitive and Resistant MRSA Isolates to Non-Beta-Lactam Antibiotics

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MRSA was first detected in 1961, and has been regarded as a hospital-acquired bacterium, namely HA-MRSA. Since the mid-1990s there have been individuals who were without any recent contact with the health care system began presenting with MRSA infections. This new MRSA strains often called CA-MRSA. CA-MRSA strains have been distinguished from HA-MRSA by molecular means. HA-MRSA strains carry SCCmec type I, II, or III and are usually resistant to beta-lactam antibiotics and many classes of non-beta-lactam antibiotics. CA-MRSA isolates carry SCCmec type IV or V and are more susceptible to non-beta-lactam antibiotics. In 2008, Otter *et al* indicated that 82% of the ciprofloxacin-sensitive MRSA isolates were found to be SCCmec IV positive. So, ciprofloxacin susceptibility may be used as a screening marker to select isolates likely to be CA-MRSA. Our study is to investigate the differences of the non-beta-lactam antibiotics susceptibility between ciprofloxacin-sensitive and -resistant MRSA isolates. Total of 1359 MRSA isolates were collected from patients during 2012 to 2013. The resistances of non-beta-lactam antibiotics were determined by disc diffusion method. Statistical analysis was done by using the Chi-square and Fisher`s test. The resistance of MRSA isolates to ciprofloxacin, TMP/SMX, clindamycin, rifampicin, and erythromycin is 68.7%, 51.5%, 92.3%, 24.4%, and 92.5 %, respectively. There were statistically significant differences among all antibiotics (P=0.000) except between clindamycin and erythromycin. The resistance of ciprofloxacin-sensitive MRSA to TMP/SMX and rifampicin were lower than ciprofloxacin-resistance isolates (5.2% vs 72.6%, p=0.000 and 3.3% vs 34.0%, p=0.000, respectively). Although ciprofloxacin-sensitive MRSA isolates showed low resistance to TMP/SMX and rifampicin, they are highly resistance to clindamycin and erythromycin (82.8% and 83.1% respectively). Can the susceptibility of ciprofloxacin be used as a definitive marker to spark initial suspicion of CA-MRSA? We need further investigation in gene typing of these MRSA isolates to prove it.

HPP 29
FAPA2014000059 (Poster)

Joint Commission International Accreditation Standards for Hospitals its Impact and Analysis on Hospital Drug Safety Use

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According to the Joint Commission International [JCI] Accreditation Standards for Hospitals, patient safety and medication management is one of the key goals in the accreditation program. From a foreign accreditation system viewpoint we hope can help us improved our pharmacy department by doing a comprehensive investigation on our pharmacists' workflow and medication quality system. In 2008, our hospital participated in the JCI accreditation program. This program includes organization and management survey, drug selection and procurement, storage, ordering and transcribing, preparing and dispensing, administration and monitoring, and international patient safety goals for foreigners included here are patient identification and drug safety and warnings. In the 2006 to 2008 before the accreditation program we had a higher near miss rate, ratio than after the accreditation

program in Dispensary Department (p<0.001, 95% C.I. 0.039%~0.0521%). However in medication error we found a higher number of cases after the accreditation (this is due to increase awareness and reporting). No significant difference [p=0.245] regarding inappropriate prescription ordered by physician but the number of cases reported after the program was significantly reduced. Surveillance of the expiration date of drugs, items requiring refrigeration and parenteral nutrition were within threshold range. No difference was noted before and after the evaluation. From the accreditation program evaluation to our analysis, we found there is difference from our usual practice and the standard sets by the JCI with regards to drug safety issues. These includes patient identification , high alert medications and drug safety and management , proper use of medications with clear labelled information for patient's use and continue care. All these needs improvement and upgrade to conform to the standard set by the JCI. We hope with proper efforts we can improve our system in line with international standards.

HPP 30
FAPA2014000066 (Poster)

Analysis of the Effectiveness of the Quality of Outpatient Pharmacy Service

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Taiwan has not fully implemented the policy of separation of drug prescribing and dispensing, leading to an increase in the workload of the Department of Pharmacy in the Outpatient of the hospital. We are hoping that an information system can be created in order to assist the delivery more efficiently and improve the quality of the service in the pharmacy department. Information was collected at our outpatient pharmacy data quality monitoring indicators system from 2012-01 to 2013-12. These includes improvement measures regarding pharmacist can immediate dispensing after doctor prescribed medications before patients going to the cashier , if the waiting time is more than 15 minutes for patient to collect their medicines, computer will send texts message to the head of the department to management. There is a computerized voice message reminding the patient to show their insurance card for identification purpose. A computer monitor shows drug images for both the pharmacist and patient for double checking the dispensed drugs. In this study, the waiting time was < 15 min (p=0.73), if shortened to about 5-10 minutes, satisfaction or acceptable rate increased from 34.58% to 56.68%. Satisfaction rate survey also increased from 39.84% to 44.42%. Prescribe near miss rate (<0.05%, p=0.912) and patient's satisfaction survey regarding pharmacist checking their identification prior to handling their medications increased from 40.13% to 90.11%. Use of computerized information systems can improve the outpatient pharmacy operation, not only, it can reduce the workload of pharmacists , shortened the waiting time for patient to collect their medications , upgrade drug safety , minimize medication errors and increase patient's satisfaction regarding pharmacy service but also improve patient's identifications accurateness prior to handling them their medications. No complained was noted from patients or family while checking their identification before giving them their drugs.

HPP 31
FAPA2014000138 (Poster)

Transformation of Clinical Pharmacy Activities in Ministry of Health Hospitals in Malaysia

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Before the year 2000, clinical pharmacy in Malaysia mainly involves medication counselling, clinical pharmacokinetics service, parenteral nutrition and cytotoxic drug reconstitution. Entering the new millennium, efforts were made to expand the services from product-oriented to a more patient-centric approach with adoption of pharmaceutical care concept. To date, it has evolved into specialised clinical services such as Medication Therapy Adherence Clinic (MTAC), critical care and cardiology pharmacy. The transformation of the clinical services is essential in fulfilling the nation's need and in line with the dynamic development of the pharmacy profession. The Clinical Unit in the Pharmaceutical Services Division, Ministry of Health Malaysia is entrusted to lead this transformation. The responsibilities include development of guidelines and standards of practice, facilitate local and overseas training, identify appropriate personnel for clinical pharmacy training programmes and continuous monitoring of the progress. Currently, there are 13 types of MTAC services (diabetes, warfarin, retroviral disease, respiratory diseases, nephrology, psoriasis, haemophilia, psychiatry, stroke, rheumatoid arthritis and geriatrics) with established protocols offered in ambulatory care setting at 660 MOH facilities. For inpatient setting, 100% ICU wards and 76.4% medical wards were filled/stationed with at least one full time pharmacist. 380,558 of the total inpatient prescriptions were intervened in 2013, which comprises of incomplete prescriptions (27.6%), prescriptions with inappropriate regimens (54.4%) and others (18.0%). 210,520 discharge counselling, 185,501 bedside counselling and 1,582 group counselling sessions (6,697 patients) were conducted in the entire inpatient settings. For continuity of care, 7,712 home medication review visits (5,336 patients) were conducted. This transformation has open up a better career pathway for clinical pharmacists and future trend of development will focus more on specialised services with international recognition.

HPP 32
FAPA2014000188 (Poster)

Effect of a Home Medication Review Program on Medication Adherence, HbA1c, Fasting Blood Sugar, Blood Pressure and Lipid Profiles in Patients with Type 2 Diabetes Mellitus: A Randomized Controlled Trial.

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Poor medication adherence diminishes the health benefits of pharmacotherapies. Patients with Type 2 Diabetes Mellitus (T2DM) require treatment with multiple medications, placing them at increased risk for nonadherence. This study aimed to investigate the efficacy of a home medication review program conducted by a pharmacist to improve medication adherence and its associated effects on HbA1c, fasting blood sugar (FBS), blood pressure (BP), and lipid profiles. Adult patients with T2DM attending health clinics in rural area of Pahang, Malaysia were recruited into this six months randomized-controlled study. Patients were taking medications for diabetes for at least two years, with HbA1c>8%. The intervention group received three home visits by a pharmacist (at baseline, 3 months and at 6 months) in addition to the standard medical care. Counselling on medication and disease was provided during the visit. Control group patients only received standard medical care. Outcome measures include medication adherence using Modified Morisky Adherence Scale, HbA1c, fasting blood sugar (FBS), blood pressure (BP) and lipid profiles. Total of 73 patients were recruited

and randomized into the intervention group (38) and the control group (35), with no significant difference identified in baseline parameters. There was significant improvement in medication adherence from baseline to 6 months in the intervention group (mean difference (MD)=-2.19, 95% CI[-2.73,-1.65], p<0.001) and was associated with significant improvements in HbA1c (mean difference (MD) = 1.57, 95% CI[0.88, 2.26], p<0.001); FBS (MD=2.76, 95% CI[0.59,4.94], p=0.009); systolic BP (MD=6.56, 95% CI[0.75,12.36], p=0.022); diastolic BP (MD=4.44, 95% CI[1.11,7.78], p=0.006); and triglycerides (MD=0.59, 95% CI[0.24,0.93], p<0.001). The control group showed no significant changes in medication adherence (MD=-0.29, 95% CI [-0.89, 0.32], p=0.342) and other associated measures. A HMR program conducted by a pharmacist provided significant improvement in medication adherence and its associated measures amongst patients with Type 2 diabetes.

HPP 33
FAPA2014000190 (Poster)

The Impact of Pharmacodynamically-Optimized Carbapenems Dosing for Hospital Acquired Infection Treatment: A Cross Sectional Analysis

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Meropenem and imipenem are often employed as the rescuer therapy for patients with nosocomial infections. Consideration of pharmacodynamic principles in dosage regimens for these agents can maximize their antibacterial effectiveness and clinical outcomes. The dosage scheme for these carbapenems may be modified to maximize the percentage of the dosage interval that drug concentrations remain above the minimum inhibitory concentration, an important parameter related to the bacterial eradication. Clinically, optimized pharmacodynamics regimen of carbapenems (OPC) may be a suitable alternative and possibly more effective than recommended regimen of carbapenems (RRC) which is available in the medical textbook. This study aimed to assess application of pharmacodynamics principle for carbapenems on clinical utility among nosocomial infection. Protocol of OPC was developed by infectious disease pharmacy specialist and approved by infectious disease physician. This treatment protocol was used as guidance for physician in medical wards. Relevant information was identified through an electronic search of hospital data base for meropenem and imipenem use in medical ward during July 2013-June 2014. According to our protocol, meropenem and imipenem regimen was classified as OPC and RRC. Clinical and bacteriological outcomes were analyzed in comparable. The 112 patients with nosocomial infection were assessable. Overall mortality on day 14 significantly difference between the OPC (94.6%) and RRC (98.2%). Among patients who survived to 14 days, eradication rates of bacteria were both 85.7% for OPC and RRC but duration of treatment for OPC was significantly shorter than RRC (11.25 days vs 13.21 days). There was no adverse drug reaction that resulted in treatment discontinuation, including nervous system disorders such as convulsion for both regimens. The results show that monotherapy of ORC was effective and well tolerated in adult patients. Pharmacodynamic principles can be applied to dosage strategies for imipenem and meropenem for better clinical outcomes.

HPP 34
FAPA2014000200 (Poster)

Using Quality Control Circle Analysis to Improve Dispensing Errors in an Outpatient Pharmacy

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Patient safety is an important issue of pharmaceutical patient care. To prevent dispensing error is an approach that can guarantee patient safety more effectively. The purpose of this study was to explore the results of quality control circle (QCC) project for reducing dispensing errors at a regional teaching hospital in Taiwan. We applied a retrospective analysis with prescription dispensing errors in outpatient pharmacy from April 9, 2012 to November 30, 2012. The study design was divided into three stages. Stage 1: We collected the near-missed dispensing cases and applied pareto principle to analyse the major causes of these errors. Stage 2: According to the major causes, we developed and implemented reasonable plans to improve the dispensing process. Stage 3: After the quality control project interventions, we calculated the rate of dispensing errors and compared with that before QCC project. Also, a questionnaire survey of the outpatient pharmacy was conducted to observe the service satisfaction. Before performing the QCC project, the average rate of dispensing errors was 0.548% the major cause dispensing errors were wrong medicines (45.4%) and counting errors (37.2%). The target was 50% reduction of dispensing errors. After the initial interventions, wrong medicines and counting errors were reduced by 64% and 46%, and average rate of all dispensing errors was reduced to 0.258%. To achieve more reduction in counting errors, we implemented other strategies to improve the counting errors. Finally, the rate of all dispensing errors was below 0.2%. Moreover, the questionnaire survey revealed the time of outpatient waiting for receiving medicine was shortened and the service satisfaction of the outpatient pharmacy was improved after implementing the QCC project. Through QCC activities was not only improve dispensing process, working environment, but also reduce dispensing errors and enhance the service satisfaction of the outpatient pharmacy.

HPP 35
FAPA2014000270 (Poster)

Drug Use Evaluation of Rivaroxaban in Atrial Fibrillation

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Atrial fibrillation (AF) is a common cardiac arrhythmia disease. AF significantly increases the risk of ischemic stroke by thrombus formation. In pass, warfarin is only one oral anticoagulant agent to prevent stroke. The use of vitamin K antagonists is highly effective for stroke prevention in patient with nonvalvular atrial fibrillation. However, drug and drug interaction or food and food interactions necessitate frequent INR monitoring, and drug induce bleeding adverse reaction is highly, requirements that make it difficult for many patients to use such drug in clinical practice. Rivaroxaban is a new oral anticoagulant agent. It is a directed and reversible Xa inhibitor to prevent thrombus formation and not necessitate laboratory monitor. We hypothesised that patients received rivaroxaban will prevention stroke event and reduce bleeding adverse reaction. A retrospective evaluation that patients who first-time received rivaroxaban and include those patients who had a diagnosis for AF at a medical centre in southern Taiwan from October 2013 to May 2014. We were assessed the incidence of stroke or thrombus formation, and rivaroxaban complications after patients were treated six months. Data from 168 patients and electronic patient chart review. The mean age (±SD) was 75.3±9.9 years. 1 (0.60%) of the participants had diagnosis of recurred thrombus within receiving rivaroxaban. The incidence of adverse reaction is 5.95%, include 2.40% of bleeding complications and 2.40% of skin associated reaction (such as rash, urticaria). The more bleeding complications in older patients (mean age 77.8 years), and 50.0% of patients combined other antiplatelet agent. In

conclusion, rivaroxaban has prevention thrombus formation and be lower risk of bleeding, especially older patients. Nevertheless, in case of bleeding is not antidote to treatment. Pharmacists should be provided to patients who receive rivaroxaban the education and counselling.

HPP 36
FAPA2014000181 (Poster)

Antibiotic Use in Upper Respiratory Tract Infections in Ambulatory Patients in Tertiary Care Hospital, Thailand

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Multidrug resistant organisms (MDRO) are emerging and challenging in Thailand. The misuse and overuse of antibiotics has been documented as the major cause of the development of antibiotic resistance. Intensifying the monitoring of antibiotic use in ambulatory patients is the one mission of the Ministry of Public Health of Thailand. The objective of this study was to determine the clinical decision and cost expenditure of antibiotic prescriptions in Upper Respiratory Tract Infections. Medical records of URI in ambulatory patients at Sunpasitthiprasong Hospital were reviewed for one year (October 2012 - September 2013). The clinical decision was determined by an infectious disease physician and the Thailand antibiotic use guideline. Cost expenditure was analysed per visit. 14,731 patients with URI were reviewed. Total antibiotic cost was $43,316 and 794 cases (5%) involved misuse or overuse of antibiotic prescriptions. Most of them were children under 10 years old (30%) and above 50 years old (20%). The cost expenditure of antibiotic prescriptions ranged between $2.00 and $7.50 per visit. The Civil Servant Medical Benefit Scheme (CSMBS) was two times more expensive than the Universal Coverage Scheme (USC). The highest cost expenditure was otitis media (78.2%, $2,748), followed by the common cold (16.3%, $ 74) and acute bronchiolitis (2.5%, $90). The two most prescribed antibiotics were amoxicillin and clarithromycin. The highest cost expenditure was found in amoxicillin-clavulanate prescriptions ($1,638) and mostly used in the Department of Otolaryngology. In conclusion, with the emergence of MDRO, antibiotic use should be analysed to determine the cost expenditure and the clinical decision. Implementation of a rational antibiotic use policy would not only control costs for hospital but also reduce drug resistance among patients.

HPP 38
FAPA2014000209 (Poster)

An Evaluation of Efficacy and Safety of Long-Term Use of Generic Pravastatin Sodium in Hyperlipidaemia

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In Japan, the wider use of generic drugs is expected to reduce the growing healthcare spending. However, the share of generic drugs remains still low compared to the European and U.S. countries. One of the reasons for the low share is reported because many people are worried about using generic drugs. To solve this problem, we retrospectively evaluated the efficacy and safety of long-term use of generic pravastatin sodium. Study period was from January 2008 to December 2011. Those patients taking generic pravastatin sodium for 15 months or greater were defined as long-time users and included in this study. Assessment of efficacy was conducted to observe TC (total cholesterol), TG (triglyceride), HDL (high-density lipoprotein cholesterol) and LDL (low-density lipoprotein

cholesterol). On the other hand, assessment of safety was conducted to observe AST (aspartate aminotransferase), ALT (alanine aminotransferase), CPK (creatinine phosphokinase), γ-GT (gamma-glutamyl transferase), ALP (alkaline phosphatase), LDH (lactate dehydrogenase), T-Bil (total-bilirubin), BUN (blood urea nitrogen), SCr (serum creatinine) and HbA1c (haemoglobin A1c) based on laboratory data and we researched discontinued patients about the reasons by electrical medical record. We enrolled 1,337 patients. As a result, there is no significant difference between short-term and long-term laboratory data except for ALT. For ALT, long-term laboratory data was significantly lower than short-term laboratory data and liver dysfunction did not occur and we considered long-term use did not effect on safety. Although 37 patients discontinued possibly due to drug related adverse events, we considered those adverse events were not due to the generic version of pravastatin sodium. In conclusion, this study showed that a long term use of generic pravastatin sodium was effective and safe; it would be helpful to relieve the people's fears of generic drugs.

HPP 39
FAPA2014000206 (Poster)

A Comprehensive Analysis of Outpatient Duplicate Prescribing Errors in a Regional Teaching Hospital

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Since National Health Insurance system and specialized medical services are well-prepared in Taiwan, patients may have duplicate medical treatment in the same or different medical departments. Duplicate prescribing is one of the most common types of medication errors which are hazardous and costly. The objective of this study is to analyse the frequency and patterns of duplicate prescribing errors in our hospital outpatient department services. This study retrospectively collected and analysed the prescriptions in our hospital outpatient department services from Jan. 1st 2014 to Jan. 31st 2014. In our study, there were 25483 patients visited our hospital outpatient department during this period. This study included 33814 prescriptions, with the overall duplicate prescribing error rate being 0.33%. 88.79% of duplicate prescribing errors were originated from different prescriptions. 37.4% of the inappropriate prescriptions were classified as same ingredients while the others were duplicate pharmacological mechanism. The most common drug classification of these prescribing errors was non-steroidal anti-inflammatory drugs (34.58%), followed by antihistamines (14.02%). In conclusion, we found that duplicate prescribing errors are significantly more serious in patients with multi-specialties visit. The implementation of pharmacists' cognitive services has made a positive impact on reducing duplicate prescribing errors in the same prescription. However, pharmacists have been slow to expand cognitive services roles to reducing duplicate prescribing errors between different prescriptions. It is suggested to integrate patient's drug profiles into the Hospital Information System (HIS) and barcode check system to enhance the efficiency and effectiveness of pharmacists' cognitive services.

HPP 40
FAPA2014000147 (Poster)

Use of a new chemotherapy-specific CPOE system to improve chemotherapy safety?

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We designed a new chemotherapy-specific CPOE system aimed to reduce the number of prescribing errors. We also evaluated the clinical impacts of prescribing errors about this new system in a teaching hospital at Taiwan. We designed a new CPOE system since 1st July, 2012 and we held a series of education sessions to discuss the current practices of chemotherapy ordering for 6 months. The prescribing errors were collected and identified by pharmacists for one year period starting 1st July, 2011 until 30th Jun, 2012 before implementing a new CPOE system (stage one), compared with one year period starting from 1st January to 31st December, 2013 after implementing new system (stage two). The causes of prescribing errors were analysed. Approximately 38 (0.92%) prescribing errors were detected out of 4141 medication orders during stage one. The most common errors of the prescribed drugs were wrong dose and wrong time, which were 47% and 39% respectively. After implementation of the new system (stage two), 23 (0.57%) prescribing errors were detected out of 4036 medication orders. The most common errors of the prescribed drugs were wrong route and wrong combination, which were 29% and 23% respectively. Other errors such as wrong frequency, wrong drug, and wrong patient were also encountered with different degree of severity. Technology in prescribing process will support the practitioner to reduce the incidence of these errors. Although the use of new CPOE system could lead to new error types, it reduced the number of prescribing errors. Our study demonstrated the fact that new CPOE system could be used as a tool for reducing the prescribing errors and improving the chemotherapy safety.

HPP 41
FAPA2014000079 (Poster)

An Evaluation on the Effects of Vaminolact® in the Parenteral Nutrition on Physical Changes of Very Low Birth Weight Preterm Neonates

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Currently, there is a lack of studies available which focus on administration of Vaminolact® in parenteral nutrition (PN) in local hospital setting. This study was conducted to evaluate the effects of Vaminolact® in PN on the physical changes of very low birth weight (VLBW) infants in Hospital Sultanah Aminah, Johor Bahru. A retrospective medical chart review was performed of VLBW infants receiving PN support in 2012. The subjects were classified into three groups of gestational age. The outcome measured was physical changes, assessed by weight, length and head circumference growth. Analyses were performed to evaluate differences in physical changes between the groups. A total of 100 VLBW premature infants were taken as the subjects in this study. The majority of the subjects were Malays, followed by other races. The average gestational age was obtained to be 28.91 ± 2.72 weeks. Vaminolact® in PN was initiated at an average age of 4.25 ± 2.54 days, with a median dose of 1 g/kg/day. The median duration of PN was found to be 13 days. Only 33% of the study sample achieved the minimum standard nutritional goal of 100 kcal/kg/day by PN. The overall mean percentage of weight gain per day, median percentage of length growth per week and median percentage of head circumference growth per week in this study was 0.30 ± 0.82% g, 0.89 (2.25)%

cm and 0.00(1.42)% cm, respectively. This was less compared to the standard recommendation. It was observed that there were no significant differences in the percentage of weight gain, length and head circumference growth between the groups ($p > 0.05$). The study findings showed evidences that the physical changes in the VLBW infants during the period of PN administration were inadequate to achieve the standard growth recommendation. This showed that the current practice of PN administration needs to be reviewed in order to optimize the outcomes.

HPP 42
FAPA2014000203 (Poster)

The Incidence of Severe Cutaneous Adverse Drug Reactions in Thai Population

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The severe cutaneous adverse reactions (SCARs) consist of Stevens-Johnson syndrome (SJS), toxic epidermal necrolysis (TEN), drug rash with eosinophilia and systemic symptoms (DRESS)/drug-induced hypersensitivity syndrome (DIHS) and acute generalized exanthematous pustulosis (AGEP) are caused by various drugs and their incidence are vary among different ethnicities. Aim of the study was to determine the incidence of SCARs reported among Thai population. In a retrospective study, reports of SCARs were retrieved from adverse drug reaction (ADR) database of ADR centre, Siriraj Hospital during January 2011 to June 2014. Data were analyzed regarding demographic data of patients, type of skin reactions and causative drugs.
Of the 160 reports of SCARs from 126 Thai patients, the reactions were observed in 69 females (55.80%). No significant difference between male and female. A mean age was 46 years (range 1-92 years). The most frequent type of SCARs were DRESS/DIHS (66 reports, 41.25%), SJS (72 reports, 45.00 %), and TEN (15 reports, 9.38 %). Focus on causative drugs, phenytoin (10 reports), allopurinol (10 reports), and cotrimoxazole (6 reports) were the most common culprit drugs related with SJS/TEN. Phenytoin (25 reports) and allopurinol (9 reports) were mainly associated with DRESS/DIHS whereas AGEP was mainly caused by antibiotics such as amoxicillin and clindamycin. Eye complications including dry eye and eye irritation were found in 16 patients after resolving SJS and TEN (13 SJS and 3 TEN), moreover two patients were dead from TEN. Current study shows that SCARs rarely occurred conditions induced by various drugs such as phenytoin, allopurinol, and cotrimoxazole among Thai patients. Therefore, patient's education about signs and symptoms of SCARs was important when initiating these drugs.

HPP 43
FAPA2014000118 (Poster)

Analysis of Dyslipidemia Caused by L-Asparaginase in Paediatric Acute Lymphoblastic Lymphoma Patients

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L-asparaginase is an important antileukaemia agent used in first-line therapy of paediatric acute lymphoblastic lymphoma (ALL). Hyperglycemia, hepatotoxicity and acute pancreatitis have commonly been reported to occur with L-asparaginase treatment. Dyslipidaemia has also long been recognized as an important L-asparaginase-related complication, but has not been mentioned in insert

paper. We analyzed the characteristics of dyslipidaemia in paediatric patients with ALL, receiving L-asparaginase. We studied retrospectively 39 patients with ALL who were admitted to the Paediatric wards in Seoul St. Mary's Hospital, from January 1, 2011 to July 31, 2013 and were treated with L-asparaginase during the induction phase. For these patients, all total cholesterol (TC) and triglyceride (TG) levels were obtained from the electronic medical records. The degree of causality and seriousness for each case of adverse drug reaction was determined using WHO-UMC causality category and CTCAE version 4.0. Of the 39 patients, 18 patients had dyslipidaemia. Baseline characteristics which included the number of L-asparaginase administration, were not different between the two groups. The dyslipidemia group were checked for hypercholesterolemia (N=14) and hypertriglyceridemia (N=13). The mean TC level of dyslipidaemia group was significantly higher than the normal group (223.4±69.0mg/dl vs 168.3±19.8mg/dl, p<.0001). The mean TG level of the dyslipidaemia group was significantly higher than the normal group. (448.6±477.5mg/dl vs 143.9±42.7mg/dl, p<.0001). WHO-UMC causality category of each case is possible or probable. L-asparaginase was discontinued for one case with serious hyperlipidaemia. L-asparaginase induced dyslipidaemia diagnosed in 18 patients (46.2%). We recommend that blood lipid level mornitoring should be conducted in L-asparaginase therapy.

HPP 44
FAPA2014000144 (Poster)

Pharmacy Drug Care Center: Beyond Pharmacy Service

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This study aimed to increase both effectiveness of pharmacy diagnostic problems and compliance in non-communicable diseases out-patients, and to reduce drug cost for our hospital. Data were collected from all pharmacy drug care center patients from 1st Oct 2012 until 28th Feb 2013. Descriptive data was analyzed from intervention by pharmacist. Cost-saving values were calculated from patient medication reconciliation record. Overall, there were a total of 13,553 patients who used the pharmacy drug care center with an average of 39.17 patients daily (max 132 patients daily). Almost all of the drug related problems were non-compliance for drug use (83.50%). Non-compliance for drug use consists of inconsistency of taking the drug (63%) and wrong drug use (37%). Eighty percent of physician accepted the pharmacist intervention. The hospital was saved 8,376,205.60 baht from this center. This study found that the pharmacy drug care center was a new strategy to solve medication reconciliation problem in out-patient. Pharmacist diagnosed drug related problem and wrote recommendation to physician before patients met. Comparison of drug history and present drug between the patient medication reconciliation record and prescription made patients to receive complete drug use, increase compliance and save cost.

HPP 45
FAPA2014000171 (Poster)

Provision Pharmaceutical Care with Sticker Tools Reduced Incorrect Dose Problem and Its Root Causes in the Elderly

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Providing pharmaceutical care for the patients at the elderly clinics during 2012-2013 identified 88.98% patients as non-compliance. Of these, 41.67% was taking improper dose of medication. The objective of this study was to reduce the problem of taking wrong dose of medication in the elderly patients. Sticker tools, a supplement label, were designed and developed in stepwise approach with continuous quality improvement (CQI) concept to manage DRPs and their root causes. In phase I,

sticker tool with specific color and bigger fonts was designed and used to help the patients identify the medication of which the prescribed dose was changed and those with visual problem. In phase II, new pictogram-contained sticker tools were developed and used to help the patients who are illiterate. In phase III, new sticker tools were redesigned to prevent them from peeling off the medication containers/package and three different colors were used to differentiate the dose of medication, time of administration, before/after meal. Non-compliance was measured by interviewing the patients with the validated questionnaire and was collected before phase I and during each phase when the sticker tools were systematically implemented in the elderly clinic. Before phase I, 41.67% of the patients took incorrect dose of medication. After using sticker tools in phase I and phase II, 37.47% and 35.29% of the patients still have this DRP respectively. The top three root causes of the remaining DRP were the label peeling off (23.14%), getting confused from polypharmacy (14.39%) and the unused medications at home (9.25%). After using the new sticker tools developed in phase III, the incorrect dose problem decreased to 16.73%. In conclusion, provision pharmaceutical care to the elderly patients who administered improper dose of medication by using sticker tools developed for specific DRPs and their root causes can diminish this DRP.

HPP 46
FAPA2014000165 (Poster)

Sources and Distribution of Unlawful Medicines in 8 Provinces of Thailand: To Inform The Public Policy Change

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According to the current law governing the medicines in Thailand *(Thailand Drug Act, B.E 2510),* selling medicines outside of registered pharmacies is not allowed except Over The Counter (OTC) medicines which have been approved for general distribution. Despite this law, general distribution of restricted medicines is occurring. This activity is of concern because of the increased possibility of harm. Data from 8 hospitals showed that 18 % of adverse drug reactions (ADRs) cases were from unlawfully medicines. This survey was conducted to track original sources of medicines and distribution routes from 613 stores in 8 provinces of Thailand. We also interviewed patients who have been affected by ADRs. After investigating non-pharmacy stores, several type of drug were found. These types include dangerous drugs (30.9%), common household drugs (21.8 %), ready packed modern drugs (20.3%), Thai traditional drugs (13.6 %), mixed medicines packaged in a set with steroid drugs (4.4 %) and others (7.7 %). Further investigation showed that these stores received their supplies from five sources. There were drug stores (46.0 %), wholesale dealers (24.6 %), grocery stores (11.1%), food truck (9.1%), department store (7.7 %) and others (1.5%). Routes of distribution were direct delivery, postal service and medicine trucks, and the trucks that travel to village and entertain villagers with various shows, i.e. animal shows or movies. At the end of the shows, seller will sell medicines to audiences. Additionally, in household we found stockpile of medicines waiting to be distributed. Findings have been forwarded to 8 Provincial Public Health Offices, the FDA, the Drug System Monitoring Mechanism Development Program (DMD) and the Regional Medical Science Center. The data gathered will be use to inform policy changes, improve drug distribution channels and protect community by limiting access to potentially harmful medicines without professional medical consultation and authorization.

HPP 47
FAPA2014000266 (Poster)

A Risky Practice of Tablet Splitting: an Example of Drugs with Narrow Therapeutic Index

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Tablet splitting is common in daily medical practice. Previous research investigated the appropriateness of tablet splitting with a focus on drug formulation and the content uniformity of split tablets. However, inaccurate splitting of drugs with narrow therapeutic index (NTI) may lead to unwanted toxicity. In this study, we aimed to investigate the frequency of prescribing split NTI drugs at ambulatory setting in Taiwan. The details of prescriptions containing NTI drugs at ambulatory setting were extracted by using the National Healthcare Insurance Research Database in 2010. We adopted the definition of NTI drugs by the North Carolina Board of Pharmacy in 2012. The therapeutic categories of NTI drugs, dosage form, patient age and status of pill splitting were further stratified and analyzed. Based on the definition of NTI drugs by the North Carolina Board of Pharmacy, 133 NTI drug items had been prescribed for oral use in the cohort datasets in 2010. A total of 512,398 prescriptions containing NTI drugs were prescribed to 148,548 patients and 41.8% of patients had received NTI drugs in form of splitting. Only 3 kinds of NTI drugs existed liquid-form products. Splitting was prevalent among the elderly with prescriptions of digoxin (82.4%) and warfarin (84.5%). The results of this study showed that NTI drugs were frequently prescribed to be split in Taiwan. This kind of potentially inappropriate medications was frequently seen in digoxin and warfarin prescriptions to the elderly. The lack of wide spectrums of strengths and formulations of NTI drugs may be the major cause. Further studies are needed to evaluate the outcome of inappropriate splitting of NTI drugs.

HPP 48
FAPA2014000097 (Poster)

Drug Utilization Evaluation of ACEI and ARB at the Regional Hospital in Central Taiwan

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ACEI (Angiotensin converting enzyme inhibitors) and ARB (Angiotensin receptor blocker) is the role of the antihypertensive drugs in the RAA (Renin-angiotensin) drugs. ACEI/ARB effect is to reduce glomerular vascular pressure, reduce urinary protein excretion and help maintain kidney function. Clinical widely used to reduce the amount of urinary protein loss filtration, slow the rate of deterioration of renal function. Recent studies have found that blocking the RAA to reduce urinary protein, renal function may not be protected but no longer deteriorating. This study evaluated a regional hospital currently ACEI, ARB's usage to alert medical personnel to note the patient's kidney function. Retrospective data collection was 102 in January to 103 in June using ACEI/ARB prescription drugs in the case of a regional hospital. Analysis of patient demographic distribution, treatment divisions, physicians age, the number of days prescribed, liver function tests and renal function tests. The results showed that drug use to Exforge, followed by Diovan, Blopress; using one kind of ACEI or ARB drugs was 95.46%, the use of two or more is 3.45%; Division usage in cardiology accounted for 55.69%, followed by endocrinology 14.48%, 12.23% neurology. Some patients with renal insufficiency continue to use ACEI/ARB combination therapy, there is a small part of the liver is not functioning properly. ACEI and ARB therapy in hypertensive patients with poor

kidney function, the maximum effective to reduce urinary protein in patients. Now study shows patients are the fastest reduced eGFR. So, the better the performance of RAA blocking drugs more can reduce urinary protein, but has failed to synchronize renal function deterioration is no longer protected; therefore clinical use ACEI / ARB in patients with poor kidney function, renal function should be aware of changes. Therapeutic effect achieved while ensuring drug safety.

HPP 49
FAPA2014000173 (Poster)

Haematological and Thromboembolic Adverse Events of Lenalidomide in Siriraj Hospital, Thailand

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Lenalidomide is an analogue of thalidomide approved in 2004. It is used as an effective agent in multiple myeloma (MM) whereas safety profiles should be concerned. Haematological and thromboembolic adverse effects (AEs) commonly present during treatment with lenalidomide. Thus, this study is to examine haematological and thromboembolic AEs reported during treatment with lenalidomide in MM and to assess the severity of the AEs.
The study design was a retrospective analysis of reports of haematological AEs during MM therapy with lenalidomide reported to the Adverse Drug Reaction Centre, Siriraj Hospital during January 2013 to June 2014. Data were presented in terms of descriptive statistics such as percentage, frequency and median. The severity of haematological adverse effects was graded by using Common Terminology Criteria for Adverse Events (CTACE) criteria. There were 17 patients with a median age 64 years using lenalidomide for MM. A median dose of lenalidomide was 25 mg daily. Fourteen (82.35%) of them were male. We found anemia in 10 patients (58.82%), neutropenia in 8 patients (47.06%) and thrombocytopenia in 6 patients (35.30%). Grade-3 neutropenia was reported in 4 patients on 2^{nd} – 5^{th} months whereas grade-3 thrombocytopenia was found in one patient after initiating lenalidomide for 4 months. For anemia event, it was found only grade 1-2 in 10 patients during 2^{nd} – 3^{rd} months of lenalidomide therapy. None of thromboembolic event was observed. In conclusion, haematologic AEs were common adverse effect during treatment with lenalidomide. They occured in 30-60% and the severity was graded as level 1 to level 3. No thromboembolic event was observed. Regarding the results, complete blood counts should be especially monitored every week for the first 2 months during treatment with lenalidomide.

HPP 50
FAPA2014000273 (Poster)

Drug Utilization of Rabies Virus Vaccine in Outpatients in a Medical Centre of Taiwan

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There was rabies-free status for several decades of Taiwan until July, 2013. The experience for proper handling of rabies vaccines is a lacked of new staff for years. This study aimed to assess the clinical rabies vaccines usages in a medical centre of Taiwan. This retrospective study analyzed the demographic data of patients who received rabies vaccination from July 2013 to January 2014. Data collected include the age, gender, racial group, medical visit department, visiting times, exposure status and vaccination dosage. A total of 755 cases were included, female vs. male was 39.1% vs. 60.9% and 42.5% self-payment cases involved. The age structure of population were 1-20 years (7.5%), 21-40 years (43.3%), 41-64 years (42.1%) and 65-96 years (7.9%). 34% (257/755) of cases were used for pre-exposure immunization. 81.7% clinical application fit the WHO guidelines.

54.1% cases were prescribed for pre-exposure immunization, like veterinarians, animal control specialists, etc. Self-protection issues were 36.5% and traveler 4.7%. Completed standard vaccinations were 46.6% cases. The majority of cases with post-exposure prophylaxis were bitten by dogs (62.8%). Another animals included cats (18.2%), mice and rats (14.2%), squirrels (2.2%), ferret badgers (0.8%), monkeys (0.8%), miscellaneous (0.8%) and unknown (0.2%). Only 4 cases without fit the WHO guidelines because their bite wound were classified as level one. In conclusion, this study presented that most cases fit the guidelines for rabies vaccinations. These evidence data reveal without any psychological impact of fear in Taiwan.

HPP 51
FAPA2014000064 (Poster)

Aflibercept-Induced Hyperpigmentation in Patient with Metastatic Colorectal Cancer

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This paper is to report a case of hyperpigmentation associated with Aflibercept. The 45-year-old woman with colon cancer, cTxNxM1, stage IV. The patient was treated with targeted cancer therapy (bevacizumab or cetuximab) in combination with traditional chemotherapy for five years and did not notice any adverse effect. Due to tumor marker elevated and the doctor changed regimen to aflibercept (5 mg/kg) in combination with FOLFIRI (irinotecan 180mg/m^2, folinic acid 400mg/m^2 and fluorouracil 2600mg/m^2) biweekly. After the third chemotherapy cycle, she noticed extensive pigmental changes, cracked and flaking on the palms and the soles. Topical urea and mometasone cream was given for symptom relief and the patient still follow up in our OPD. Cutaneous hyperpigmentation is a common drug induced adverse effect on targeted cancer therapy such as epidermal growth factor receptor (EGFR) inhibitors but it is rare in vascular endothelial growth factor receptor (VEGFR) inhibitor. Aflibercept is a VEGFR antagonist, and the most frequent adverse events were hypertension, proteinuria, and headache. The mechanism of drug-induced hyperpigmentation is unclear, but it may to be interference of EGFR signaling in the skin. We speculate that EGFR-VEGFR pathway cross-talk may contribute to aflibercept induced hyperpigmentation. In addition, the patient was administered FOLFIRI before and wasn't noticed of any skin adverse effect. Using of the Naranjo probability scale in this patient, there is a probable relationship (Naranjo score= 4) between aflibercept use and the skin adverse reaction. In conclusion, clinically, we need to rely on anecdotal case reports, and postmarketing surveillance data to assess the incidence of rare adverse drug reaction. We expect new diagnosis and treatment could provide more precisely to relieve the drug induced skin adverse reaction.

HPP 52
FAPA2014000276 (Poster)

Effectiveness of Computerized Decision Support System in Preventing Inappropriate Pill Splitting of Prescription Medications

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To reduce inappropriate pill splitting, we developed an automatic interruptive alert system linked to a computerized physician order entry (CPOE) system for special oral formulation drugs in outpatient settings. In this study, our aim is to examine the impact of the alert system in the prescribing process

and the effect of the warnings of inappropriate pill splitting. All prescriptions from the CPOE system were collected and used as a retrospective before-and-after design to analyze the ambulatory prescriptions from January 1, 2010 through May 31, 2010 (baseline period) and from June 1, 2010 through August 31, 2011 (intervention period). During the intervention period, any change in a prescription in response to an alert would be logged and analyzed. There were 34 different drugs with special oral formulations in this study. During the 15-month intervention period, 909 alerts for 26 kinds of drugs were triggered. We observed a rapid and sustained decrease in the monthly alert rates of inappropriate splitting after the implementation of this alert system. The rate of inappropriate prescriptions dropped from 0.61% (703/116,088) in the baseline period to 0.16% (186/114,637) in the late post-implementation period (incidence rate ratio 0.27, 95% CI 0.23-0.31, P<0.001). Of the prescriptions which triggered alerts, 24.6% (224/909) were prescribed by cardiologists, 15.5% (125/909) by psychiatrists and 11.9% (108/909) by endocrinologists. The three drugs with the highest number of alerts were alprazolam ER tab 0.5 mg (22.2%, 202/909), fluvastatin ER tab 80 mg (18.8%, 171/909) and paliperidone ER tab 3 mg (6.9%, 63/909). In conclusion, we showed that a computerized decision support intervention can be highly effective in reducing the number of prescriptions with inappropriate pill splitting. We encourage the establishing of such a warning system with specified targets and straightforward alerts in order to prevent inappropriate pill splitting in CPOE systems.

HPP 53
FAPA2014000056 (Poster)

A Case of Improper Treatment Course: Baclofen for Hiccups

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Baclofen is generally used as a muscle relaxant, and used for hiccups is an off-label indication. It doesn't often think that it can be used to treat hiccups at first sight and there is no alertness for long-term use. A 87-year-old male was treated with baclofen for hiccups (2.5mg three times daily from October 8, 2012). He didn't take any drug associated with hiccups such as corticosteroids or benzodiazepines, but had many potential causes of hiccups: esophagus ulcer, gastroesophageal reflux disease and nasogastric feeding. The physician could not ensure the cause and prescribed baclofen for about one year. However, a pharmacist visit showed the frequency of hiccups already reduced and didn't affect the sleep quality as well as nutrition. Even no considerable adverse drug effects, the physician accepted our suggestion to discontinue baclofen on October 4, 2013. Short bouts of hiccups (≤48 hours) don't require a medical evaluation. Persistent (>48 hours and ≤1 month) and intractable (>1 month) hiccups may necessitate a medical evaluation. Baclofen, an analog of γ-aminobutyric acid (GABA), can decrease the excitability and inhibits the hiccup reflex. However, the symptomatic treatment should not be long-term used even though there is no definitive treatment course. To conclude, not only baclofen, many drugs such as metoclopramide used for hiccups is an off-label use; even if chlorpromazine is approved by Food and Drug Administration (FDA), it may also be thought of as sleep aids or antipsychotics. This case has been published on Taiwan Pharmacist's Weekly News to arouse the attention of all pharmacists.

HPP 54
FAPA2014000112 (Poster)

Perlis Warfarin Clinic: A Study on the Effects of Evolution in the Model of Care

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Management of oral anticoagulation therapy was previously done by doctors (usual medical warfarin clinic, UMWC). In 2008, pharmacist assisted warfarin clinic (PAWC) was initiated in Hospital Tuanku Fauziah which then evolved to pharmacist managed warfarin clinic (PMWC) in 2011. This study was to compare the effectiveness of evolution in model of care initiated by the pharmacists in time in therapeutic range (TTR), international normalised ratio (INR) control and time in high risk INR. This retrospective cohort study recruited 64 patients on warfarin therapy who were managed through three different models of care (UMWC, PAWC and PMWC). Medical records and Medication Therapy Adherence Clinic Warfarin Follow-up Visit Forms were reviewed to investigate the INR amongst the patients over five years (2007-2012). The primary endpoints were TTR, INR control (poor = TTR <60%, moderate = TTR 60-75% and good = TTR >75%) and time in high risk INR (INR <1.5 and INR >4.5). ANOVA test was used for numerical data while Chi-square test was used for categorical data. Post-hoc tests were done for significant results. Results showed that the mean TTR of the two new models (PAWC =56.65%; PMWC =59.12%) were higher than UMWC (34.18%) ($p < 0.001$ for all). However, there was no significant difference between PAWC and PMWC in mean TTR. There were significant association between INR control and model of care ($p=0.023$). UMWC had more patients in poor INR control (78.13%) than PAWC (54.69%) and PMWC (57.81%) ($p<0.05$ for all). There were no significant difference in time in INR >4.5 among the three models. However, UMWC had significantly higher percentage of time in INR <1.5 as compared to PAWC and PMWC ($p<0.001$). Two new models were more effective than UMWC. However, PMWC was no superior to PAWC which might be due to other factors that were not controlled in the practice.

HPP 55
FAPA2014000240 (Poster)

Identifying and Evaluating Potential Drug-Related Problems: Medication Review in Elderly Residents of a Care Home

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Elderly patients are vulnerable to medication misadventure from risks including inappropriate prescribing, polypharmacy, frailty, cognitive and physical disability. Periodic medication review has significant impact on identifying and improving patient outcomes, but data on its impact is relatively scarce in Malaysia. The Beers criteria have been used to promote safer prescribing in the elderly, whilst various screening criteria are used to guide medication review. The aim of this pilot study was to compare the performance of the Screening Tool of Older Person's potentially inappropriate Prescription (STOPP) and the Beer's Criteria in detecting potentially inappropriate medicines (PIMs) and related adverse drug events (ADEs) in elderly residents of a care home. Medication review was undertaken for 20 residents at a residential home. Medication related problems were identified using the STOPP and Beer's criteria. PIMs with clear causal correlations or contribution to the principal reason were documented. The mean age of study subjects was 64 years (range 48-85). The total number of prescribed medications was 96. More than two thirds of subjects had two or more documented co-morbidities. The STOPP criteria identified 16 PIMs affecting 13 subjects. The most frequently encountered PIM was the use of anti-cholinergics to treat extrapyramidal side effects of

neuroleptic drugs. The Beers' criteria identified 22 PIMs in 11 subjects, and the most frequently encountered PIM was short-acting benzodiazepines. A high proportion of study subjects were prescribed at least one potentially inappropriate medicine. As the tools use different criteria, they can be used in a complementary manner, but may also be synthesized and tested in the Malaysian setting, with a view to informing prescribing practice for the elderly.

HPP 56
FAPA2014000274 (Poster)

Bar-Code Technology Implementation on Paediatric Vaccines to Reduce Dispensing Error

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The management of paediatric medications is important and crucial for the patient safety in the clinical practice. To collect the administration record, clarify with similar packaging with different medications and distinguish the paediatric vaccine with different drug are major jobs for pharmacists. Implement the information technology on pharmaceutical practice may reduce the medication error. Unfortunately, some drugs did not have bar-code label in Taiwan. This study implements the bar-code into the paediatric vaccine which did not have bar-code label to prevent medication errors. We build label sticker with bar-code to assist the paediatric vaccines in medication dispersion in Mackay Memorial Hospital. The labels would stick on the package and the bar-code information includes the product code, batch number and expiry date. During the dispensing process, pharmacist could scan the bar-code on the vaccine drug bag printed by the order and then scan the bar-code label sticker on the dispensing vaccine to determine if bar-code matches. The delivery rate progressively increased from 2013 April (61%) till December (89.7%). There is no medication error in paediatric vaccine since the bar-code technology implemented. In addition, nurse can record the batch number by bar-code system for the vaccine to be injected. The bar-code system not only records the required information efficiently but also reduces the dispensing error. This study found that no medication error since the system was introduced. The bar-code system also saves the time for medications checking. It decreased the risk of medication delivery error. In addition, the pharmacists may manage some administration data easier. This system decreased medication error and improved patient safety.

HPP 57
FAPA2014000185 (Poster)

Evaluation of Beneficial Effect in Adding the Nilavembu Kudineer Chooranam (Siddha Formulation) to Metformin in Treatment of Type 2 Diabetes Mellitus

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The guidelines for the management of type 2 diabetes given by the Indian Council for Medical Research, strongly recommend research and careful evaluation of indigenous system and the possibility of drug–herb interaction. Similarly, the American Diabetes Association (ADA) currently does not have any specific guidelines for the use of Complementary and Alternative Medicine (CAM) in patients with diabetes but has acknowledged its use in lieu of patients' interest. **Nilavembu Kudineer Chooranam** (NKC) (ingredients: each 100 g contains: *Andropraghis paniculata* 11.1g, *Vetiveria zizanoides* 11.1g, *Coleus ambonicus* 11.1g, *Santalum album* 11.1g, *Tricosanthes*

cucumerina 11.1g, *Cyperus rotundus* 11.1g, *Zingiber offcinale* 11.1g, *Piper nigrum* 11.1g, *Mollugo cerviana* 11.2 g) is one of the Siddha formulation available at Siddha unit which is used in treating type 2 diabetes patients at government hospitals in Tamilnadu, India. There are no reports available on the pharmacodynamic effects of NKC when given alone and along with metformin. A prospective open label study was performed at the Government District Headquarters hospital, Ooty, Tamilnadu, India. The fasting plasma glucose, postprandial plasma glucose, lipid profiles, blood pressure, HbA1c, serum creatinine and urine albumin levels were measured at baseline and at regular intervals for a period of 3 months. Results showed that during the follow-up periods, the NKC exhibited statistically and clinically significant antidiabetic effect by reducing the HbA1c levels. This was comparable with the effect of metformin. Similarly the NKC + metformin combination caused significant HbA1c reduction as that of metformin + glibenclamide group. The serum creatinine, urine albumin levels remained unchanged significantly. In conclusion, the nilavembu kudineer chooranam was found to be effective as an antidiabetic agent and can be used in combination with metformin for treating type 2 diabetes.

HPP 58
FAPA2014000119 (Poster)

A Retrospective Comparison of the Mortality of Critically Ill Patients Receiving Prolonged and Standard Infusion of Meropenem

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Meropenem is one of the most widely used antibiotics for treatment of serious bacterial infection in septic patients. Since meropenem is a beta-lactam antibiotic, it exhibits the bactericidal effect with time-dependent activity. Theoretically, the longer the infusion time, the longer the concentration of meropenem will remain above a pathogen's minimum inhibitory concentration (MIC) thus increasing the efficacy of the drug. Thus, the objective of this study is to compare the mortality rate of critically ill patients with sepsis receiving 30 minutes and 3-hour meropenem infusion. A retrospective cohort and cross-sectional study was conducted among septic patients treated with meropenem infusion in Intensive Care Unit of three hospitals in Malaysia. Patients included in the study received either 30 minutes or 3-hour infusion of meropenem as per practice of individual settings. Outcomes and clinical data were retrospectively collected from the electronic databases and patients' file from the record departments of individual settings. A total of 1975 patients received meropenem infusion during their admission in the ICUs. 11.4% of the selected samples met the inclusion criteria of the study and were included in the analysis. From the 225 subjects, 108 patients received 3-hour infusion of meropenem while the remaining 117 patients received 30-minute infusion of meropenem. Patients receiving the prolonged infusion of meropenem were found to have lower mortality rate compared to those receiving the standard infusion of meropenem (64.1% vs. 49.1%, p=0.16). Regression analysis of the data showed that infusion time and patients' age significantly confounded the mortality outcome of the studied patients. This study would be able to strengthen the evidence in using prolonged infusion of meropenem as a standard practice in critical care settings in Malaysia. Prolonged infusion of meropenem seems to have equal efficacy if not superior to the standard infusion of meropenem.

HPP 59
FAPA2014000084 (Poster)

Knowledge, Attitude and Vaccination Status of Influenza among Healthcare Workers

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Health care workers play an important role in providing health care directly to the patient. Thus vaccination of influenza by the health care workers is essential to prevent spreading of the disease to them and also to patients. The objectives of this study were to evaluate the level of knowledge, attitude towards work practices and influenza vaccination status among healthcare workers. This cross-sectional survey was conducted in March and April 2004. It involved 800 respondents among healthcare workers in Hospital University Kebangsaan Malaysia (HUKM) in Kuala Lumpur. Results revealed low level of knowledge about influenza among healthcare workers with average score of 63.2%. There was no correlation ($p>0.05$) between level of knowledge and gender, but there was significant difference ($p<0.05$) based on age, level of education, and occupations. Attitude of health-care workers towards work practices and the risk of influenza infection were at low levels with average score of 56.3%. There were significant differences ($p<0.05$) between attitude among healthcare workers with occupations, and level of knowledge about influenza. The overall influenza vaccination rate among health-care workers was low, only 264 (33.0%) of respondents had received influenza vaccination. Influenza vaccination was highest among healthcare workers with high level of attitude (72.8%). In conclusion, more educational programs on influenza and its preventive measures including infection control measures and importance of annual vaccination need to be introduced to increase the level of knowledge among healthcare workers.

HPP 61
FAPA2014000068 (Poster)

Medical Warehouse Room Quality Indicator Management Monitoring

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Medical warehouse room management system is related to hospital business operation due to the competitiveness in our healthcare system. Using indicators management approach that allow the administrators to control and regulate drug inventory, ensure the normal supply of medicines to prevent the pile-up of excess and unnecessary stocks or expired medications that affect safety of the patient. The purpose of this study is to determine the necessary basic indicators then 2 year comparison evaluate their effectiveness and their threshold (independent T-test). Data were collected from January 2012 to December 2013. These include monthly inventory indicator management and monitoring thresholds in each month. As a result, six indicators were identified and these are: 1. delayed in supply by manufacturers rate, 2. shortage of drug products from manufacturers rate, 3. inventory error rate, 4. narcotic drugs turnover ratio, 5. drug warehouse turnover ratio and 6. lending drugs from medical warehouse room in out-patient and in-patient department pharmacy. All the results of these indicators are within the threshold range. However, in one occasion where ratio of lending drugs in between out-patient and in-patient department pharmacy was noted to have exceeded the threshold range. Comparing the year 2012 and 2013 there is a significant difference [$p=0.002$], mean 2.115 (95% CI-1.0395-0.2689) in delay in drug delivery rate. Problems the administrator needs to face are higher rates of drug shortage during Chinese New Year festival, excessive use of some

restricted drugs with limited supply and long holidays when most pharmaceutical companies were closed. Another problem facing the medical warehouse unit is the government-owned national health insurance which control and regulate the price of the medicines that can affect the budget of the hospital. Most hospitals will do the necessary adjustments to negotiate with the drug companies to reduce the cost of medicines.

HPP 62
FAPA2014000087 (Poster)

Palivizumab Injection Use and Safety Assessment of a Medical Centre in Taiwan

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Respiratory syncytial virus (RSV) is the leading cause of lower respiratory tract infections in infants and young children, especially in children under 2 years. Currently there is no specific treatment for RSV infection, mainly with supportive therapy. Palivizumab is a humanized monoclonal antibody (IgG1) which inhibits RSV activity, indicated for prevention of serious lower respiratory tract disease caused by RSV. Taiwan's Ministry of Health and Welfare has approved palivizumab for prophylaxis in high-risk infants, which included infants with bronchopulmonary dysplasia (BPD), premature infants (≤35 weeks' gestation) and hemodynamically significant congenital heart disease (CHD). We retrospectively analyzed the efficacy and safety of palivizumab use in our hospital. We selected infants born during July 2011 to April 2014 and have completed 6 doses of palivizumab. We extracted data for 24 months for each infant. Data was collected from electronic patient record on demographic, readmission indication, length of stay (LOS) and side-effects. A total of 41 premature infants (21 male and 20 female) were included. 39 (95%) infants were ≤28 weeks' gestation, among them, 17 (44%) infants associated with chronic lung disease (CLD). Two (5%) infants were ≤35 weeks' gestation concomitant with CLD. All of our cases were without CHD. The readmission was 47 patient visit, the average of 1.1 patient visit. Readmission related to respiratory disease was 25 patient visit (53%), the average LOS was 6.2 days, unrelated to respiratory disease was 22 patient visit (47%) with the average LOS 5.5 days. The survival rate within 24 months was 100%. The main side effects of palivizumab were injection side reaction and mild fever. Palivizumab is currently the only medication used to prevent serious lower respiratory tract disease caused by RSV infection. Our results show that palivizumab is safe and effective in preventing RSV infection in high risk patients.

HPP 63
FAPA2014000089 (Poster)

Increment of Grade 3 or 4 Adverse Reaction Reporting Rate from Chemotherapy Agents

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Adverse drug reaction (ADR) monitoring is often as one of the hospital's risk management program. According to previous literature, chemotherapy induced Grade 3 or 4 ADRs of hematologic toxicity was approximately 16%. However, the same reporting rate was only 0.08% at a regional teaching hospital in Southern Taiwan. Chemotherapy induced grade 3 or 4 ADRs were defined by the NCI Common Terminology Criteria. Data was collected retrospectively from ADR reporting system from January to December 2012. Some interventions were conducted based on the reasons of unwilling reporting tendency from the health care professionals. The informative systems integrated the communication between doctors and pharmacists. Physicians can actively assess patients' conditions through the CPOE system based on NCI criteria. After completion the evaluation from physicians, the

CPOE system will then automatically send the informed messages over circular note system to pharmacists. In addition, an e-Learning program was established as the pharmacist training courses by Moodle platform. Moreover, a standard detection process of abnormal clinical laboratory value was designed for pharmacists. Grade 3 or 4 ADRs reporting rate were studied before and after the interventions. Six months after interventions, 149 ADRs were reported; 149 reports were submitted to TFDA. During the study period, physicians and pharmacists voluntarily reported 149 ADRs detected using this automated system. Compared with before, only 21 ADRs was identified using traditional detection methods. The Grade 3 or 4 ADR reporting rate of chemotherapy agents was significantly increased from 0.08% to 0.87% (p=0.0000003). The integration system enables automated detection of ADRs during clinical practice stage. In this study, the physician ADR reporting rate was successfully increased. In the future, pharmacist circular note system will combine with the nurse assessment system to increase the whole reporting rate.

HPP 64
FAPA2014000058 (Poster)

Simvastatin/Ezetimibe Induced Hand Eczema

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The combination of a statin with ezetimibe, acting as a dual inhibition mechanism against the synthesis and absorption of cholesterol, reduces LDL-cholesterol significantly more than treatment with a statin in monotherapy. A drug combination comprising ezetimibe 10 mg and simvastatin 20mg has been introduced into the market in Taiwan. Ezetimibe and simvastatin had proven to be a well-tolerated, effective lipid-lowering drug combination. In addition to rash, adverse effects about dermatologic had rarely been mentioned. Eczema was a common skin disease which had a variety of etiology and morphology. Medication were unusually been suspected the etiology of eczema. This case is about ezetimibe/simvastatin suspected the cause of hand eczema. This case is a 60-year-old woman, with a history of hypertensive cardiovascular disease, dyslipidemia and carotid stenosis, had long-term medication control with 6 items of cardiovascular medication including valsartan, felodipine. Physicians started prescription rosuvastatin 10mg for hypercholesterolemia from 9 July 2010 and then changed to ezetimibe/simvastatin 10/20mg for meeting the target of LDL in 22 July 2012. After taking about four weeks, the patient's eyes and fingers became to swelling; then fingers peeled repeatedly. Contact dermatitis was diagnosed by dermatology physicians in LMD and hospitals. Multiple medications were prescribed but there were no significant improvement. Until Jun 2013, she discontinued taking the suspected medication because of her friend's advice to medications might be the cause. After ezetimibe/simvastatin was discontinued by herself, the symptoms of eyes and hands improved gradually. Though eczema was not life-threatening, it significantly affected the patient's quality of life and spends extra time and money. The patient found finally the true etiology under the friend's reminder. So we suggested that the dermatologic symptom might be considered by medications early, if it was not improved after standard therapy.

HPP 65
FAPA2014000069 (Poster)

A Case Report of Suspected Inflammatory Polyarthritis and Delayed Infusion Reaction After TrastuzumabTherapy

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We describe a case report of suspected trastuzumab-induced inflammatory polyarthritis and delayed infusion reaction. 46 year-old female was diagnosed with breast cancer in 2012. She received right modified radical mastectomy, which demonstrated right breast invasive ductal carcinoma, pT2N2, stage IIA, ER, PR (+), HER2/neu=3+. She received adjuvant chemotherapy docetaxel plus epirubicin and cyclophosphamide in 6 cycles and followed by tamoxifen 10mg bid daily and trastuzumab (4mg/kg) therapy per 3 weekly. After seventh trastuzumab treatment, she developed fever with diffuse arthralgia the next day. The symptom accompanied with chills, skin rash over her abdominal and back, dizziness and conjunctivitis (bilateral red eyes). The laboratory data were generally within normal range except elevated white count, CRP and ESR. Bilateral hand, cervical spine X-ray showed negative finding. Peripheral blood and Port-A blood culture were negative. Whole body CT didn't discover any obscured infection source. Echocardiography examination didn't support infection endocarditis. Systemic steroid had been prescribed and the fever, skin rash, arthragia and conjuntivitis subsided. Due to no evidence of infection or tumor recurrent, we suspect the symptoms are trastuzumab adverse effect related. (Naranjo score = 5). The mechanism of trastuzumab-induced inflammatory polyarthritis and delayed infusion reaction is unknown. According to patient's condition, we guess it may be some factors induce these reactions, include antichimeric antibody produced or a concomitant viral infection. Our opinion is that a relationship between trastuzumab and the onset of inflammatory polyarthritis and delay infusion reaction is possible. Clinicians should be alert to the possibility of such adverse reactions.

HPP 66
FAPA2014000268 (Poster)

Suspect Ceftriaxone-Induced Neurologic Adverse Effects: Case Report

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Ceftriaxone is a third-generation cephalosporin commonly used in serious gram-negative infections. Neurological adverse effects resulted from cephalosporins include wide ranges of clinical manifestations, such as a change in mental status or encephalopathy, and seizures. We describe a case that developed encephalopathy and seizures after the use of ceftriaxone. A 74 year-old woman was diagnosed with hypertension, chronic kidney disease and stroke with mild sequela. She suffered from shortness of breath for one week and admitted to ward under the impression of lung pneumonia on March 28, 2014. Ceftriaxone was administered intravenously 1g Q12H plus Azithromycin 500mg QD. She was transferred to ICU according to deterioration of respiratory function on March 29. Under relatively stable condition, she was transferred to ward on April 1. Obvious involuntary movements of four limbs, altered state of consciousness occurred since April 6. Under the suspicion of encephalopathy induced by ceftriaxone, antibiotic was shifted to ciprofloxacin 200mg Q12H. Psychiatrist recommended quetiapine 25-50mg PO before sleep and olanzapine 5mg injection as needed. Generalized seizures occurred on April 9 and valproic acid 400mg was injected Q8H under the suggestion of neurologist. Based on literature search, time-series association, only ceftriaxone has possibility to induce neurotoxicity. The patient's consciousness gradually improved on April 12. She

discharged on May 1 under relatively stable condition. Encephalopathy is a rare side effect of a third-generation cephalosporin. This adverse effect is common in the initial 10 days of ceftriaxone use, and alleviation within 2-7 days after discontinuation. In this case, state of consciousness was recovered and seizures were under control 6 days after discontinuation of ceftriaxone. This case reminds medical professionals to be aware of unusual behaviors followed by ceftriaxone use, in order to reduce the possible neurotoxicity.

HPP 67
FAPA2014000061 (Poster)

Impact of a Pharmacist Intervention on Medication Discrepancies and Clinical Outcome in Home Care

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Medication discrepancies are common among elderly patients using multiple drugs for the treatment of chronic diseases. The aim of this study was to investigate the occurrence of medication discrepancies in this population. An observational study involving 35 patients aged over 65 years at least five prescriptions drugs and received home care service was conducted. A pharmacist faced to a patient or caregivers to discuss medication discrepancies. The mean (± S.D.) number of medication discrepancies in this group was 1.5 (±0.7). The discrepancy rate was 62.9 % and resolution rate was 77.2 %. Medication discrepancies found using the medication discrepancy tool (MDT) were not to need prescription (20%), financial barrier (5.7%), fear of adverse drug effects or knowledge deficit (17.2%) and incorrect dosage (20%). The findings indicate that a pharmacist was effective in resolving medication discrepancies and potential preventing drug-related problems. An important task for pharmacists is to identify, resolve, monitor, and prevent the occurrence of medication discrepancies among this patient group. Early interventions will have the best effects.

HPP 68
FAPA2014000055 (Poster)

Analysis of the Styles and Pharmacological Classifications for Adverse Drug Reaction in a Medical University Hospital

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ADRs not only increase the cost of healthcare but also are one of the reasons causing high morbidity and mortality. In order to avoid the recurrence, ADRs were analyzed by seasons in Chung Shan Medical University Hospital (CSMUH). This study aimed to warn medical care staff of the ADRs, promote the safety of using drugs and prevent the occurrence toward ADRs. Pharmacists collected the ADRs information then evaluated the relevance to drugs according to Naranjo Probability Score, checked patients' medical histories, interviewed patients on the phone and discussed with medical care staff. We divided ADRs into 15 styles according to the adverse effects, which were dermatologic, neurologic, gastrointestinal, cardiovascular, musculoskeletal, respiratory, haematologic, immunologic, hepatic, endocrine/metabolic, ophthalmic, psychiatric, renal, genitourinary and others. The 13 pharmacology drug classifications for ADRs were anti-infective, muscular-skeletal, nervous, respiratory, and cardiovascular system, alimentary tract and metabolism, blood and blood forming organs, anti-neoplastic and immune-modulating agents, genitourinary system and sex hormones, systemic hormonal preparations, anti-parasitic products, sensory organs, and dermatologicals. A total of 427 ADR cases were identified from January to December in 2013. The final statistical results

showed the most common ADRs styles were dermatologic (235, 51%), neurologic (85, 19%) and gastrointestinal (45, 10%); the most common pharmacological classifications related to ADRs were anti-infective for systemic use (91, 21%), muscular-skeletal system (81, 18%) and nervous system (69, 16%). We can provide statistical analysis for medical care staff and set individual pharmaco-vigilance in medical order system to prevent patients from taking the same drug again. By the way of preventable ADRs through monitoring the high dangerous drugs, we elevate the quality of pharmaceutical care, promote the usage of appropriate economic medicines and reduce the ADR-related hospitalizations. Our ultimate goal is to enhance drug safety and quality of life in order to promote public health.

HPP 69
FAPA2014000202 (Poster)

A Comparative Study of Changing Penfill Insulin to Conventional Syringe Insulin

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Diabetes Mellitus (DM) is the health problem in Thailand. Patients with DM have to use insulin injection lifelong although insulin injection is expensive. To reduce the direct medical costs, changing from penfill insulin injection (PII) to conventional syringe insulin (CSI) is very practical. This study aimed to compare the blood glucose level and direct medical costs before and after changing from PII to CSI. This action research used before and after design. DM patients received PII during June to September 2012 (Phase I) and changed to CSI during October 2012 to January 2013 (Phase II). The inclusion criteria were DM patients who received insulin injection for more than 1 year, had no limitation of insulin injection, received counseling from pharmacist and had at least 2 blood sugar level tests before and after changing insulin injection. Only insulin injection cost was included. During phase I, 713 of 855 DM patients received PII (83.39%). The approximate time of disease was 2.19 years and had insulin injection twice daily. During phase II, 720 DM patients received insulin treatment. Of these, 364(50.56%) patients received PII and 114(15.83%) of these changed to CSI. Although the total amount of insulin unit increased from 1,551,400 units (15.12 units/patient/day) to 2,868,900 units (33.20 units/patient/day), the total cost of insulin treatment decreased from 542,990 baht in phase I (0.35 baht/unit) to 429,729.83 baht in phase II (0.15 baht/unit) which gives rise to a total cost saving of 113,260.17 baht. The average cost decreased from 158.79 to 149.40 baht/patient/month. Fifty one DM patients were monitored and blood glucose level was compared between phases I and II. The results revealed that blood glucose level decreased statistically significantly from 204 mg% to 117 mg% (paired t-test, P=0.0388). In conclusion, changing PII to CSI decreased direct treatment cost and blood glucose level also decreased. It is possible that calibration is needed for penfill injection.

HPP 70
FAPA2014000277 (Poster)

Effectiveness of Clinical Pharmacist Visit among Hospitalized Elderly Patients

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Pharmaceutical care on elderly patients is complex because of multi-comorbidities, polypharmacy. The aims of this study is to identify medication problems and suggestions in elderly patients visited directly by geriatric pharmacists. From March 2014 to June 2014, a case-control study, matched by age and gender, was conducted at a medical center in southern Taiwan. Cases were hospitalized patients aged 65 years in geriatric wards and received comprehensive pharmaceutical care, 1) Reasonability of drug utilization by clinical visit; 2) Patient education and suggestions; 3) To assess the prevalence of potentially inappropriate medications based on STOPP & START criteria. Controlled cases were those in general medical wards and received routine pharmaceutical consultation and suggestions. The requirements of pharmaceutical suggestions in controlled cases were retrospectively reviewed. A total number of 120 cases were enrolled, with 50% were female. The mean ages of case and control group were 82.5±7.5 and 82.5±7.4, respectively. Mean numbers of diseases per patient were 3.58 and 3.53. Mean numbers of medications per patient were 13.0 ± 4.8 and 10.7±3.8. A total number of medications required education by pharmacist is 78 and 103, and the numbers of crushing ungrindable medications is 62 and 67. Number of potentially inappropriate medications defined by STOPP criteria is 40 and 27, while medications defined by START criteria are 18 vs 14. After visit by geriatric pharmacists in the case group, all patients with 78 medication problems received education, and the crushing ungrindable medications decreased from 62 to 51. Medications problems defined by STOPP and START criteria in the case group decreased from 40 and 18 to 27 and 10, respectively. Geriatric pharmaceutical care visited directly by pharmacists could detect more medication problems and practical education might be provided to those hospitalized elderly patients.

HPP 71
FAPA2014000220 (Poster)

Subcutaneous Versus Intravenous Administration of Bortezomib in Patients with Multiple Myeloma: A Retrospective Review Study

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Intravenous (IV) bolus is the standard administration route of bortezomib, however, subcutaneous (SC) administration is an important alternative route. Bortezomib induced peripheral neuropathy in multiple myeloma (MM) patients is a common and serious side effect. Currently, it has been reported that SC administration of bortezomib decreases the incidence of peripheral neuropathy as compared to IV bolus injection without any differences in efficacy. We compared the efficacy and safety of SC vs. IV bortezomib in patients with multiple myeloma (MM). This study was designed to retrospective review the medical records of patients with MM, who were treated with bortezomib-based regimen between January 2012 and November 2013 at the medical center in Taiwan. Twelve MM patients were average 66 years; had received one to three lines of therapy. Patients were received bortezomib by standard SC (n=6) or IV bolus (n=6) at the recommended dose and schedule (1.3 mg/m² dose twice a week to once a week). Twelve patients were evaluated (IgG: light chain: IgA type=6:5:1; Male:

Female=7:5). The number of treatment cycles was 7 (range 2–21). The mean cumulative bortezomib dose was 21.5 mg/m² (range 7.8–44.2). The most common of adverse events were reported thrombocytopenia (3 [50%] vs. 4 [67%]), peripheral neuropathy of any grade (1 [17%] vs. 3 [50%]) with SC vs. IV bortezomib. Patients with peripheral neuropathy of any grade, where the average cumulative bortezomib dose was 17 mg, were treated by medication including duloxetine, pregabalin, and methylcobalamin. In conclusion, SC administration is a promising alternative to IV administration, particularly in patients with poor venous access or at increased risk of side effects. Decreased incidence of grade 3 or higher adverse events were observed with SC administration. Further studies in larger populations are warranted to confirm preliminary efficacy and safety data.

HPP 72
FAPA2014000260 (Poster)

Drug Related Problems in Geriatric Clinic

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Drug related problems (DRPs) are common in the elderly patients. Apart from chronic illness many elderly patients also suffered from mental and memory problems. They use more drugs than the younger patients. The objective of this study was to investigate the prevalence of DRPs among the elderly patients. The study was conducted at a geriatric clinic of SDMC, which is the academic hospital that belongs to the Faculty of Medicine, Ramathibodi Hospital. Pharmacists collected the information by reviewing patients' medication profiles and interviewing the patients or caregivers to find out DRPs. The study period was from December 2006 to April 2013. Data from 1,187 visits of 615 patients were collected and analyzed. DRPs were found in 892 visits (75.15%). The most common type of DRPs was patient drug use process. In this study half of the problem was non-compliances (54.23%) which included taking medication irregularly (43.70%), self-discontinuing medication (29.40%), do not follow the prescribed direction (22.30%), and self- medication or dietary supplement (4.60%). Other common DRPs founded were adverse drug reactions (19.22%), inappropriate drug selection (5.72%), drug interaction (5.26%), untreated condition (4.80%), duplicated medication (4.03%), dosage too high/too low (3.31%), over use/no indication (2.63%), and need additional drugs therapy (0.80%). In conclusion, DRPs are common especially in elderly. Non-compliance was the most prevalence. These events may lead to considerable patient morbidity and mortality. Pharmacists have major roles in the prevention and resolving of DRPs. More comprehensive systemic approaches are needed to resolve these problems.

HPP 73
FAPA2014000275 (Poster)

Evaluation on the Use of Febuxostat

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Febuxostat, an xanthine oxidase inhibitor (XOI), is commonly used for treatment of hyperuricemia in patients with gout. This drug is recommended for use as first-line therapy, or use post failure of

treatment with allopurinol and benzbromarone. This study was undertaken to gather relevant data and evaluate the results to understand the efficacy of a new drug at our hospital. This is a retrospective study. We collected data from October 2012 to March 2013, using febuxostat and ICD-9 diagnosis code 274.0-274.9 (gout). We included patients whose uric acid> 6 mg/dL and recorded the dose, serum uric acid levels pre- and post- treatment, improvement rates in clinical symptoms. SPSS17.0 was used to for statistical analysis. In total 48 patients were included in this study, of whom 42 were males, 6 females. The ratio of male to female is 8.8:1.2, and the average age is 57 (34-88) years old. Complications occurred as hypertension: 66.7%; high cholesterol: 62.5%; diabetes: 12.5%; liver and renal dysfunctions were approximately 12.5%. Ratios of the daily maintenance dose of febuxostat as 20mg, 40 mg and 80 mg are 12.5%, 68.75% and 18.75% respectively. The average uric acid levels pre- and post- treatments were 8.9 (6.2-11.5) mg/dL and 5.5 (4.6-8.8) mg/dL. Of which, 64.6% of patients whose uric acid levels were reduced to below 6 mg/dL, and ten patients improved either in episodes of gouts attack or relief of symptoms. In this study, we found febuxostat can effectively reduce serum uric acid, gout episodes or improve symptoms. Although no serious adverse reactions occurred, we still need to monitor liver functions, gastrointestinal symptoms, rashes, etc., to further enhance patient medication safety. Issues related to combination therapy with anti-inflammatory drugs (such as NSAID and steroids) are left for further study.

HPP 74
FAPA2014000230 (Poster)

The Effectiveness of Adult Epilepsy-Medication Therapy Adherence Clinic (Epi-MTAC)

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Provision of pharmaceutical care in epilepsy patients has contributed in improvement of their anti-epileptics adherence, seizure frequency, and management of their disease. In HTAN, adult Epi-MTAC has been operated since May 2011. A retrospective study was conducted with data collection from 2010 to 2013. The objective is to evaluate the effectiveness of adult Epi-MTAC in HTAN. Subjects involved had at least 3 visits and 6 months follow-up. Data for pre- and post-Epi-MTAC recruitment of subjects' anti-epileptic adherence, seizure frequency, and prescriber's acceptance of pharmacists' intervention were collected from the Medical Out-Patient Department (MOPD) files and MTAC files. Therapeutic Drug Monitoring (TDM) data of subjects was obtained from TDM unit. The questionnaire-evaluated subjects' quality of life (QOL) and satisfaction towards MTAC service were obtained from MTAC unit. From 54 subjects recruited, significant ($p<0.05$) improvements were found in post-Epi-MTAC recruitment for anti-epileptics adherence and mean seizure frequency per month. A self-rating by Epi-MTAC pharmacists showed some short-comings in Epi-MTAC service, leading to implementation of a new intervention, which was provision of epilepsy tool kit. Subjects were found to be satisfied with the Epi-MTAC services; though there was no significant increase in mean satisfaction score even after the new intervention (epilepsy tool kit) was provided. There was a small improvement in subjects' QOL between 0-month and after at least 6 months in Epi-MTAC. High acceptance by the prescribers of Epi-MTAC pharmacists' interventions was achieved. A positive outcome was seen from the impact of Epi-MTAC pharmacists' interventions in TDM request. In conclusion, by collaborating with the prescribers and with active participation from patients, Epi-MTAC plays an important role in ensuring the quality of drug and disease management in epilepsy patient and was shown to be effective.

HPP 75
FAPA2014000100 (Poster)

Comparison Haematologic Adverse Effect between R-CHOP, CHOP, CVP and ESHAP Regimens in Non - Hodgkin's lymphoma Patients at Saraburi Hospital, Thailand

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The incidence of diffuse large B-cell lymphoma has increased at Saraburi Hospital. There were many chemotherapy regimens to treat such as R-CHOP (Rituximab, Cyclophosphamide, Doxorubicin, Vincristine and Prednisolone), CHOP (Cyclophosphamide, Doxorubicin, Vincristine and Prednisolone), CVP (Cyclophosphamide, Vincristine and Prednisolone) and ESHAP (Etoposide, Cisplatin, Cytarabine and Prednisolone). Many patients have suffered serious hematologic adverse effect until non compliance to treat with chemotherapy in the next cycle and this in turn, decreased quality of life. Thus, this study aimed to analyze hematologic adverse effect and 5-years survival of these regimens. This study was descriptive research and retrospective study. Data were collected since January 1, 2008 to December 31, 2013 from medical records of adults Non - Hodgkin's lymphoma patients at Saraburi Hospital. The results were analyzed using Kruskal Wallis Test statistics in SPSS Program. The mean age of 190 patients in Non-Hodgkin's lymphoma was 54.7 years old. There were 1,124 hematologic adverse effects such as anemia, hypokalemia, neutropenia and thrombocytopenia. All of four regimens R-CHOP, CHOP, CVP and ESHAP were happened anemia most 28.0%, 25.4%, 22.4% and 24.2% respectively, hypokalemia were happened 27.2%, 24.5%, 21.5 % and 24.0% respectively, neutropenia were happened 27.9%, 23.8%, 21.7% and 23.8% respectively. This difference was significant in statistic P=0.04. In 5-years survival found that CVP regimen was the most rate 52.6 %. In medical treatment expense founded that R-CHOP was the most expensive ,more than CVP regimen 7 times, CHOP regimen 5 times and ESHAP regimen 4 times. The average times of hematologic adverse effect per one patient found that CVP regimen was less than other regimen 2.8 times. In conclusion, CVP regimen has the best 5-years survival, less medical treatment expense and less hematologic adverse effect.

HPP 76
FAPA2014000169 (Poster)

Pharmacist-led Home Healthcare Increased Medical Appointment Adherence and INR Level

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Non-adherence to medical appointment in patients who received medical care at Warfarin Clinic from October 2012 through March 2013 was 8.70 %. It was higher than the quality control criteria (5%) from The National Health Security Office, Thailand. Thus, the purpose of this study was to decrease the appointment non-adherence of patients in Warfarin Clinic, to monitor side effects of warfarin and to identify and decrease drug-related problems. Forty-two patients were included in this study. This study was an action research using before and after design conducted at Warfarin Clinic, Warinchumrab Hospital. INR level and drug-related problems (DRPs) during October 2012 through March 2013 were retrospectively reviewed and collected from electronic and paper-based medical records. Pharmacist-led home healthcare visit were initially implemented in April 2013 to identify barriers and problems of medical care services in these patients. During home healthcare visit, health education and pharmaceutical care were provided to each patient to identify and properly manage those DRPs and improper health behaviors. The result revealed that the appointment non-adherence rate statistically decreased from 8.70% to 2.90% (McNemar's chi-squared, P=0.028) after pharmacist-led home healthcare visit. Achievement of INR level statistically increased from 52.22% to 63.73%

(Pair t-test, P=0.016). DRPs including improper dose of warfarin, non-compliance, bleeding, drug interaction also statistically decreased from 56.52% to 42.02% (McNemar's chi-squared, P=0.001). In conclusion, pharmacist-led home healthcare visit has reduced appointment non-adherence, DRPs and increased achievement of INR level significantly.

HPP 77
FAPA2014000085 (Poster)

Drug Use Evaluation of Restricted Antibiotics in Hospitalized Patients at Phangnga Hospital

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Drug Use Evaluation (DUE) studies are designed to assess drug use appropriateness. We aimed to evaluate drug utilization of 5 restricted antibiotics (imipenem/cilastatin, meropenem, vancomycin, cefoperazon/sulbactam and ampicillin/sulbactam), the broad spectrum antibiotics that consume a significant proportion of our hospital outlay, under the Pharmacy and Therapeutic Committee (PTC) regulation. Data was collected prospectively from January 2013 to September 2013. Demographic and drug use details were recorded on special forms. Appropriateness was assessed if met criteria and utilization was measured in ATC/DDD index (defined daily dose (DDD)/100 patient-days). Overall, 120 patients received 225 courses with one of these antibiotics. The appropriate rate of restricted antibiotics prescription was 83.63% (189 courses). The total 5.75%, 38.94% and 55.31% of 226 courses was prescribed documented, empirical and specific therapy respectively. The DDD/100 patient-days of the study was 0.33 in imipenem/cilastatin, 4.64 in meropenem, 1.10 in vancomycin, 1.22 in cefoperazon/sulbactamand 2.71 in ampicillin/sulbactam. The final clinical outcomes of patients were 80.97% therapeutic response and 19.03% therapeutic failure. Only 65.04% of cultures reports were found multi-drug resistant (MDR) organisms. In conclusion, the majority of courses with restricted antibiotics were empirically. The appropriateness of drug use was acceptable. However, almost 20% of courses still concerned irrational use. Educational interventions, intensive PTC regulation and empowerment of adherence to a strict antibiotic prescribing policy can help significantly to overcome this problem.

HPP 78
FAPA2014000163 (Poster)

The Prevalence and Types of Prescribing Errors (PE) in the Outpatient Pharmacy Unit of an Academic Hospital

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Medication prescribing is an important process of pharmacy services in the hospital. The unclear and errors in prescribing cause several untoward consequences. The aim of this study was to identify the prevalence and types of PE in the outpatient pharmacy services. The prescriptions at outpatient pharmacy services (Orthopedics, Surgery, Skin, and Ear Nose throat department) during Jan – Dec 2013 were studied. SDMC is one of the 3 hospitals belong to the Faculty of Medicine, Ramathibodi Hospital. Physicians prescribed by handwritten before sending to the pharmacy unit. The total of 313,217 prescriptions was analyzed. Prescribing errors were found in 1,937 prescriptions (0.62% of total prescriptions). The most frequent errors were omitted and unclear drug strength (46.61%). These were followed by prescribing drug which patients has documented history of allergy (16.42%), inappropriate dosage (11.10%), incorrect dosage schedule (10.37%), unclear drug name or unclear

handwritten prescription (7.64%), inappropriate route of administration (3.36%), omission of the prescriber's signature (2.48%), prescribing two drugs which have the same pharmacologic mechanism or significant drug interaction (1.34%) and use of non-internationally accepted abbreviated drug name (0.67%). All unclear prescriptions were sent back to physicians and 96.26% were corrected. In conclusion, PE is still common in everyday clinical practice. Computerized Physician Order Entry will be soon implemented which may partly reduce PE. Pharmacist intervention will significantly reduce PE. More epidemiological studies to identify the key factors affecting PE are needed.

HPP 79
FAPA2014000296 (Poster)

The Geriatric Clinic Care Program: An Approach to Maintaining Good Health and Quality of Life

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The Geriatric Clinic aspires to address the health care needs of the geriatric population through provision of free medical services. We commit to providing the patients with access to free health services and medications, and to promote activities and lifestyle modifications for a better quality of life. The Geriatric Clinic advocates proper care for the elderly to improve their overall well-being through education, diagnosis and prevention of diseases as well as the provision of appropriate management and specific care to ensure improvement in quality of life. The programme was conducted at the St. John's Home for the Elders, Quiapo, Manila, Philippines, between September 2013 and January 2014, and was divided into four phases. Phase I comprised of patient profiling and consultation. Patient profiling included demographic characteristics, patient medical history, adherence to medication, eye examination, vital signs, SF-12 (a measurement of patient's limitation of activities), and chronotyping. Doctors assessed patients and recorded their corresponding management. Phase II focused on providing diagnostic tests which included X-ray, ultrasound and electrocardiogram. Phase III comprised of communicating diagnostic test results and giving management plan for patients, together with their medicines and medication information. Phase IV comprised of follow-up monitoring, and seminars on nutrition, exercise, and sleeping habits. Activities provided included showcasing of talents, games and lunch to the beneficiaries. Volunteers quantified the effect of the interventions. The results showed that medication adherence rate was high among patients after the intervention, and poor adherence rate was found to affect blood pressure control. However, this was found to be inconclusive because of the very small population involved. The study population also exhibited a high prevalence of hypertension and diabetes. The community was endorsed to the Hypertension Clinic and Diabetes Clinic. Overall we conclude that the patients' quality of life has improved.

HPP 80
FAPA2014000225 (Poster)

Predictors of Adherence to Calcium Carbonate as Phosphate Binder among Dialysis Patients in Hospital Raja Perempuan Zainab II

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Patients with end stage-renal disease (ESRD) are at risk of cardiovascular disease and bone disorder due to hyperphosphatemia. Treatment with phosphate binders is associated with improves survival

among hemodialysis patients. However, poor adherence is common in these patients which can lead to inadequate control of serum phosphorus concentrations. Thus, this study aimed to determine the predictors of adherence on calcium carbonate as phosphate binder among haemodialysis patients in HRPZ II. A cross sectional study was conducted at hemodialysis unit of HRPZ II targeting only on patients taking calcium carbonate as phosphate binder. All responders were assessed based on their adherence to the medication using Modified Morisky scale. Twenty one out 44 patients (48.0%) reported non-adherence towards calcium carbonate. Mean phosphate level was significantly low in patients with good adherence (p= 0.034) as compared to patients with poor adherence. Gender, education level, and marital status did not significantly influence medication adherence. However, unemployed or pensioner patients show more compliance compared to employed patients (p= 0.027). Mean pill burden and duration of hemodialysis were not significantly differently between adherence and non-adherence group. There was significantly difference between mean age of adherence to non-adherence patients (p=0.004). In conclusion, the employment status, age and phosphate level of the patients were the predictors of adherence on calcium carbonate as phosphate binder among haemodialysis patients in HRPZ II. Unemployed or pensioner and older patients showed more adherence towards their medications.

HPP 81
FAPA2014000228 (Poster)

Risk Factors of Anti-tuberculosis Drugs-Induced Hepatotoxicity in Central of Chest Institute of Thailand

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The purpose of this research was to determine the rate and risk factors of drug-induced hepatotoxicity in tuberculosis patients treated at Central of Chest Institute of Thailand. The study was a three-year retrospective study with data collected from the patient charts between January 2008 and December 2010. Two hundred and twenty seven patients were selected from four hundred and forty seven drug-induced hepatotoxic tuberculosis patients based on the inclusion criteria, calculated as 50.78%. The percentage of tuberculosis patients in Central of Chest Institute of Thailand (3,482) having drug-induced hepatotoxicity was 6.52. The result showed that the mean ± SD for onset of hepatotoxicity in patients who received H300:R600:Z1500:E1000 regimen was higher than the patients who received H300:R450:Z1000:E800 regimen. As for the patient's weight, there is a greater risk of hepatotoxicity in patients with less than 45 kilograms (OR = 1.49, 95% CI: 1.14 – 1.95, p = 0.0037). According to the research, patient's weight is the second risk factor for hepatotoxicity. Gender was also found to be associated with hepatotoxicity from anti-tuberculosis drugs as the research found that male has more risk than female (OR = 1.73, 95% CI : 1.32 – 2.27, Z statistic = 3.930, p = 0.001).

HPP 82
FAPA2014000271 (Poster)

Using the Quality Control Circle Approach to Reduce Resupply Rate in Pharmaceutical Inventory Control

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Good inventory control makes ordering and pharmaceutical management easier. Essential medicine programs place a high priority on improving inventory control to ensure a reliable supply of all pharmaceutical products at health facilities. To achieve this aims, we carry out the quality control

circle approach in improving pharmaceutical inventory control in our hospital. Our end point is to improve patient pharmaceutical services and to obtain a better pharmaceutical management. The study was carried out in 2013 year from March to October; we used the quality control (QC) techniques (i.e., Gantt charts, Plato, QC STORY decision tables, etc.). We analyzed the distribution procedure from the warehouse to our pharmacy, drug shortage rate, drug deficiency rate, the resupply rate, stock-out rate. We used the Pareto principle (80/20 rule) to improve the event and improve the rate of drug resupply rate. Before QC technique was implemented, the event of resupply event rate was 7.79%. Our implementation to improve the event includes; setting the pharmacy inventory IT system, individual staff to manage the inventory management system, setting the provisional procurement application form, drugs status reminds/warning, etc. A 4.4% improvement result was obtained; with a decreased of 0.58% resupply rate; main target is 1.35%; overall target achievement rate is 112%. QC circle activity provides an excellent method in improving the quality control of pharmaceutical inventory management. A good inventory management balances the service level and safety stock. A regular and accurate stock count and standard method for valuing are needed to determine the base of inventory value.

HPP 83
FAPA2014000315 (Poster)

Using Comic, Pictograms and Table Sticker to Improve Knowledge and Medication Adherence in Children with HIV/AIDS

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Adherence to treatment of chronic diseases is one of the main things to ensure the success of therapy. Children with chronic disease, often not adhere to their treatment. The problem of non-adherence is due to the lack of information which given to the children about their treatment. This study aims to determine the effectiveness of education to improve knowledge and adherence in children with chronic illness. This before-after study test the effectiveness of illustrated booklet (comic), pictograms and table stickers on 22 outpatient children with HIV/AIDS in Sanglah Hospital Denpasar-Bali. We used a validated pre-test and post-test questionnaire to measure their knowledge about HIV/AIDS medication. We used 'pill count' to measure the improvement of the medication adherence. In this study, comic; pictograms and table stickers would be given to all children after they filled the questionnaire (pre-test). Results showed that their knowledge's score after study was higher than before study ($p < 0.001$). The level of adherence, at the beginning (before the study), is already high (pill count 100%), there was no significant difference 'pill count' between before and after the administration of education ($p = 1{,}000$). In conclusion, comic, pictograms, and table stickers can increase the knowledge of children with HIV/AIDS. Children's knowledge of the disease and treatment is needed to maintain medication adherence, particularly when the children grow up, as teenager or adolescent.

COMMUNITY PHARMACY

CPP 01
FAPA2014000098 (Poster)

The Clinical Effectiveness of Clinical Scoring System for Pharyngitis Diagnosis Leading to Antimicrobial Selection in Community Pharmacies

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The objective of this study was to determine the clinical effectiveness of clinical scoring system for pharyngitis diagnosis leading to antimicrobial selection in community pharmacies. The clinical scoring system is based on 4 clinical criteria for predicting risk of infection from group A streptococci (GAS), namely fever (the body temperature $\geq$ 37.8 ^{O}C), absence of cough, cervical lymphadenopathy and tonsillopharyngeal exudates. Patients with less than 3 criteria were unnecessary treated with antimicrobial drugs. The study constituted a quasi-experimental design with parallel groups to compare clinical effectiveness at 7 and 14 days after pharyngitis treatment between study groups, diagnosed by using clinical scoring system, who did not receive antimicrobial drugs (n = 37), and control group with unnecessary antimicrobial treatment (n = 37). Both groups were suspected to have viral pharyngitis based on the clinical score 0 - 2. The results showed that antimicrobial drug usage was statistically significantly decreased from 97.7% in control group to 7.5% in study group ($p < 0.001$). At day 7 and day 14 after treatment, clinical response, defined as clinical improvement and complications in both groups were not significantly different. The receiving of antimicrobial drugs was not related to the clinical response ($p = 0.327$ at day 7 and 0.282 at day 14). In conclusion, this clinical scoring system is effective in promoting appropriate diagnosis, differentiating between viral- and bacterial- infected pharyngitis, and antimicrobial selection in community pharmacies.

CPP 02
FAPA2014000281 (Poster)

The Projection of Community Pharmacy Service in Diabetes Care

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Diabetes has become the highest population among chronic diseases in Taiwan. However, the public knowledge about diabetes care has not been well established, especially the awareness and management of complications. The aim of this study was to provide pharmacy care for diabetes patients in the community in order to better control complications and reduce medical cost. The counselling desk specific for diabetes care was established in community pharmacy, where primary care such as blood pressure and glucose measuring, drug use counselling, education for quit smoking and dietary recommendation through dietician were conducted. According to statistical analysis on the Q & A results, almost all the diabetes patients agreed that pharmacy care was satisfactory. The health education and drug use counselling for diabetes patients did reduce the occasion of falling down caused by low blood glucose. The pharmacy care for diabetes in community is helpful to control complications. The patient's quality of life and the confidence can be secured through community pharmacy care.

CPP 03
FAPA2014000279 (Poster)

Build a Supporting System of Drug Supply for Community Pharmacies by Taipei Pharmacist Association

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The situation on shortage of drugs, rare-use or purchasing price higher than reimbursement happened to community pharmacies. This is caused by inadequately implemented separation policy of dispensing from prescribing. The aim of this study was to solve the drug supply problem and provide the drug use convenience to the general public as well as better management of community pharmacies. The Taipei Pharmacists Association established the website of platform for drug supply listing which allowed community pharmacies in Taipei to list drugs needed or drugs to be shared. Moreover, the policy allowing Taipei Pharmacists Association to be a drug supplier for Taipei City Hospital Tender is under investigation. The website of platform for drug supply listing is satisfactory to solve the problem mentioned above. Furthermore, the information obtained from the platform has been statistically analyzed and investigated to be a valuable reference for better health and pharmacy care service. All the community pharmacies and citizens in Taipei enjoy the convenience and benefits from the website of platform for drug supply listing. It is a milestone for pharmaceutical services especially for the current status of separation of dispensing from prescribing.

CPP 04
FAPA2014000282 (Poster)

Development Programs of International Meeting Participation for Community Pharmacies of Taipei Pharmacist Association

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More than half of the member pharmacists of Taipei Pharmacist Association (TPA) are from community pharmacies. However, very few of them have experience of participating in international meetings while participants are mostly from hospitals or academy. It might be one of the reasons they are not familiar with the international pharmacy meetings. In order to elevate the quality of community pharmacies, expand the viewpoint of community pharmacists, and encourage participation in international meetings, a series of workshops were sponsored by the International Affairs Committee of TPA during October, November, and December 2013. Three lecturers from pharmacy schools and hospital pharmacy were invited to introduce their experience of participating in FIP and FAPA, how to write an abstract, and how to prepare a poster at international meetings. A total of 22 member pharmacists of TPA joined the workshops and practiced writing an abstract with individual counselling from lecturers at the workshops. In addition, two classes of etiquette and table manners were given by another lecturer. An exercise dinner was held at an elegant restaurant after the classes. Participants who complete the programmes were awarded certain credits for the pharmacist continuing education as well. Every participant completed his/her own essay and would love to submit their abstract to FIP 2014 in Bangkok or FAPA 2014 in Malaysia, and enjoyed the programme very much. The workshops were well accepted and welcomed. Participants learned about the international meetings and how to write an abstract at limited period of time. Outstanding participants were identified to assist at future workshops.

CPP 05
FAPA2014000032 (Poster)

Correlation of Diabetes Treatment Satisfaction and Quality of Life in Outpatient Elderly at RSUP Dr Kariadi Semarang

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There is a need for normative data to improve the quality of life for elderly patients with measuring diabetes treatment satisfaction and quality of life. The study was conducted on 106 outpatient elderly with type 2 diabetes mellitus at the Paviliun Lanjut Usia RSUP dr Kariadi Semarang during September-November 2012. The study design was a cross sectional study. Diabetes Medication Satisfaction Tool Scale (DMSAT) was used to measure treatment satisfaction and the Euro Quality of Life 5D is used to measure the quality of life of patients. The primary outcome measure was treatment satisfaction, quality of life and correlation of treatment satisfaction and quality of life of elderly patients with diabetes mellitus type 2. Statistical analysis using pearson correlation test. Overall diabetes treatment satisfaction mean score patient was include quite satisfied category (5.42 ± 0.12) and the EQ VAS quality of life mean 72.92 ± 10.14. On the quality of life measure with EQ-5D have extreme problems on mobility domain 1.9% patients, self-care 2.8%, usual activities 2.8%, depression 0.9%. There are significant differences between age, education level, and Charlson comorbidity index scores in patients with quality of life. Based on the Pearson test, there is no significant correlation between treatment satisfaction and quality of life of patients ($P > 0.05$).

CPP 06
FAPA2014000245 (Poster)

Health Supplements Used by Pregnant Women

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Health supplements are commonly used in pregnancy but information on the extent and types used are scarce. A cross-sectional study was conducted on pregnant women who were at least in the second trimester of pregnancy, and who attended the antenatal clinic in the University of Malaya Medical Centre, from January to April 2013. The aim of this study was to investigate the safety of common health supplements used by pregnant women especially during the first trimester of pregnancy. Data was collected via face to face interviews using a structured questionnaire. A total of 1376 health supplements were used by 491 out of 500 pregnant women (98.2%) who participated in this study. More than half (54.3%) of the health supplements were started during the first trimester of pregnancy. The commonly used health supplements were Obimin® (82.8%), folic acid (70.0%), calcium (51.6%) and iron (16.6%) supplements, and vitamin C (11.0%). A majority of the respondents (85.2%) used more than one type of supplements without knowing that they were consuming much higher than the Recommended Daily Allowance (RDA) for pregnant women. These include the mean dosages of folic acid, vitamin A and vitamin D. The findings of this study indicate a lack of awareness concerning the safety of health supplements hence, women of child-bearing age should be counselled on this issue as excessive use of some supplements such as vitamin A, may have deleterious effect on the foetus and mother.

CPP 07
FAPA2014000014 (Poster)

Unit Cost Analysis of Managing Common Illness in the University Health Services

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Mahasarakham University (MSU) medical centre provides health services to students, free-of-charge, supported by the Thai government. The Pharmacy (UniPharm) also serves numerous students who suffered from common illnesses, but out-of-pocket. Both places should be incorporated into one system. Cost of services is, therefore, essential to design a payment method between them. This study was to examine the proportion of the student visits of both settings regarding common illnesses (covering eight systems: upper-respiratory, gastrointestinal, urinary tract, reproductive health, pain, eye/ear, skin, and helminths), and to perform unit cost analysis. Patient visits were observed during August to October 2013. Labour (LC) and material costs (MC) related to the focal activity were recorded. Total cost divided by total patient visits determined the unit cost. Patients were followed up after 3-14 days of pharmacy visit to examine the effectiveness. Sensitivity analysis was performed by varying direct medical cost at ±10%. Managing common illness at the medical centre involved nurse assistants, nurses, doctors and pharmacists. Of 6,701 patients, 1,454 (21.7%) visited regarding aforementioned illnesses, 904 were students (13.5%). Upper respiratory disorders were the most common, 53.0% (771/1,454). Unit cost of treatment ranged from 85.39 baht (eye/ear) to 245.93 baht (sexual health). At the UniPharm, community pharmacist performed multiple tasks including assessing patient, choosing appropriate treatment and dispensing. Of the 9,141 customers, 755 were students seeking help regarding common illnesses (8.5%). Upper respiratory disorders were also found to be the highest 41.9% (325/755). Unit cost of treatment ranged from 54.16 baht (pain) to 82.71 baht (skin problems). Two-thirds (70.1%, 543/699) reported completely recovered. Varied direct medical cost affected the unit cost change for approximately 4.3-7.3% in both places. Managing common illnesses at the UniPharm shows satisfactory effectiveness with lower unit cost, thus its potential to be a sub-contractor of the university health system.

CPP 08
FAPA2014000012 (Poster)

Investigation of Actual Conditions about Mixture of External Medicines in Japanese Health Insurance Pharmacy: Questionnaire Survey in Japan

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As a dermatological therapy in Japan, two or more kinds of external medicines are mixed depending on patients' symptoms to improve their compliance. However, several problems exist when mixing external medicines, such as separation of mixed medicines due to an incompatible match. In this survey, we investigated the attitude of pharmacists toward mixing external medicines in Japan. A questionnaire survey was conducted in order to explore the pharmacists' attitude and experiences toward mixing external medicines. The subjects of the survey were the pharmacists who work at the pharmacies belonging to Chiba Pharmaceutical Association (1931 pharmacies). The response rate was 19.2%. A quarter (25.4%) of the respondents had positive opinions about mixing external medicines.

As patients benefit from the mixed external medicines, the respondents who had positive opinions about mixing external medicines indicated that reduced side effects, improved usage impression, and increased effect of medicines more than those who did not ($p<0.01$). Furthermore, the respondents who did not have positive opinion had never had problems and questions about mixing external medicines more than those who did ($p=0.023$). Those problems they indicated were related to the complaints from patients and the prescription questions to doctors. The survey revealed pharmacists' experiences of having problems and questions were associated to their attitudes toward mixing external medicines. Since the problems the respondents had about mixing external medicines corresponded to the complaints from patients and their prescription questions to doctors, solving their problems and questions may reduce the complaints from patients and the prescription questions to doctors. Since external medicines should be originally used alone, currently not much information on mixing external medicines is described in drug labeling in Japan. In order to reduce the complaints from patients and the prescription questions to doctors, the tools that pharmacists can easily extract the information on mixing of external medicines should be developed.

CPP 09
FAPA2014000110 (Poster)

Knowledge, Attitude and Practice (KAP) towards Human Immunodeficiency Virus (HIV)/ Sexually Transmitted Illnesses (STIs) among Secondary School Students in Kota Damansara, Selangor.

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Sexual and reproductive health of young people has become a major health problem in recent decades. Recently, WHO revealed that adolescents who were infected with STIs including HIV accounted for an estimated 40% of all new HIV infections among adults worldwide in 2009. In comparison to that, about 26% of reported HIV infections in Malaysia are amongst young people aged between 13-29 years old. Recent and rapidly increasing HIV rates show an urgent need for prevention interventions in Malaysia. This study aimed to evaluate the knowledge, attitude and practice of secondary school students with regard to HIV/STIs. A cross-sectional study was conducted between January - December 2013. A total of 312 secondary school students in Kota Damansara, Selangor completed anonymous self-administered questionnaires in supervised classroom settings. Data in the study demonstrated an overall low level of knowledge of HIV/STIs (35.5%), which was influenced by gender, age and academic streams of the subjects ($p<0.05$). There were some misconceptions identified, mostly regarding ability to cure HIV and that usage of antibiotic and vaccine was believed could prevent or stop the infections. Analysis showed a negative attitude among the subjects towards HIV/STIs and people living with HIV (PLHIV), which was also influenced by age and academic stream ($p<0.05$). Subjects were found to have engaged in risky practices that could lead to the contraction of HIV/STIs. Study observed that subjects with higher knowledge level have better attitude towards the disease and PLHIV ($r= 0.583$, $p<0.001$). Yet knowledge and good attitude are not sufficient to prevent them from getting involved in risky practices. The most common source of information on HIV/STIs was TV/radio advertisements. Knowledge inadequencies and negative attitude among subjects require more emphasis in the curricula and education campaign on the diseases.

CPP 10
FAPA2014000024 (Poster)

Look Alike Sound Alike (LASA) Medications

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Look Alike Sound Alike (LASA) medications involve medications that are visually similar in physical appearance or packaging and names of medications that have spelling similarities and/or similar phonetics. As more medicines and new brands are being marketed in addition to the thousands already available, many of these medication names may look or sound alike. Confusing medication names and similar product packaging may lead to potentially harmful medication errors. Emphasis on patient safety in the naming of medicines is now undertaken by national and international regulatory and advisory boards. The World Health Organization's International Non-proprietary Names Expert Group works to develop international non-proprietary names for pharmaceutical medicinal substances for acceptance worldwide. Healthcare organizations need to institute risk management strategies to minimize adverse events with LASA medications and enhance patient safety. Therefore, it is necessary to study the common risk factors associated with LASA medications, Strategies to avoid errors with Look Alike Sound Alike Medications Prescribing procedure, Patient Education and roles of typography in differentiating the Look Alike Sound Alike Medications.

CPP 11
FAPA2014000145 (Poster)

Barriers to Implementing Practice Research in Japanese Community Pharmacists

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To expand the professional roles of pharmacists in the community, they should clarify themselves that they can improve patients' outcomes through practice researches. There would be some barriers to conduct a practice research by community pharmacists in Japan. The purpose of this research is to reveal the barriers to conduct a research in Japanese community pharmacists. Community pharmacists (n=478) who gave a presentation in three major pharmacy related conferences in last 2 years were asked on barriers to conduct a practice research in their setting. We also explored their level of understanding of technical terms using in protocols of practice researches. A questionnaire was mailed to the pharmacists directly and the response was returned by mail. We obtained 229 responses from community pharmacists (47.9%). From the responses, the barriers to conduct a practice research in Japanese community pharmacists: 1) they can't find enough time to research because of busy tasks, 2) no supervisor for research in community pharmacy setting and 3) a lack of understand the importance of practice research in other community pharmacists. Many community pharmacists would have knowledge about statistical analysis, but are not good for the study designs of practice research. We identified 3 major potential barriers to the development of practice research of community pharmacists in Japan. To overcome the barriers, the development of a collaborative relationship among pharmacists to make time for practice research and the establishment of collaboration between universities or research institutes and community pharmacists would be a challenge to implementing practice research in Japanese community pharmacists.

CPP 12
FAPA2014000103 (Poster)

Practices of Remote and Modernised Indigenous People towards Minor Illness: A Comparison

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To improve the health conditions of indigenous population, the government provides them with convenient healthcare services, free education and mass media exposure. However, how much this modernisation has changed our Orang Asli practice in managing and prevention of minor illness is still doubtful. Thus, this study is aimed to compare the practice between the remote and modernised indigenous people towards minor illness which the result could be useful to the authority in designing future healthcare promotion programme for the similar population. Cross-sectional surveys using pre-tested questionnaire were carried out at a remote Orang Asli settlement (Kampung Pos Piah, Sungai Siput, Perak) and modernised Orang Asli settlements (Kampung Tadom, Kampung Paya Rumput and Kampung Mutus Tua, Banting, Selangor), according to Jabatan Kemajuan Orang Asli Malaysia. A total of 141 and 103 indigenous adults were conveniently sampled from remote and modernised settlements respectively. Public healthcare centre were preferred by most remote population while in modernised settlement, both public and private healthcare centre were almost equally preferred. Fever, cough and common cold were the top three minor illnesses that made both populations to seek treatment from modern medicine. In remote settlement, reachability is the main barrier in seeking treatment from modern medicine. Both populations will advise and assist ill family member to seek treatment and take care of them. In remote population there is a significance number of them will distance themselves from (n = 54), lock up (n = 33) and disown (n = 20) the ill family member, which might be due to misconception on minor illnesses. There was significantly more people in remote settlement prevent minor illness by visiting 'bomoh' regularly. The difference in practice towards minor illnesses between the two populations which could be due to different exposure and facilities availability in the neighbourhood.

CPP 13
FAPA2014000039 (Poster)

Survey of Community Pharmacies conducting Chinese Medicine Business in Taichung

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The aim of the study was to reveal the problems and accordingly attempt to figure out alternative solutions as reliable references to the authorities and associated organizations in promoting Chinese medicines. This survey investigated the general perceptions of pharmacists working in community pharmacies towards conducting the captioned business in Taichung. There were 213 pharmacies, that is 28.8% of the 739 in the entire city, which offered products associated with Chinese medicines. Ample room for such business remained. The survey results showed that the respondents lacked faith to be involved in Chinese medicines in the present business, and generally believed that education on this particular business is sufficient, whereas the incentive or additional training offered by the government and occupational associations were not. The survey indicated that there were three types of business model in the current market. The first type is a business model that fully embraced all kinds of Chinese medicines. Products offered by this type may range from prepared decoction, herbs, processed medicines (scientific Chinese medicines), medicinal cuisine, and regime teas to medicines that may alleviate gastrointestinal and vascular diseases or disorders, including products that empowered immunity and that helped body shaping for both retail and wholesale markets. The second

type of pharmacy was those which barely offered processed Chinese medicines to accompany western medicines. The last type was certified as licensed sellers, and offered the requested Chinese medicines in response to the customers' demand. The survey results indicated that over 70% of the community pharmacies lacked faith in the Chinese medicine business. The authors suggested that the pharmacist associations and the associated authorities should make sufficient endeavors to ease the suspicious towards this business, and provide education and training programmes to encourage and improve more involvement of pharmacists in this business. The consumers can have more choices, and may increase their overall satisfaction towards the medication services.

CPP 14
FAPA2014000229 (Poster)

Knowledge, Attitude and Practices of Contraception among Rural Women in Banting, Selangor

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Modern contraceptive practice in Malaysia is low. Only 30% of married women aged between 15-49 years make use of modern contraceptive methods. The government however has been promoting family planning since 1967, implying that contraception would by now be a household use. This study was conducted to determine the knowledge, attitude and practice (KAP) of contraception among rural women, forty five years after the introduction of modern contraception in Malaysia. This survey was carried out in Banting, Selangor. A total of 250 married women were enrolled in this study using convenient sampling. Respondents were interviewed using a questionnaire. Their demographic and socioeconomic information were recorded and data on contraceptive KAP were collected from married women in the age group of 15 to 49 years. Of the respondents (n=250), 88% indicated that they had knowledge regarding contraceptive methods, 48.8% were practising contraception and 52.4% had good attitude towards contraception. Both demographic data and socioeconomic factors influenced the contraceptive practices. The analysis showed that women with lower education were more likely to practise contraception compared to women with higher education. Women who were working, having less than two children and who were in the higher income status were more likely to practise contraception. Women who had higher knowledge regarding contraception and women who were practising contraception were more likely to develop good attitude towards contraception ($p<0.001$). This suggests that awareness on contraception is reasonably good among rural women. Efforts to promote contraceptive use among Malaysian women especially those in rural areas should continue and be strengthened.

CPP 15
FAPA2014000309 (Poster)

Analysis of Factor Affecting Therapy Adherence in Systemic Lupus Erythematosus (SLE) Patients

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Medication adherence in chronic diseases such as Systemic Lupus Erythematosus (SLE) has been shown to improve clinical outcomes and prevent exacerbations and maintain SLE in a stable state. However, patient adherence remains a problem in the treatment of SLE. Various studies suggest that patient adherence in the treatment of SLE is still quite low. This study is an observational study with descriptive and analytical design. The samples in this study were 37 patients with SLE who were enrolled as members of the Syamsidhuha foundation. Adherence levels measured with validated

questionnaires, MMAS-8 item and factors affecting adherence searched in-depth interviews. Adherence factors were classified into patient factors, treatment factors, disease factors, health service factors and socioeconomic factors. These factors were analyzed using logistic regression to look for effects on the level of adherence. This study showed that 65% of patients adhere to treatment. Different factors were significant patient factors ($p = 0.039$) and socioeconomic factors ($p = 0.045$). Factors that significantly affect patient adherence are patient factors, health service factors, and socioeconomic factors.

CPP 16
FAPA2014000280 (Poster)

The Milestone of Pharmaceutical Service in Taiwan ~ Be Part of Consumer Protection ~ 2013 Intercity Pharmacy Forum

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The demands of drug use safety and convenience have been progressively increasing. Facing the needs of upgrading qualities and convenience of pharmacy professional service, Taipei Pharmacists Association believed that we should learn more from the other countries. In order to evaluate the policy for separation of dispensing from prescribing, to deliberate the strategy of pharmacy care, and to find out the better practice environment to secure people's well-being of healthcare through "responsible self-medication", Taipei Pharmacists Association and Taipei City Government jointly held 2013 Intercity Pharmacy Forum. We invited pharmacist leaders from Tokyo, Seoul, Beijing, Shanghai, FIP, FAPA, the Pharmaceutical Society of Singapore and Malaysia. We exchanged views in promoting the policies of the pharmacy service deemed helpful to the country to overcome difficulties in the next decade. The target of 440 participants was achieved. The current issues were thoroughly discussed and the view exchange among participants was wonderfully communicated. The ROC President, Ma Ying-Jeou, declared the core value of the Forum: To implement medical diversion and pharmacist professional service to ensure drug safety is the existing policy and patient-oriented pharmacy services not only reduce medical wastage but also lower expenditure of health insurances. The cross-strait platform to assist the Government in promoting the development of cross-strait medicine and health was built. The pharmacists in Taiwan actively promote the value of pharmacy service currently. The Health Bureau of Taipei City increased the budget and activities for promoting the role of pharmacy practice in the community. The Taipei citizens gave high marks to pharmacist providing professional service and 78.4% expressed that they do need pharmacist's professional consultation.

CPP 17
FAPA2014000308 (Poster)

Awareness on the Use of Medicine and Know Your Medicine Campaign by Sarawak Consumers: A Comparison between Urban and Rural Population

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"Know Your Medicine" (KYM) Campaign was launched in tandem with the Malaysian National Medicines Policy which stresses the importance of the Quality Use of Medicine (QUM) among consumers. It is essential to understand how consumers use their medicines and their awareness towards the campaign so that the authorities could plan effective strategies to enhance consumers' understanding on the concept of QUM. The study was conducted to explore the awareness on the use of medicines and towards KYM campaign by Sarawak consumers with comparison between urban and rural population. A cross-sectional study was carried out from September to November 2013 by using self-administered questionnaire. 26 data collectors were appointed and trained in data collection. Multiple stages sampling was carried out to pick 385 respondents from the whole of Sarawak. Research data were analyzed with non-parametric tests with significance level $p<0.05$. A total of 189 respondents were recruited from each urban and rural area. Rural respondents were less aware that medicines approved by the Ministry of Health must have MAL Registration Number and Hologram Meditag™ sticker. Rural respondents had difficulties in reading medicines' label supplied by private healthcare institutions. They also perceived that controlled medicines can be obtained from the grocery shops. In terms of disposing defect or expired medications, more respondents from rural would return them to the pharmacist in Government health institutions. Urban respondents were less aware of KYM campaign. Both urban and rural respondents were aware of side effects and drug interactions of their medication. The study revealed the current scenario on the use of medicines and awareness towards KYM campaign among the urban and rural population in Sarawak. This serves as a yardstick for future strategy development by Sarawak Pharmaceutical Services Division in enhancing consumers' understanding on the concept of QUM.

DRUG MARKETING & SOCIO-ECONOMIC PHARMACY

SEP 01
FAPA2014000121 (Poster)

A Study on Cost Effectiveness, Reduction in Pack Per Year and Peak Flow Analysis of Electronic Cigarette Users in Klang Valley, Malaysia

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Electronic cigarette (EC) is a battery-powered device that imitates the feel and experiences of smoking a conventional cigarette. It is a novel product emerging in the market just a couple of years ago and therefore, there are only few scientific studies on the effectiveness of this product and its health implications. The aims of this study were to compare the estimated costs spent on conventional cigarettes (pre-EC) with that of the estimated costs after shifting to EC (post-EC), to calculate the reduction of pack per year after shifting to EC and to measure the peak flow reading of the EC users in the Klang Valley, Malaysia. This study was conducted at an electronic cigarette stall in Downtown Night Market, Cheras, Kuala Lumpur. Questionnaires were given to 73 respondents who fulfilled both the inclusion and exclusion criteria. After answering the questionnaires, a peak flow meter test was carried out on each of the respondents. In addition, the peak flow meter test was also carried out on the same number of conventional cigarette smokers to compare the readings with that of the EC users. Findings from this study suggested that EC is a cost effective device which showed a significant reduction in average monthly expenditure. In addition, the results also showed that electronic cigarette helped in the reduction of pack per year. There is also a significant difference between the peak flow readings of the EC users with that of the peak flow meter readings of the conventional cigarette smokers. In conclusion, EC may be considered as an alternative to the current nicotine replacement therapy (NRT) in an attempt to quit smoking.

SEP 02
FAPA2014000167 (Poster)

Cost-effectiveness Analysis of Medication Reconciliation at Female Medical Ward in Chonburi Hospital, Thailand

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Medication reconciliation (MR) is an important process in medication management system to improve quality of care. However, the economic outcome of MR in Chonburi Hospital has not been disclosed. Cost-effectiveness analysis of this process is needed for decision making of the hospital director to implement this activity throughout the hospital. This study aimed to assess the incremental cost effectiveness ratio (ICER) of the medication reconciliation process. The ICER was carried out from the provider perspective. This retrospective study included patients admitted to the female medical ward, Chonburi Hospital from October 1, 2012, to December 25, 2012. Patients with the same ICD-10 diagnosis codes were assigned to the MR implemented group (MR group) and the non-MR implemented group (non-MR group). The direct costs associated with the MR process were determined, including material and labour costs. The effectiveness was defined as the length of stay in the hospital and the cost saving of

the reusable medicines. The number of patients in each group was 21. The average time to complete medication reconciliation process was 103 minutes per patient. The average labour cost per patient of the MR group was 8.84 USD higher than of the non-MR group. The average reduced length of stay per patient per day was 1.6 days for the MR-group which accounted for 99.22 USD. The reusable medicine saving cost was 5.13 USD per patient. The overall effectiveness was 104.34 US per patient. The incremental cost effectiveness ratio of the MR process in Chonburi hospital was 11.8. The implication is that for every 1,000 USD of the MR costs, the return is 11,800 USD of the effectiveness outcomes.

SEP 03
FAPA2014000028 (Poster)

Comparison of Cost Analysis and Usage Effectivity of Repacked Meropenem and Non Repacked Meropenem in Paediatric Patients

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High cost of antibiotic remains a health problem in developing countries, such as Indonesia. The use of meropenem in paediatric patients, at Saiful Anwar General Hospital, reached 70% in definitive therapy of infection cases. Due to unavailability of paediatric dosage form, patients have to buy the standard pack meropenem 1 g/vial even if the required dose are less than that. Low stability after reconstitution, low doses used by paediatric patients, and left-over of injection, it based the pharmacist to make a repacking of meropenem. The purpose of this study is to analyze effectivity and usage cost in repacked meropenem, done by observational analysis and taken by secondary data in medical records. The amounts of samples are 60 pediatric patients, divided by 30 paediatric patients using repacked meropenem and 30 pediatric patients using non-repacked meropenem. The effectiveness will be evaluated by observed the clinical improvement, such as pulse, temperature and respiration rate for 3 to 7 days, then calculating the score of effectiveness and processed by SPSS with Mann Whitney method. The fastest clinical improvement was patient using repacked meropenem (4 days), while the score of effectiveness in patient using repacked meropenem (pulse score 6.87; temperature score 6.80; RR score 6.70) was bigger than non-repacked meropenem (pulse score 6.80; temperatures score 6.60; RR score 6.57). Cost data processing using ACER method, the obtained by usage of repacked meropenem is cheaper than non-repacked meropenem. The conclusion of this study are repacked meropenem is more effective and low price than non-repacked meropenem.

SEP 04
FAPA2014000123 (Poster)

Validation of Questionnaire Assessing General Knowledge about Features of Registered Healthcare Products (VALKORP)

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Awareness of registered healthcare products is highly important for society. Aim of the current study was to develop and validate a questionnaire to assess and to measure general knowledge about registered healthcare products. This was a cross-sectional study conducted from August till December 2013 among employees at government departments located at KWSP building and Federal House, Kota Kinabalu, Sabah. A Malay language, non-validated self-administered questionnaire was modified into 2 domains consisted of 13 items and proof read by Malaysian Institute of Translation & Books (ITBM). A total of 86 government servants were requested to participate through convenient sampling. Re-test was conducted after 2 weeks and 84 responded. Descriptive analysis, internal consistency, intraclass correlation and factor analysis were done. Internal consistency with Cronbach's Alpha of 0.877 and intraclass correlation coefficient of 0.745 showed sufficient reliability. Factor analysis indicated 2 main factors. This result was similar to our initial intention where questionnaire was modified into 2 domains. However, loading factor of item-4 was low (0.384). This was increased to $\geq$0.4 when 3 factors were extracted. Loading factors of item-13 were 0.499 and 0.634 for each factor respectively and this suggested item-13 correlated better with the first three items. Decision of content expertise was to remove item-4 and move item-13 to be the first item. Final Cronbach's Alpha was 0.879. This validated questionnaire was used to assess general knowledge of registered healthcare products and can be used for further validation of English version.

INDUSTRIAL PHARMACY

IPP 01
FAPA2014000052 (Poster)

Solubility Enhancement and Formulation Development of Aprepitant Using Self-Micro Emulsifying Drug Delivery System

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Aprepitant is a nerokinin-1 receptor antagonist which is indicated for the prevention of acute and delayed nausea and vomiting associated with initial and repeat courses of highly emetogenic cancer chemotherapy. Aprepitant is one of the prototypical BCS class II model compound which has poor solubility and poor permeability characteristics. The delivery of aprepitant is also fraught with inter-patient variability when delivered as a tablet formulation, thereby requiring a nanoparticulate capsule-based composition. To overcome this problem, the solubility of drug was improved by using self-micro emulsifying drug delivery system in various vehicles viz. oils, surfactants and co-surfactants. A pseudo ternary phase diagram was constructed to identify the self-micro emulsification region using water titration method. The in vitro self-micro emulsification properties and droplet size analysis of SMEDDS were studied following their addition to water under mild agitation. The resultant formulations were investigated for clarity, phase separation, globule size, effect of pH (SGF, SIF) and effect of dilution (1:100, 1:500, and 1:1000), dissolution, emulsification time and freeze – thaw stability. The optimized formulation, SMEDDS used for in vitro dissolution contained oil (Capryol 90), surfactant (Cremophor-EL) and co-surfactant (Transcutol ®HP). The self-micro emulsifying drug delivery system developed was found to be a good model for enhancing the solubility of poorly water soluble drugs and the formulation development of aprepitant was found to be good, which gave promising results in terms of zeta size, effect of dilution, pH, freeze thaw, stability, dissolution, emulsification time and others. The formulation APT7 was found to be good, in terms of solubility and dissolution.

IPP 02
FAPA2014000015 (Poster)

The Microbiological Quality of Herbal Cosmetics

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Herbal cosmetics have become popular in recent years; thus products are diverse in the market. However, microbial contamination is a major concern because of contaminated raw materials and unhygienic or suboptimal production process. This study was to examine microbiological quality of herbal cosmetics which were commercially available in Maha Sarakham, Thailand. Thirty herbal cosmetics in three forms; powder, aqueous- and oil-based preparations, were convenience sampled from different sources. Assessment of microbiological quality included (1) the enumeration of microorganisms - total aerobic microbial count (TAMC) and (2) the detection of specific pathogenic bacteria including *Staphylococcus aureus, Pseudomonas aeruginosa, Candida albicans and Clostridium spp*., as per the Thai Industrial

Standard, TIS 152-1996. Total yeast and mold count (TYMC) was additionally carried out. Of the 30 samples, 16 (7 powder, 5 aqueous-based, and 4 oil-based preparations) did not meet the TIS standard due to the exceeded amount of TAMC (> 1x10^3 CFU per g or mL). *S. aureus* was found in one aqueous-based product, while *Ps. aeruginosa* was found in one oil-based, and *Clostridium spp*. was found in three brands of powder form and one aqueous-based product. *C. albicans* was not detected in any of the samples. TYMC more than 1x10^3 CFU per g or mL was found in 14 samples (7 powder, 4 aqueous-based and 3 oil-based products). This study identified poor microbiological quality of some herbal cosmetics available in Maha Sarakham. Producers should pay more attention to good manufacturing practices and adhere to guidelines given by relevant government authorities. Several measures, including monitoring programmes and post-marketing surveillance may be imposed further to reduce the level of microbial contamination of herbal products.

IPP 03
FAPA2014000092 (Poster)

Formulation and Characterization of Acyclovir Loaded Nanostructured Lipids with Polysorbate 80
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Acyclovir is used to treat brain encephalitis caused by herpes virus. Acyclovir being a hydrophilic drug, has poor oral bioavailability (15% - 30%) and its blood plasma to cerebrospinal fluid ratio is 10:1. The nanostructured lipids are formulated using polysorbate 80 for targeting the brain so that the concentration of drug in the brain can be increased and the dose of drug can be reduced. Hallucinations and nephrotoxicity have been reported with high doses of acyclovir. NLCs are prepared by emulsification method. The formulation was optimized by changing different parameters like stirring time, stirring speed and liquid-lipid content. The prepared NLCs were evaluated for entrapment efficiency, percentage of drug loading, particle size, zeta potential and also studied for *in-vitro* dissolution as well as *in-vivo* bio-distribution. Selected lipids were found to be compatible with acyclovir based on IR peak matching method as there is no peak interference or shift in the mixture. Partitioning studies indicate that glyceryl dibehenate has a higher partition coefficient for acyclovir compared to tristearin. The entrapment efficiency and drug loading were found to be higher in NLC prepared with 25% liquid-lipid with 300 mg weight compared to 12.5% liquid-lipid with 150 mg weight. *In vitro* studies revealed that NLC (25% liquid-lipid) released the maximum drug over a period of 12 hours, followed by 12.5% liquid-lipid. Haemocompatibility studies showed that with increasing concentration from 40 μg/mL to 200 μg/mL, there was no significant increase in % of haemolysis, and did not produce any toxic effects. Bio-distribution studies indicate that the nanoparticles reached the brain 6.8 times more in the case of nanostructured lipids with 12.5% liquid-lipid whereas, 8.2 times more in the case of nanostructured lipids with 25% liquid-lipid when compared to the pure drug.

IPP 04
FAPA2014000005 (Poster)

Effects of Cosolvent in Water Phase on Microemulsion Regions of Nonionic Systems and Antioxidant Efficacy of Topical Nicotinamide Microemulsion

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Microemulsions are widely studied for cosmetic formulation development. Generally, microemulsion regions are constructed for blank (without active) systems. Therefore, enough large microemulsion regions are necessary to still obtain microemulsions after the active addition. In this study, effects of various amounts of isopropanol (IPA) in water phase on microemulsion regions of systems containing 1:1 Tween80:Span80 as surfactant blend and isopropyl palmitate (IPP) as oil phase was investigated. Afterwards, a microemulsion formulation was selected to incorporate with nicotinamide and then the antioxidant efficacy of the obtained nicotinamide microemulsion was determined via penetration and retention in newborn pig skin by using 2,2-diphenylpicrylhydrazyl (DPPH) method. It was found from pseudoternary phase diagram construction by titration method that appropriate fractions of IPA (water:IPA = 1:1, 2:1 and 3:1) could enlarge microemulsion regions comparing with the cosolvent-free system. Relation between dielectric constants of water:IPA mixtures and microemulsion regions could be observed. It may explain that IPA molecules resided in the water could reduce polarity of the water phase. Nevertheless, water itself could provide larger microemulsion region than some water:IPA mixtures (4:1 to 9:1) with lower dielectric constants. The reason was unclear. It might be due to interaction among water, IPA and surfactant blend. Formulation containing 20% w/w IPP, 50% w/w 1:1 Tween80:Span80, 27% w/w 2:1 water:IPA and 3% w/w nicotinamide was chosen for further study. The free radical-scavenging activity of topical nicotinamide microemulsion penetrated through newborn pig skin into receptor fluids of modified Franz diffusion cells could not be detected by UV measurement of the DPPH method while that of the skin extract samples could be somewhat noticed. Although low antioxidant efficacy was detected, the results suggested that nicotinamide microemulsion could retain in the skin membranes higher than pass into the receptor fluids, representative of the blood circulation. Therefore, this microemulsion system should be proper for cosmetic purpose.

IPP 05
FAPA2014000140 (Poster)

Effect of Changes in the Characteristic of the Mixing Crystalline Atorvastatin Calcium Directly With Tween 80 (Co-Crystal) which can Increase Atorvastatin Tablet Dissolution

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Atorvastatin is a drug anti hyperlipidemia are currently widely used by people with hyperlipidaemia as an adjunctive therapy to diet to reduce elevated total cholesterol, LDL cholesterol, and triglycerides in patients with primary hypercholesterolemia. Currently on the market are in the form of atorvastatin coated tablet. Atorvastatin is a substance that is poorly soluble in water but highly permeability (biopharmaceutical classification system 2). Substance used in the study is atorvastatin calcium crystalline type 1 according to the origin of Lipitor. In the experiments conducted, atorvastatin interaction is mixed or used with Tween 80 with rapid stirring using a super mixer for 2 minutes operations. This is a simple method to make co-crystal of atorvastatin to change its physical characteristics. The change in the

physical characteristics of the initial or hygroscopic particles which attract each other between atorvastatin was reduced, thus increasing its solubility. From these results, further formulation into a tablet dosage form by using a standard formula which then used wet granulation method to produce coated tablets. The dissolution method standard is from the Indonesian Pharmacopoeia. From the results of the dissolution with the same formula, the results are mixed or atorvastatin in the first interaction with Tween 80 higher than when Tween 80 was added while mixing with other additives as a wetting agent in excipient. The conclusion is co-crystal atorvastatin can make dissolution tablet tester higher with same formula.

IPP 06
FAPA2014000233 (Poster)

Effect of Pregabalin Intra and Extra Granular to Comparative Dissolution Test with its Originator

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Pregabalin is a gamma-amino-butyric acid (GABA) analog that works as an anti-anticonvulsant, anxiolytic, and also has sleep-modulating activity. The study was conducted with limited equipment causing the capsule weight between the originator, Pregabalin (Lyrica ex Pfizer) with Pregabalin capsules that we want to be different. So the challenge is how to make a product that has a Comparative Dissolution Test which conforms to the originator, but has good flow properties and homogeneity. The study was conducted by using a dry mix of excipients with good flow properties, dry granulation using a roller compactor (intra and extra granular) and wet granulation (extra and intra-granular). Of the five experiments, the results conform to the originator in terms of Comparative Dissolution Test at 3 pH media (pH 1.0 – 1.5 ; pH 4.0 – 4.5 and pH 6.0 – 6.8) is when Pregabalin located outside the granules (extra granular).

SCIENTIFIC

SPP 01
FAPA2014000009 (Poster)

The Hospital Formulation of Levetiracetam Suppository and Evaluation of the Pharmaceutics

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Levetiracetam, a drug used for a combination therapy in Japan for a partial epilepsy attack, acts by combining with synaptic vesicle protein 2A of the nerve ending. Its action mechanism is different from the existing antiepileptic drugs. However, it cannot be used for patients who cannot take drugs orally because levetiracetam in Japan is only available as an orally administered drug. Therefore, this study was undertaken to formulate levetiracetam as a suppository which is a parenteral administrative dosage form. Levetiracetam suppositories using E Keppra® Tablets and vosco H-15 or vosco S-55 as the suppository base were prepared. Mixture ratio of vosco H-15 and vosco S-55 were (1) H-15:S-55=100%:0%, (2) H-15:S-55=75%:25%, (3) H-15:S-55=50%:50%, (4) H-15:S-55=25%:75%, (5) H-15:S-55=0%:100%. A content uniformity test and a dissolution test were performed. For the content uniformity test, we followed the 16th edition of Japanese Pharmacopoeia to measure the average value of the contents of ten suppositories for each suppository base, and assessed conformity when the determination value of ten samples was less than 15%. In the dissolution test, we measured the average value of the accumulative amount of dissolution (AD) and the dissolution time of four suppositories for each suppository base. A suppository was put in a dialysis membrane, being moved vertically in a testing liquid and samples were collected over time to measure the levetiracetam content. In all the mixtures, determination value of content uniformity tests was less than 15%, and the average of the AD was over 90% within 60 minutes. In this study, the uniformity of the content was high and the dissolution behaviour was good in the levetiracetam suppositories for all mixture ratios. Therefore, we were able to establish a method to make levetiracetam suppositories for a useful clinical application from the viewpoint of drug formulation.

SPP 02
FAPA2014000075 (Poster)

The Impact of High Dose Green Tea Polyphenol Extract and Vitamin C on Blood Pressure and Renal Haemodynamics in Cisplatin-Induced Renal Failure in Spontaneously Hypertensive Rats

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This study evaluated the potential benefits of natural and synthetic antioxidants (green tea and vitamin C) on blood pressure and renal haemodynamics in renal failure hypertensive model. Renal failure was induced by cisplatin injection (5 mg/kg i.p.). After 7 days, the rats received either a vehicle (control), a high dose vitamin C (1000 mg/kg/day) or a high dose green tea polyphenol extract (1000 mg/kg/day) via

oral gavages for 21 days (n=6 rats per group). Tail cuff blood pressure was measured on days 0, 7 and 28 of the study. On day 29, rats were anaesthetized with sodium pentobarbitone (60 mg/kg i.p.) and renal cortical blood perfusion was measured using laser Doppler flow probe positioned at the surface of the left kidney. Renal failure SHR group had higher kidney index compared to control SHR group (0.37 ± 0.01 vs. 0.29 ± 0.01%, $p<0.05$). Vitamin C high dose treatment reduced systolic blood pressure by 9% when compared with control SHR group (140 ± 2 vs. 155 ± 7 mmHg, $p<0.05$). The renal cortical blood perfusion in the group treated with high dose green tea was higher by 11% compared to the control SHR group (167 ± 5 vs. 150 ± 2 bpu, $p<0.05$). These data indicate that high dose of vitamin C but not green tea has a significant blood pressure lowering effect while high dose green tea showed significant vasodilatory effect in cisplatin-induced renal failure SHR. The results suggest an important role played by free radicals in this model of renal impairment.

SPP 03
FAPA2014000317 (Poster)

Using Marker Drugs to Study the Gastrointestinal Transit Behavior of Amphotericin B-Containing Solid Lipid Nanoparticles

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The objective of the study was to investigate the gastrointestinal (GI) transit behaviour of an amphotericin B (AmB) solid lipid nanoformulation (SLN), as well as the absorption of AmB in rats using paracetamol (PAR) and sulfasalazine (SSZ) as marker drugs. AmB, PAR and SSZ similarly formulated into SLNs and have comparable characteristics would likely behave in a similar fashion in the GI tract when all three SLNs are simultaneously administered via the oral route. PAR SLN and SSZ SLN would therefore be useful as marker drugs for estimating the gastric emptying and caecal arrival times of AmB SLN respectively. The three types of SLNs were formulated similarly using beeswax and theobroma oil as the lipid matrix. These were then characterized with regards to size, morphology, viscosity, relative density and migration propensity in agarose gel. *In vitro* drug release and *in vivo* studies were carried out using high performance liquid chromatography (HPLC). All three types of SLNs exhibited identical properties with regards to z-average, viscosity, relative density and migration propensity in agarose gel. PAR was absorbed rapidly from the small intestine following its emptying from the stomach and reached its T_{max} in 1 hour. The T_{max} of AmB was 8 hours. Sulfapyridine (SP) was absorbed after its release from microbial degradation of SSZ from SLN in the colon with a lag time of 2 hours post administration. The caecal arrival time of the SLNs was found to be about 2 hours, as estimated from the initial detection of SP in the plasma. AmB, PAR and SSZ SLNs were successfully formulated with matching physical characteristics. AmB from its SLN was favorably but slowly absorbed from the small intestine, presumably through uptake of the SLN by Peyer's patches followed by emptying into the systemic circulation.

SPP 04
FAPA2014000072 (Poster)

Comparative Antibacterial Property of the Matured Trunk and Stem Bark Extract of *Tamarindus Indica Linn*, Preformulation, Development and Quality Control of Cream

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Studies on *Tamarindus indica* showed that it is rich in tannin which is responsible for its antibacterial property. Thus, the objective of this study was to compare the antibacterial activity of the bark of trunk and stem using the acetone extract of the barks. Powdered barks (225 g each) were extracted by soxhlet method using 70% acetone as solvent for the tannin. Trunk bark produced a yield of 2.6% extract and 2.1% for stem bark. Results showed that the trunk bark was more sensitive than the stem bark to organisms such as *Staphylococcus aureus*, *Corynebacterium minutissimum*, and *Streptococcus sp.* Dermal sensitization test on rabbits using 100, 40, and 20 mg/mL of extract showed that tamarind has no irritating property and therefore, is safe for formulation as an antibacterial cream. The extract from trunk bark has higher contents than that of stem bark when tested for compendia requirements such as foreign matter (1.35% and 1.21%), total ash (10.16% and 8.27%) and water determination (11.81% and 7.28%). Preformulation data showed that both extracts had the same solubility in water, 80% ethanol, ether and chloroform. A 1% aqueous solution of the extracts exhibited a pH 8.38 (trunk bark) and 8.17 (stem bark). Density by displacement method was 0.92 (trunk bark) and 0.91 (stem bark). Both extracts were stable to direct sunlight and efflorescent. Excipients for manufacture of cream such as methyl paraben, propyl paraben, sodium lauryl sulfate, stearyl alcohol and white petrolatum subjected to differential scanning calorimetry were found to be compatible with the extracts except for sodium lauryl sulfate where polymorphism was exhibited at higher temperature. Thus, a dark-brown smooth cream which passed microbial, sensitivity and antibacterial tests was developed as the final output of this study.

SPP 05
FAPA2014000306 (Poster)

The Hypotensive Activity of Defatted Crude Extract, Ethyl Acetate and Butanolic Fractions of *Cassytha filiformis L*. on Prednisone-Saline and Prednisone-Saline-L-NAME Induced Hypertensive Rats: A Comparative Study

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A comparative study of the hypotensive activity of defatted crude ethanolic extract of *Cassytha filliformis* L. and its ethyl acetate and butanolic fractions has been carried out on the anaesthetized hypertensive-induced rats. An amount of 30 Sprague-Dawley rats were divided into two subdivisions: prednisone-saline-induced (PN) and prednisone-saline-L-NAME-induced (PNL) hypertensive rats. Each subdivision rats were divided into 5 groups. Group 1 was treated as control; group 2, 3 and 4 were treated with defatted crude ethanolic extract, ethyl acetate and butanolic fractions of the plant at the dose of 5 mg/kg; while group 5 was treated with tempol 100 µmol/kg. The doses were commenced in 3 consecutive intravenous administrations every one hour interval. The systolic (SBP), diastolic (DBP), mean arterial pressures (MAP) and heart rate (HR) of the animals were measured (Biopac® MP 150 Data Acquisition System). Data were presented as the percentage changes of those parameters and analyzed by three way

ANOVA followed by Duncan's Multiple Range Test. Results showed that the ethanolic extract and tempol decreased animal SBP, DBP, MAP and HR significantly ($p<0.05$) while ethyl acetate and butanolic fractions did not ($p>0.1$). The average percentage decrease of animal SBP and MAP on PNL rats were higher ($p<0.05$) as compared to those on PN rats, while DBP and HR of those groups of animal were not significantly different ($p>0.1$). Repeated dose of all samples tended to decrease animal SBP and HR ($p<0.1$) but not in DBP and MAP ($p>0.1$). These results indicate that the defatted ethanolic extract of *Cassitha filliformis* exhibits more hypotensive effect compared to its ethyl acetate and butanolic fractions. This hypotensive effect is greater on oxidative stress related hypertensive rats.

SPP 06
FAPA2014000073 (Poster)

Functional Contribution of α_{1D} Receptors in Renal Vasculature of Left Ventricular Hypertrophy Induced by Isoprenaline and Caffeine in Wistar Kyoto Rats

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This study investigated the role of α_{1D}-adrenoceptor in the modulation of renal haemodynamics in rats with left ventricular hypertrophy (LVH). LVH was established in Wistar Kyoto (WKY) rats using isoprenaline (5 mg/kg s.c. every 72 hr) and caffeine (62 mg/L in drinking water) for 14 days. Renal vasoconstrictor responses were measured for noradrenaline (NA), phenylephrine (PE) and methoxamine (ME) before and after low or high dose intrarenal infusions of BMY 7378, a selective α_{1D}-adrenoceptor blocker. LVH group had a significantly higher mean arterial blood pressure but lower renal cortical blood perfusion as compared to the control (all $p<0.05$). The magnitude of the renal vasoconstrictor response to ME but not to NA or PE in LVH group was blunted ($p<0.05$) in comparison with the control group (*LVH vs. C*, 38 vs. 50%). The magnitude of the drop in the vasoconstrictor responses to NA, PE and ME in the presence of a higher dose of BMY7378 was significantly greater in the LVH compared to the control (*LVH vs. C*, 45 vs. 25%, 52 vs. 33%, 66 vs. 53%, all $p<0.05$). These findings indicate attenuated renal vasoconstrictor responses during LVH. In addition, α_{1D}-adrenoceptor subtype is playing a key role in the modulation of vascular responses in this diseased state.

SPP 07
FAPA2014000047 (Poster)

NMDA Receptor Antagonism in the Hippocampus Ameliorates Acute Stress Potentiation of Aggressive Behaviors in the Post-Weaning Isolation-Reared Mice

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Despite epidemiological evidence showing that early life events have long-term effects on the susceptibility to subsequent stress exposure during adulthood, there has been very little work examining the underlying cellular mechanism. We used post-weaning social isolation mice as an animal model of early life adversities to test the action of NMDA receptor antagonists on acute stress-induced exaggeration of aggressive behaviors in the social isolated (SI) mice. Synaptic protein levels of NMDA receptors were measured using synaptosomal preparation. Acute stress giving before test markedly

exacerbated offensive behaviors and attack number in the SI mice. Post-weaning social isolation increased hippocampal surface expression of NR2A and NR2B without affecting NR1 subunit of NMDA receptors, PSD-95 and a2 subunit of GABAA receptors. Bilateral hippocampal injection of NMDA antagonists reversed acute stress-induced exaggeration of aggressive behaviors in the SI mice. Acute stress induced phosphorylation of eukaryotic elongation factor-2 (eEF2) which was abrogated by NMDA antagonist. Furthermore, eEF2 kinase inhibitors reversed acute stress-induced exaggeration of aggressive behaviors and exhibited anti-depressant effect in the SI mice. These results suggest the involvement of NMDA receptors and eEF2 kinase in the isolation-induced alterations of behavioral phenotypes and NMDA receptor antagonists may be useful to ameliorate child neglect-induced exacerbation of aggressive behaviours.

SPP 08
FAPA2014000146 (Poster)

Improvement of Dispersibility of Fullerene C60 Derivative by Pluronic F-127 and the Potential to Enhance Anti-inflammatory Effect of C60 Derivative

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Fullerene C_{60} (C_{60}) is consisted of 60 carbon atoms and is known as a strong anti-oxidant. As a strong anti-oxidant, C_{60} is believed to be capable of absorbing free radicals in organisms; therefore, we are currently aiming to apply C_{60} as a nano-medicine for inflammatory diseases, which are often closely related to oxidative stresses. However, aggregability of C_{60} is one of the hurdles for its application in medicinal field because agglomerates often hinder its original anti-inflammatory effect and can also reversely cause inflammation. Our group has successfully formulated C_{60} pyrrolidine tris-acid (C_{60}-P), which is one of C_{60} derivatives with higher dispersibility and higher anti-inflammatory effect. Additionally, other groups have reported that dispersibility of C_{60} was significantly improved when a poloxamer compound, Pluronic F-127 (F127) co-existed in the solution. In this study, we attempted to apply F127 for C_{60}-P to enhance the anti-inflammatory effect by increasing its dispersibility. We first measured the diameters of C_{60}-P particles prepared with F127. As a result, it significantly increased C_{60}-P dispersibility and regulated their particle size. To determine the anti-inflammatory effect of C_{60}-P with F127, we measured the amount of IL-8 produced by Caco-2 cells after IL-1β stimulation. However, C_{60}-P dispersed with F127 did not show enhanced anti-inflammatory effect against stimulated Caco-2. Our interest now is in whether F127 can decrease pro-inflammatory effect induced by agglomerates of C_{60}-P. Further studies with other dispersant on the relationship between C_{60}-P dispersal and its anti-inflammatory effect need to be conducted to maximize the potential of C_{60}-P as a nano-medicine. We also believe that this study will also contribute to understand the dynamics of nanomaterials used in various products.

SPP 09
FAPA2014000314 (Poster)

Investigating Regulatory Role of Prolactin in Parental Behavior in Male Parents

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In all mammalian species, a combination of neuroendocrine and experiential factors contributes to the emergence of remarkable behavioral changes observed in parental behavior. However, paternal behavior is rare and is observed in only 6% of mammalian species including humans. Our understanding of neuroendocrine bases of paternal behavior in humans is still preliminary and more research is needed in this area. The researchers reviewed available laboratory and clinical data regarding hormonal bases of parental behavior in human and non-human mammals. Literature searches were conducted on electronic databases, and the following MeSH terms were used: Behavior Endocrinology, Fathering Behavior, Hormone of Paternity, Hormones and Behavior, Mammalian Fathers, Mammalian Paternal Behavior, Maternal Care, Neurobiological bases of Fathering, Neurobiology of Parental Brain, Parental Behavior, Parental Care, Parental Responsiveness, Parent-infant Behavior, Parenting and Plasticity, Parenting Brain, Paternal Behavior, Paternal Care, Paternal Hormonal Effects, Paternal Prolactin Level, and Prolactin. A positive relationship between prolactin and regulation of paternal behavior in mammalian species showing biparental behavior and humans were observed. Currently available data suggest that the expression of parental behavior involves neuroendocrine circuits in both male and females. There is probably a positive relationship between prolactin and paternal behavior in humans. Elevated prolactin levels in newly fathers most probably contribute to child caring behavior and facilitate behavioral and emotional states attributed to child care. Moreover, elevated paternal prolactin levels after childbirth decrease the parents' libidos so that they invest more in parental care than in fertility behavior.

SPP 10
FAPA2014000080 (Poster)

Exogenous Hydrogen Sulfide Up-Regulates the NO/eNOS System in Spontaneously Hypertensive Rats

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This study investigated the effects of exogenous H_2S on NO/NOS system in SHR. Eighteen SHR rats were divided into two groups (n=9 in each group, 1-6 for *in vivo*,7-9 for CSE and eNOS expression), viz:- SHR, SHR + NaHS (56 µmol/kg i.p. for four weeks). WKY rats served as control. In *in vivo* study, blood pressure, plasma H_2S and NO were performed at the end of treatment. For CSE and eNOS expression, reverse transcribed cDNA was amplified using TaqMan Fast PCR Master mix on a Step One Plus qPCR. Cycle number at which the transcripts were detectable was normalized to the cycle number of ß-actin gene. Relative changes in expression levels were determined using the $2^{-\Delta\Delta CT}$ method. *In vivo* data, mean ± SEM, was analyzed by one way ANOVA followed by Bonferroni *post hoc* test with significance at 5%. SHR rats had higher mean arterial blood pressure, lower plasma H_2S and NO (all $p<0.05$) along with

64.2% and 41.2% decreased expression of aortic CSE and eNOS respectively as compared to WKY control. Exogenous H_2S decreased the mean arterial blood pressure and increased the plasma H_2S and NO levels as compared to SHR (all $p<0.05$). Moreover, SHR + NaHS had 475.9% and 228.2% higher expression of aortic CSE and eNOS respectively as compared to SHR. The results obtained suggested that exogenous administration of H_2S not only up-regulated the H_2S/CSE system but also the NO/eNOS pathway. An increased NO production is suggested to mediate the antihypertensive vascular effects of H_2S in spontaneous hypertension.

SPP 11
FAPA2014000295 (Poster)

Acute Toxicity and the *In Vitro* Determination of the Contractile Effects on the Locally Administered Ethanolic Extract of the Leaves of *Strophanthus cumingii* (Apocynaceae) on the Isolated Skeletal Muscle of Female Sprague-Dawley Rats

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Strophanthus cumingii (Apocynaceae), locally known as Abuhab-baging, produce toxic alkaloids and cardiac glycosides from the thickened sap of the bark. Strophanthin is a muscle poison that increases the contractile power of all striated muscles. The study aims to establish acute toxicity by determining the median lethal dose, and the *in vitro* determination of the contractile effects on the locally-administered ethanolic extract of the leaves of *S. cumingii* on the isolated gastrocnemius muscle of female Sprague-Dawley rats; concentration which exhibits the most favorable skeletal muscle contraction; and the significant difference between the skeletal muscle contraction under normal physiologic conditions and upon administration of the ethanolic extract of the leaves of *S. cumingii.* As confirmed by TLC, G-strophanthin is present in the ethanolic extract of *S. cumingii* leaves. The median lethal dose of the ethanolic extract of *S. cumingii* leaves administered intramuscularly is 550mg/kg through the Up-and-Down Method under the Main Test. There is a significant difference between the skeletal muscle contraction under normal physiologic conditions and upon administration of the test extract. In the determination of which concentration exhibits the most favorable skeletal muscle contraction, the ethanolic extract of the different controls of *Strophanthus cumingii* having doses of 0.075 mg/ml, 0.225 mg/mL, and 0.75 mg/mL shows that there is a significant difference produced among the controls together with negative and positive control with its F value of 3.30 greater than its F critical value of 2.46. The dose of 0.075 mg/mL gave the most favorable amplitude reading compared to the other controls.

SPP 12
FAPA2014000193 (Poster)

Hydrolase Activity of Bacteria Isolated from Pristine Mangrove Soil

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Mangroves are coastal forests that have unique characteristics which represent a dynamic, productive and biological important ecosystem. Malaysia, being one of the megadiverse countries, harbour a wide variety of natural habitats for the prospecting of extremophiles especially the pristine mangrove soil. This ecosystem is different compared to dry land environment because of periodic inundation of saline water

and sometimes freshwater. Pristine mangrove soil has lesser human contact than impaired mangrove soil, thus it could be spared from human contamination. Pristine mangroves soil may have significant different microbial communities which could potentially harbour different valuable enzymatic activities. Although hydrolase has emerged as an important class of biocatalysts for industrial applications, very few hydrolase producing bacteria have been characterised. Thus, the research was undertaken to isolate hydrolase producing bacteria from pristine mangrove soil. The hydrolase activity of these bacteria was confirmed using tributyrin agar plates. The optimum condition for hydrolase production of these bacteria were optimised. Several colonies with potential hydrolase activities were successfully isolated and characterised. Further study is warranted for additional investigations.

SPP 13
FAPA2014000050 (Poster)

Learning Induces Sonic Hedgehog Signaling in the Amygdala Which Promotes Neurogenesis and Long-Term Memory Formation

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It is known that neurogenesis occurs throughout the life mostly in the subgranular zone (SGZ) of the hippocampus and the subventricular zone (SVZ) of the lateral ventricle. Here we investigated whether neurogenesis occurred in the amygdala and its function in fear memory formation. Mice were injected intraperitoneally with 5-bromo-2'-deoxyuridine (BrdU) 2 h before receiving 15 tone–footshock pairings. The number of BrdU+/DCX+ and BrdU+/NeuN+ cells was significantly higher in the conditioned mice suggesting that association of tone with footshock induced neurogenesis. To determine the relationship between neurogenesis and memory formation, mice were given cell proliferation inhibitor methylazoxymethanol acetate (MAM). MAM markedly reduced neurogenesis and impaired fear memory formation. Similarly, intra-amygdala infusion of cytosine arabinoside (Ara-C) which interferes with DNA synthesis decreased freezing responses. Sonic hedgehog (Shh), its receptor patched1 (Ptc1) and transcription factor Gli1 protein levels increased at 1 day and returned to baseline at 7 days after fear conditioning. Immunohistochemistry confirmed that Shh+ cells increased after conditioning. Silencing Shh gene expression with small hairpin interfering RNA (shRNA) by means of a retrovirus vector encoding Shh shRNA (Retro-Shh-shRNA) which allowed us to knockdown Shh specifically in the mitotic neurons reduced the number of BrdU+/NeuN+ cells and decreased freezing responses. These results suggest that fear learning induces Shh signaling activation in the amygdala which promotes neurogenesis and long-term memory formation.

SPP 14
FAPA2014000096 (Poster)

Evaluating the Potential of Buprenorphine to Reduce Relapse to Morphine/ Methamphetamine Addiction

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There is growing evidence of methamphetamine abuse among methadone users which might affect the success rate of methadone maintenance treatment (MMT) programme. Buprenorphine has been proven to reduce dopamine level in brain following methamphetamine dependence and to reduce relapse to cocaine, which suggest the potential of buprenorphine treatment for psychostimulant addiction. Therefore, the aim of this study is to evaluate the potential of buprenorphine to reduce relapse in opioid addicts that used methamphetamine concurrently (dual dependencies). Initially, tail-withdrawal test (T=52^{o}C) is used to evaluate the mu-opioid receptor properties of buprenorphine and methamphetamine (n=6 for each group). Later, using a conditioned place preference (CPP) paradigm, the morphine/methamphetamine dependence model is developed in mice. The mice were divided into two major groups, morphine and morphine/methamphetamine dependent groups (n=8-12 for each group). Dependence was induced using variable dose of morphine (3.0-5.0 mg/kg, i.p.) and methamphetamine (1.0 mg/kg, i.p.). Following abstinence, a priming dose of morphine or and/or methamphetamine is given. The ability of buprenorphine (0.3 mg/kg, i.p.) to reduce relapse in these dual dependencies is investigated. From the tail-withdrawal test, 1 mg/kg naltrexone significantly blocked the mu-agonist properties of 0.3 mg/kg buprenorphine ($P<0.05$), while 1 mg/kg methamphetamine failed to activate the mu-opioid receptors. Initial findings in CPP paradigm show that 0.3 mg/kg buprenorphine produced Straub's tail effect (60-90^{o}) and stereotype behaviour (45-60 minutes) in morphine/methamphetamine dependent mice after complete abstinence (n=6-8), which suggest the activation of dopamine system after complete abstinence which was not reported with cocaine. Interestingly, the Straub's tail effect is abolished when the mice were treated with naltrexone (n = 5). The studies to investigate the responsible receptor(s) that can reduce sensitization to morphine and/or methamphetamine are currently ongoing in order to identify the potential drug targets to reduce relapse to these dual dependencies.

SPP 15
FAPA2014000152 (Poster)

Anti-Inflammatory Mechanism of C60 Pyrrolidine Tris-Acid (C60-P) on Caco-2 Cells

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With the development of nanotechnology, many nanomaterials with innovative functions have been created. The fullerene C_{60} is one of the most promising nanomaterials because of their unique chemical and physical properties. It has been reported that the fullerene C_{60} has antioxidant effect, and so it is called as a "radical sponge". For this character, the fullerene C_{60} is expected to be applied as nanomedicine for inflammatory disease which is related to oxidative stress. However, because the fullerene C_{60} has poor solubility, it is difficult to be applied as medicine. In order to improve the solubility, we have used various fullerene C_{60} derivatives and evaluated anti-oxidant and anti-inflammatory effect of each fullerene C_{60} derivatives. Previously, we have found that C_{60} pyrrolidine tris-acid (C_{60}-P) had high solubility and strongly inhibited inflammatory cytokine (IL-8) production on Caco-2. Furthermore, we revealed that this anti-inflammatory effect was independent of anti-oxidant effect. Here, to clarify this newly discovered anti-inflammatory mechanism, we examined the effects of C_{60}-P on Mitogen-Activated Protein Kinase (MAPK), which is one of pathways in IL-8 production. After treatment with C_{60}-P for 30 minutes, Caco-2 was stimulated with IL-1β. Subsequently, by using western blotting, we analyze phosphorylation of MAPK (p38, ERK, JNK) as an index of activation. C_{60}-P did not suppress phosphorylation of p38, ERK, and JNK in Caco-2. Next, we examined the effects of C_{60}-P on IL-8 mRNA production after stimulation with IL-1β by using realtime-PCR. Although stimulation with IL-1β increased the production of IL-8 mRNA, C_{60}-P did not suppress IL-8 mRNA production. These results suggest that C_{60}-P-mediated anti-inflammatory effect is independent of MAPK phosphorylation and mRNA production. Therefore, we consider that C_{60}-P effect on downstream of these pathways, such as inhibition of secretion or translation. We believe that our findings might provide useful information for application of fullerene C_{60} to nanomedicine.

SPP 16
FAPA2014000133 (Poster)

Investigation of Taste Masking Techniques for Drug Causing Mucosal Irritation

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Taste masking techniques for drug causing mucosal irritation was investigated. The objective of the study was to investigate and compare the effectiveness of various taste masking techniques for Dapoxetine HCl, a drug causing oral mucosal irritation. Taste masked granules of dapoxetine HCl were prepared via different taste masking techniques, namely, ion exchange using Kyron T-134 resin, coating with a hydrophilic polymer Carbopol, inclusion complexation with hydroxypropyl beta-cyclodextrin, chemical

modification via reaction with sodium bicarbonate and addition of sweetener and flavoring agent (sucralose and green apple flavor) were investigated and compared. Coating with Carbopol, inclusion complexation and addition of sweetener and flavouring agent, did not satisfactorily circumvent the oral mucosal irritation and unpleasant taste of dapoxetine HCl. On the contrary, ion exchange and chemical modification techniques were found to be effective. The dissolution of the drug was not affected in 0.1 N HCl medium (80% drug released within 45 minute). Kyron formed a resin complex with dapoxetine HCL, while sodium bicarbonate converted dapoxetine HCl into non-soluble dapoxetine base. The resin-drug complex and dapoxetine were not soluble in the pH of oral cavity. The drug released in acidic pH of 0.1M HCl. The SEM showed the formation of drug-resin complex. The FTIR spectra showed that there was no chemical interaction involving the major functional groups of the drug for the two methods. The drug was stable at 40°C for 6 months. Ion exchange and chemical modification were effective taste masking techniques that could be used to resolve the oral mucosal irritation and improve the palatability of dapoxetine HCl in orally disintegrating tablets.

SPP 17
FAPA2014000201 (Poster)

Effect of Bromelain from Pineapple Fruit Stem on Motility of the Gastrointestinal Tract of the Rat

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Bromelain from pineapple fruit stem (PSJ) is a glycosylated single-chain cysteine endopeptidase with inhibitory effects on intestinal motility, secretion and inflammation. An anecdotal account claimed that bromelain could cure gastroesophageal reflux disease (GERD) but evidence pertaining to its effects on gastroesophageal motility and secretion are scarce. This investigation looked at the effect of chronic stem bromelain treatment (PSJ) on the response of oesophagus, stomach, ileum and colon of rats to acetylcholine, histamine and their antagonists. Five groups of male albino rats were fed either with normal saline (control), 3 different concentrations of PSJ or bromelain via oral tube for 21 days. On day 23, segments of oesophagus, stomach, ileum and colon were removed for isolated organ bath experiments. Effects of different doses of acetylcholine, histamine and their antagonists on tissue contractility were recorded via Powerlab^{TM}. Dose response curves for acetylcholine and histamine with their EC_{50s} were obtained alone and in the presence of their antagonists, atropine, mepyramine, respectively and in the presence of PSJ. The mean SEM of the EC_{50} of treatment groups were compared against the control group by ANOVA and Student's *t*-test. The dose response curves for acetylcholine and histamine alone and in the presences of either atropine or mepyramine in the control rats were compared with those of the treated rats. The results from the oesophagus, stomach, ileum and colon were analysed. A shift to the left of the dose-response curves to agonists of treated compared to the control rats would show an increase in responsiveness, while a shift to the right would show a decrease in responsiveness. If PSJ shifts the dose-response curves of acetylcholine / histamine of the control rats to the right, then PSJ would have antagonistic effect on muscarinic and histamine H_1 receptors.

SPP 18
FAPA2014000151 (Poster)

Analysis of Neurological Effects After Exposure to Silver Nanoparticles via Intranasal Route

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The development of nanotechnology enhances the prevalence of ultrafine particles, called nanoparticles (1-100 nm). For example, silver nanoparticles (nAg) have been widely used in daily commodities because they can be easily applied to products compared with silver ions previously used as an anti-bacterial agent. Thus, we have more opportunities to expose nAg routinely. Considering some recent studies report that the inhalation exposure of airborne ultrafine particles may be related to brain diseases, information about bio-distribution and biological effects of nAg on brain is indispensable for safety use and the promotion of health. In this study, we assessed distribution of nAg to brain following nasal administration and their neurological effects by comparing with silver ions. C57BL/6 mice were treated with nAg (10 nm) or silver ions by nasal administration for 28 consecutive days. Silver content of each brain sub-region was measured by ICP-MS. ICP-MS analysis showed that silver content of brain in nAg treated group was lower than that in silver ions treated group, and that silver content was highest in olfactory bulbs (OB). In order to clarify their influence on OB, the expression of tyrosine hydroxylase (TH), which is a marker of dopaminergic neurons playing a major role in OB, was evaluated by Western blot. As a result, TH amount of the OB in nAg treated group was reduced by approximately 10%, though TH in silver ions treated group was significantly decreased by approximately 50%. In other words, nAg may have less neurological effects on OB than silver ions after nasal exposure. With the aim of elucidating various effects of nAg on brain including OB, we are currently performing neurobehavioral tests.

SPP 19
FAPA2014000288 (Poster)

Formulation and Evaluation of Extended Release Microencapsulated Mefenamic Acid Using the Oil of *Cocos nucifera* (Coconut Fruit) and Liquid Paraffin (50:50) as Oil Phase in Solvent Evaporation Method

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Mefenamic acid is a non-steroidal anti-inflammatory drug that could cause adverse reactions and drug interactions if the medication would be taken unmonitored. To prevent further occurrences of these events and better patient compliance, an extended release formulation of mefenamic acid was prepared in this study through microencapsulation using solvent evaporation method. The potential of virgin coconut oil (VCO) as an oil phase was tested by using 50:50 ratio of VCO and liquid paraffin in the experimental group and utilizing liquid paraffin alone in the control. The resulting microspheres were employed under Fourier Transform Infrared Spectroscopy, Scanning Electron Microscopy (SEM), Differential Scanning Calorimetry (DSC), and Dissolution Test to confirm the presence of mefenamic acid, identify its morphology, determine the compatibility of excipients with the drug and verify the extended release of the medication. The change in endothermic peak in DSC thermograms suggested that the mefenamic acid in VCO:liquid paraffin formulation reacted with VCO or was lost during formulation. Infrared spectra

results also implied the absence of mefenamic acid in both formulations. SEM images of VCO:paraffin formulation showed crystal shaped, collapsed microcapsules with smooth edges, which implied that microcapsules were not formed. However, the dissolution test revealed that the incorporation of VCO to liquid paraffin as the oil phase was superior compared to liquid paraffin in extended release preparations. This was validated by the testing of significance using Independent Sample T-test at 95% Confidence Interval. Statistics showed that the differences from 30 minutes down to 2 hours were all found to statistically significant, given *p*-values less than alpha 0.05 (mean *p*-value=0.01034). Therefore, the 50:50 ratio of VCO:liquid paraffin is incompatible with mefenamic acid. Nevertheless, it is more effective as an oil phase when compared to pure liquid paraffin in terms of delaying release of the drug from the preparation.

SPP 20
FAPA2014000316 (Poster)

Investigating the Effects of Novel Wound Dressings Based on Chitosan, Sodium Alginate, and Gelatin

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Chronic nonhealing ulcers are a critical problem in clinical practice. Slow healing, difficulty in providing proper healing support or treatment methods, and patient suffering are great challenges for modern medicine. Chitosan has been proven to have desirable qualities, such as hemostasis, bacteriostasis, biocompatibility, and biodegradability properties. One of the most interesting effects of chitin and chitosan on wound healing is formation of granulation tissue with angiogenesis. Chitin and chitosan induce fibroblasts to release interleukin-8, which is involved in migration and proliferation of fibroblasts and vascular endothelial cells. The aim of this study was to prepare and evaluate a novel wound dressing based on chitosan, sodium alginate, and gelatin. For this purpose, two different formulations of films were prepared. One formulation contained gelatin and chitosan and the other one consisted of chitosan and sodium alginate. Required properties for successful wound dressings such as thickness, water vapor permeability and oxygen penetration were examined. Then the best film from each formulation was identified by Design-Expert® software. A water-soluble pressure-sensitive adhesive was prepared. The selected films were covered by a thin layer of adhesive. Animal studies were performed on female albino rabbits and wound areas were measured on days 0, 3, 6, and 9. Healing of the wounds treated with chitosan-alginate dressing was more rapid than control. With the chitosan-alginate dressing the rate of healing showed statistically significant difference (p value <0.05) from day 3 onwards. With the chitosan-gelatin dressing, the rate of healing showed statistically significant difference (p value <0.05) from day 9. The results showed that wound dressing based on chitosan, sodium alginate, and gelatin accelerates the healing process. In addition, permeability studies illustrated that both chitosan-alginate and chitosan-gelatin films allowed higher oxygen penetration compared with the pure chitosan film.

SPP 21
FAPA2014000040 (Poster)

Anticancer Activity and Apoptotic Induction of Chalcones against TRAIL Resistant Cancer Cells

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In the present study, a series of 46 chalcones were synthesised and evaluated for antiproliferative activities against the human TRAIL-resistant breast (MCF-7, MDA-MB-231), cervical (HeLa), ovarian (Caov-3), lung (A549), liver (HepG2), colorectal (HT-29), nasopharyngeal (CNE-1), erythromyeloblastoid (K-562) and T-lymphoblastoid (CEM-SS) cancer cells. The chalcone 38 containing an amino (-NH2) group on ring A was the most potent and selective against cancer cells. The effects of the chalcone 38 on regulation of 43 apoptosis-related markers in HT-29 cells were determined. The results showed that 20 apoptotic markers (Bad, Bax, Bcl-2, Bcl-w, Bid, Bim, CD40, Fas, HSP27, IGF-1, IGFBP-4, IGFBP-5, Livin, p21, Survivin, sTNF-R2, TRAIL-R2, XIAP, caspase-3 and caspase-8) were either up regulated or down regulated.

SPP 22
FAPA2014000166 (Poster)

Size Effects of Gold Nanoparticles on the Tissue Distribution and Retention

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With the recent development of nanotechnology, the application of nanomaterials (≤ 100 nm) in biomedicine has attracted much attention. However, the increasing use of nanomaterials has raised concerns over their safety for human health. Collecting information between physical properties of nanomaterials and their unique biodistribution is important to produce safer forms of nanomaterials. In this study, we investigated the influence of particle size on the *in vivo* tissue distribution of gold nanoparticles, which are promised diagnostic or anticancer drug. Gold nanoparticles with 10, 30, 50, 70, and 90 nm in diameter were injected in BALB/c mice via tail vein. The gold contents in liver, kidneys, and spleen were determined by the inductively coupled plasma mass spectrometry at 1, 14, and 28 days after the administration. Regardless of particle size, the percentage of the injected dose in kidneys and spleen was from 0.5 to 4 % at day 1 after the administration and gradual decrease was observed at day 14 and 28. On the other hand, the percentage of the injected dose in the liver of mice treated with each gold nanoparticles was from 50 to 90 % at day 1 after the administration. Furthermore, the gold content in liver did not decrease even at 28 days after administration. Thus, little difference in tissue distribution tested was observed between each particles size. However, evaluating the accumulation mechanisms of gold

nanoparticles in liver is critical for ensuring the safety of nanomedicine. We believe that our study is useful in designing a new drug of nanoparticles with high safety and efficacy.

SPP 23
FAPA2014000191 (Poster)

Amorphous Silica Nanoparticles Induce Size-Dependent Inflammation

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Exposure to particulate matters (PM) in environment, such as yellow dust and crystalline silica induce inflammatory disease such as allergy and silicosis. Recently it has been reported that nano-sized particles in PM play a pivotal role in these influences. On the other hand, by the development of nanotechnology, broad applications and prevalence of nanomaterials (less than 100 nm in diameter) are expanding. Because of their ultra-fine size, nanomaterials have a lot of helpful abilities such as high tissue permeability, which are expected to be applied to efficient Drug Delivery Systems. Although it is concerned that the characteristic of nanomaterials as particles might have the possibility of the similar inflammatory effects to PM, their potential inflammatory effects have not been fully understood. In this study, we evaluated the correlation between the size of particles and inflammatory activity using amorphous silica nanoparticles (nSP). THP-1 cells were treated with each nSP and submicron-sized silica particle (the diameter of 10, 30, 50, 70, 100, 300, and 1000 nm; nSP10, nSP30, nSP50, nSP70, nSP100, nSP300, and mSP1000) and IL-1β production in the culture supernatants were measured. Although smaller particles induced higher IL-1β secretion between mSP1000 and nSP50 in culture supernatant, nSP30 and nSP10 induced less secretion than that of nSP50. Thus nSP50 would have the highest inflammatory potential. Next, we evaluated the inflammatory effects of nSP *in vivo*. C57BL/6 mice were treated intraperitoneally with each size of nSP. After 24 h, whole peritoneal cavity lavage fluid (PCLF) was collected. nSP50 induced the highest increase of total cell numbers in PCLF. These results suggest that inflammation induced by nSP is size dependent *in vivo*. We are now trying to investigate the effects of particles size on cellular uptake or intracellular distribution, and clarify why nSP50 induces the strong IL-1β secretion.

SPP 24
FAPA2014000141 (Poster)

Preparation and Characterization of Diclofenac Sodium Loaded Solid Lipid Nanoparticle

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The possibility of using Solid Lipid Nanoparticles (SLN) for topical use is an interesting feature. This system has occlusive properties on the skin surface, therefore enhancing the penetration of drugs through the stratum corneum by increased hydration. This advantage can be used to enhance the drug penetration of topical delivery such as diclofenac sodium for the relief of signs and symptoms of osteoarthritis, rheumatoid arthritis and ankylosing spondylitis. The purpose of this study was focused on the preparation

and physical characterization of Diclofenac sodium loaded SLN (D-SLN). D-SLN were prepared by hot homogenization followed by ultrasonication technique. Since the occlusion factor of SLN is related to its particle size, two formulations different in its surfactant contents were prepared to investigate the difference of the particle size resulted. Surfactants selected for preparation of formulation A (FA) were lecithin soya and Tween 80 whereas formulation B (FB) were lecithin soya, Tween 80, and Sodium Lauryl Sulphate. D-SLN were characterized for particle size and distribution, polydispersity index (PI), zeta potential using Beckman-Coulter Delsa™ Nano. Overall, the particle size obtained from FA was larger than FB. FA has 90% of the particles above 1000 nm, whereas FB has 90% below 100 nm.

SPP 25
FAPA2014000120 (Poster)

Preparation and Characterization of Water-in-Oil Nanoemulsion of 5-Fluorouracil to Enhance Skin Permeation for Treatment of Skin Diseases

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The objective of the study was to prepare and characterize a water-in-oil nanoemulsion of 5-Fluorouracil (5-FU) to enhance the skin penetration. The present study describes a nanoemulsion of 5-FU using Capyrol PGMC, Transcutol HP and PEG 400 as oil, surfactant and co-surfactant, respectively. The optimized formulations were further evaluated for heating cooling cycle, centrifugation studies, freeze thaw cycling, particle size distribution and zeta potential in order to confirm the stability of the optimized nanoemulsions. The *in vitro* characterization results showed that the droplets of prepared formulation were ~100 nm with ± 15 zeta potential. *In vitro* skin permeation studies were conducted in albino mice skin. Significant increase in permeability parameters was also observed in nanoemulsion formulations ($p < 0.05$). The steady-state flux (*J*ss), enhancement ration and permeability coefficient (*K*p) for optimized nanoemulsion formulation (FU2, FU1, 1:1 S mix were found to be 24.21 ± 2.45 μg/cm^2/h, 3.28 ± 0.87 & 19.52 ± 1.87 cm/h, respectively), which were significant compared with conventional gel. The *in vitro* and *in vivo* skin deposition studies in rat indicated that the amount of drug deposited from the nanoemulsion (292.45 μg/cm^2) in skin was significant ($p < 0.05$), an increased as compared to a conventional 5FU gel (121.42 μg/cm^2). The skin irritation study using rat skin showed that the mean irritation index of the nanoemulsion reduced significantly ($p < 0.05$) as compared with conventional gel containing 1% 5-FU. The results from this study suggest that a water-in-oil nanoemulsion could be safely used to promote skin penetration of 5-FU following topical application.

SPP 26
FAPA2014000246 (Poster)

Effects of Black Pepper on Pharmacokinetics of Glimepiride in Type 2 Diabetic Rats

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The relationships and interaction between foods, dietary supplements and drugs are gaining recognition in the healthcare and medical fields. An estimated 12-45% of individuals using supplements with

prescription drugs are at risk of interactions. Glimepiride is a third generation sulfonylurea which stimulates insulin release from pancreatic beta cells and may acts via extra- pancreatic mechanisms. Glimepiride is metabolized by CYP2C9. This should be taken into account when glimepiride co-administered with inducers, inhibitors and substrate of CYP2C9. Black pepper alone accounts for about 35% of the world's total spice trade and considered as "King of Spices". It has been used medicinally for centuries. In addition, the CYP450 inhibitory and bioenhancing properties of black pepper had been proved. This study was designed to explore the effect of black pepper on pharmacokinetics of glimepiride as no studies are available to address this interaction. Type 2 diabetes was induced in overnight fasted rats by streptozotocin and nicotinamide. Glimepiride (1mg/kg) and aqueous black pepper extract (250 mg/kg) were administered to diabetic rats and blood samples were collected at time intervals of 0.5, 1, 2, 4 and 8 hours after drug administration and analysed with HPLC to estimate glimepiride concentration in serum. The C_{max}, t_{max}, AUC, $t_{1/2}$ and MRT of glimepiride were calculated with Kinetica software. In type 2 diabetic rats, the C_{max}, t_{max} and AUC of glimepiride were significantly increased in glimepiride and aqueous black pepper extract treated rats. The values of $t_{1/2}$ and MRT were decreased. The glimepiride concentration increased two times and $t_{1/2}$, AUC increased as well. The CYP2C9 inhibitory and bioenhancing properties of black pepper has been proven and documented and responsible for this pharmacokinetic activity. The present study revealed that black pepper significantly altered the pharmacokinetics of glimepiride and may potentiate the risk of hypoglycaemia.

SPP 27
FAPA2014000194 (Poster)

Characterisation and Optimisation of Hydrolase-Producing Bacteria Strains Isolated from Non-Pristine Mangrove Soil

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Mangroves are reported to be one of the most productive and biologically important environments. It is usually found at the transition zone between land and sea in the tropical regions. This ecosystem varies in terms of its salinity, water levels and nutrient availability during the seasons which are responsible for the high level of diversity of microorganisms. These microorganisms known as extremophiles have developed unique properties to survive under extreme conditions of mangrove soil and may produce effective enzymes which function optimally under extreme conditions, making them potential biocatalysts used in harsh industrial processes. Although halophilic hydrolases were found to be an excellent alternative in industrial applications, very few hydrolases from halophiles have been characterised and there was a lack of research being conducted on isolation of hydroalse-producing bacteria from local Malaysia mangroves. In addition, literature search using ScienceDirect and Pubmed did not reveal any hydrolases isolated from local Malaysia mangroves. Thus, the research was undertaken to isolate and identify hydrolase producing bacteria from non-pristine mangrove soil. Colonies were screened for hydrolase activities on tributyrin agar plates and colonies with distinct morphologies were selected for dereplication based on repetitive element polymerase chain reaction (rep-PCR) fingerprinting. Parameters affecting hydrolase production, such as media, incubation time, temperature and agitation speed were conducted. In addition, the effect of pH, temperature, metal ions and concentrations of sodium chloride on the stabilities and activities of hydrolases was also studied. Few hydrolase-producing bacteria strains were successfully isolated. Further studies are warranted for additional investigations.

SPP 28
FAPA2014000149 (Poster)

The Basic Analysis for the Evaluation of Nanomaterials Excretion

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Nanomaterials have been utilized in an increasing number of applications such as medicine, cosmetics, and foods. It is because nanomaterials have unique character and useful function by the decrease of the particle size to the nanoscale. On the other hand, it is concerned that these materials have potential health risks attributed to their unique properties. Therefore, it is necessary to assess risk of nanomaterials from the point of view about kinetic analysis and the hazard analysis. In the recent studies, while the cellular uptake mechanisms of nanomaterials have been reported extensively, there is little known about excretion of nanomaterials from the cells. A greater understanding of the nanomaterials' excretion may provide useful information about their safety relating the accumulation and ADME (absorption, distribution, metabolism and excretion) of nanomaterials. In this study, to evaluate the nanomaterials' excretion, we analyzed the quantity of the intracellular nanomaterials. We treated fluorescence labeled silica nanoparticles with a diameter of 70 nm (nSP70) to human alveolar adenocarcinoma cell line (A549) for 2 hours. The cells were washed with phosphate buffered saline before changing to fresh growth medium for further incubation. Then, we analyzed the intensity of fluorescent nSP70 inside the cells by flow cytometry. As a result, the level of the fluorescence inside the cells increased after incubation with nSP70 for 2h due to nanomaterials uptake, but this level of the fluorescence decreased after 6h. These results suggest that the particles had excreted from the cells. It has been already reported that foreign substances and secretory protein are excreted through various organelle such as lysosome and the Golgi apparatus. Therefore, we are investigating through which pathway the nanomaterials inside the cells might be excreted. We believe that these data will contribute to risk analysis of nanomaterials.

SPP 29
FAPA2014000017 (Poster)

Molecular Docking Based Screening of Natural Products as Potential Aldose Reductase Inhibitor for the Management of Diabetic Complications

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Diabetes mellitus is a chronic multifactorial metabolic disease resulting from insulin deficiency or insulin resistance. Complications due to diabetes such as neuropathy, nephropathy and retinopathy are the major cause of disability, which reduces quality of life. Aldose reductase (AR, ALR2), the first enzyme of the polyol metabolic pathway that catalyzes the NADPH-dependent reduction of glucose to sorbitol, has been found to be implicated in the etiology of the long-term diabetic complications. AR inhibition is the most widely used strategy to prevent and delayed diabetic complications. Natural products, containing inherently vast structural diversity than synthetic compounds, have been the major sources of bioactive agents and will continually play as protagonists for discovering new drugs. Phytochemicals are considered privileged structures as they have the diversity space in which chemical scaffolds embody characteristics that promote binding to multiple protein targets. Therefore, natural products are considered

important sources for new drugs or lead optimization of AR inhibitors for the management of diabetic complications. In the present study, a library of natural compounds with different scaffolds was employed for the screening of the compounds against AR. Molegro Virtual Docker (MVD 2013.6.0.0 version) was used to perform the screening studies. The structure of AR was taken from the protein data bank and the PDB entry was 1AH3. Mol-Dock score along with re-rank score was the criteria for measuring the affinity of screened compounds with AR enzymes. The binding information obtained from the present studies can be mapped which will be helpful in studying the structural features relating to the trends in activities of the different compounds. The result of present study will provide a new approach for the potential use of these natural compounds as novel selective inhibitors of AR in the management of diabetic complications.

SPP 30
FAPA2014000078 (Poster)

Effect of Renal Denervation on the Sensitivity of Cardiopulmonary Reflex Mechanism in Cisplatin-Induced Acute Renal Failure Rats

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The present study investigated the mechanisms underlying the suppressed low pressure cardiopulmonary baroreflex mediated control of renal sympathetic nerve activity and heart rate in cisplatin induced renal failure. Renal failure was induced using cisplatin (5mg kg^{-1}, i.p.) and the rats were used seven days later. Groups of rats were anaesthetized with chloralose–urethane and prepared for measurement of renal sympathetic nerve activity and heart rate. Acute unilateral or bilateral renal denervation was performed by 10 % phenol and the cardiopulmonary receptors were stimulated using an acute saline volume load (0.25 % body weight) for 30 min. Cisplatin administration reduced ($P<0.05$) body weight by 12.5%, creatinine clearance by 27% and increased urine volume and water intake, by 27% and 9% respectively ($P<0.05$). Fractional excretion of sodium was increased by four folds as compared to control rats and increased ($P<0.05$) plasma creatinine and kidney index by 39% and 30% respectively compared to the control rats. Volume expansion reduced ($P < 0.05$) renal sympathetic nerve activity by 34% in control rats but remained unchanged in the renal failure rats. Unilateral and bilateral renal denervation progressively restored the volume-expansion induced renal sympatho-inhibition to control values. These findings demonstrated a significant role of the renal sensory innervation in cisplatin damaged kidneys which blunted the normal baroreflex control of sympathetic outflow to the kidney.

SPP 31
FAPA2014000150 (Poster)

Optimization of an Immune Method to Shorten Time for Inducing High-Affinity Antibodies

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Protein functions are regulated depending on their domains functions; therefore high-affinity monoclonal antibodies (mAbs) that block specific domains of proteins can accelerate the functional analysis of proteins. Because immunization is the best method to induce high-affinity mAbs, it is widely used for isolating mAbs. Lymph node cells are currently focused as antibody sources because antibody-producing cells in lymph node are induced in early stage of immunization. The early induction of antibody-producing cells in lymph node is expected as a method to shorten period for establishing mAbs, compared with general method that uses spleen-derived antibody-producing cells. However, immunization protocol inducing antibody-producing cells in the shortest period has not been clarified yet. Here, we tested four different sites of immunization, then analyzed hypertrophies of five different lymph nodes, to optimize the protocol for immunization. Emulsion for immunization was prepared with titer max gold adjuvant and ovalbumin (OVA), as a model antigen. BALB/c mice were administered with emulsion subcutaneously or intramuscularly (back, footpads or thighs, tail base). We measured the weight of cervical, axillary, inguinal, iliac, popliteal lymph nodes 3, 7, 14 days after immunization. Differences in hypertrophies of lymph nodes were observed within 14 days in each immunization site. For example, popliteal lymph nodes were enlarged remarkably in mice immunized subcutaneously in footpads. Meanwhile, iliac and popliteal lymph nodes were enlarged in mice immunized intramuscularly in thighs, tail base. These results clearly showed that antibody-producing cells were induced in different lymph nodes depending on the site of immunizations. Then, it also suggested that efficiency of affinity maturation might be different between each immunization. We expect that the immunization protocol will be optimized for rapid isolation of mAbs, by further analysis such as comparing antibody repertoires induced in different lymph nodes.

SPP 32
FAPA2014000168 (Poster)

The Correlation Analysis between the Size of Silica Nanoparticles and Their Acute Toxicity for Making Safer Nanomaterials

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Nanomaterials, which are particles with a diameter smaller than 100 nm, are widely applied to drugs as drug delivery system carriers and base compounds. Therefore, it is necessary for us not only to evaluate

their safety, but also to collect information to make safe forms of nanomaterials. However, it is reported that shrinking the particles down to nanosize changes their biodistribution and hazards. Thus, it is essential to reveal the relationship among physical property, efficacy, and safety because it allows us to establish methodology for making valuable and safe nanomaterials. We have elucidated that administration of excessive amounts of amorphous silica nanoparticles (nSPs) induced a drop in rectal temperature, and decrease in a number of platelets. Here, we investigated the effects of the particle size on nSPs-induced hazard to develop efficient and safe nanomaterials. C3H/HeN mice were treated with each size of nSP (10, 30, 50, 70, 100, 300, and 1000 nm) and PBS (control) by intravenous injection. As a result of analyzing the rectal temperature after administration, the mice treated with nSP with a diameter 50 nm showed the maximum drop in rectal temperature among the other treated mice with smaller and larger nSPs. On the other hand, nSPs size-dependently decreased the number of platelet, and nSP with a diameter 10 nm showed marked decrease. These results suggest that nSPs might induce size-dependent and also size-specific hazards. Therefore, some of their hazards might be preventable through strictly controlling the size. Now, we try to reveal each mechanism include size-dependent and the size-specific hazard focused on the blood coagulation system which is associated with platelets and on the complements which can induce a drop in rectal temperature.

SPP 33
FAPA2014000258 (Poster)

Synthesis and Redox Potentials of Copper Dithiocarbazates Complexes as Potential Radiopharmaceuticals

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Dithiocarbazates bear resemblance in their chemical structures to thiosemicarbazones which have found application in radiopharmaceutical metal-ligand complexes as hypoxia imaging agents. Schiff base ligands derived from dithiocarbazates and their complexes have been widely studied for their biological activities e.g. antimicrobial and antitumour. The literature search by our team has revealed that there is little effort hitherto in exploring Dithiocarbazates derivatives as potential radiopharmaceuticals. It is therefore the aim of this project to synthesize a series of Dithiocarbazate derived Schiff Base ligands and their copper complexes and characterize their suitability for further development as radiopharmaceuticals. We used electrochemistry to measure their reduction potentials and the stability of the generated Cu (I) complexes. The redox potentials of these Copper complexes are expected to be tunable by judicious choice of substituents on the diimine backbones. We managed to synthesize 7 Copper (II) complexes with various redox potentials. Results obtained thus far are encouraging and that this class of compounds warrants further research as radiopharmaceuticals. This work provides a platform for a new research avenue for Dithiocarbazate derivatives.

SPP 34
FAPA2014000221 (Poster)

Antimicrobial Activity of Dichloromethane Extract of *Turbinaria ornata*

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Antimicrobial resistance is a worldwide hazard and new resistance mechanisms have been emerging and spreading globally. One of the ways to tackle the issue of antimicrobial resistance is to actively encourage innovations and development of new antimicrobials. Marine natural products have been increasingly found to be a promising source of drug candidates for fighting human diseases. There is great potential of sourcing antimicrobials from seaweeds. Malaysia with its extensive coastline has more than 380 taxa of seaweeds. Seaweeds biosynthesizes compounds called secondary metabolites in order to adapt to surrounding environment, protect against predators as well as guard against pathogens. Extracts from red, brown and green seaweeds are found to possess various biological properties including antioxidant, anti-inflammatory, antitumor, antibacterial and anticoagulant activities. In this study, a marine brown seaweed belonging to the family Sargassaceae, *Turbinaria ornata* was assessed for its antimicrobial properties. Dichloromethane extract of *Turbinaria ornata* was tested against 21 microorganisms including gram positive, gram negative bacteria, yeasts and fungi.

SPP 35
FAPA2014000049 (Poster)

AMPA Receptor Endocytosis and NMDA Receptors in the Amygdala is Involved in the Destabilization of Methamphetamine-Associated Memory

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Drug addiction is a chronically relapsing disorder characterized by compulsive drug-seeking behavior. Addicts is easy to relapse drug withdrawal process, the main factor is addicts re-exposure to environmental cues of drug intake and thus causing animal drug craving. When drug-related memory is reactivated, the memory is thought to become destabilized such that it is susceptible to disruption by amnestic agents. Previous researches showed that NMDA receptors are involved in the destabilization of memory reconsolidation. Here, we used a conditioned place preference (CPP) procedure in mice to examine the role of AMPA receptor endocytosis and NMDA receptors in the amygdala in the destabilization of methamphetamine (MeAM) memory. Conditioning MeAM (2 mg/kg, i.p.) for 3 days in mice could induce a significant rewarding effect. Mice injected with anisomycin 1 hour after CPP test did not exhibited CPP for the previously MeAM-paired chamber. In addition, anisomycin treatment prevented MeAM priming-induce reinstatement of CPP suggesting the disruption of MeAM memory reconsolidation. Anisomycin had no effect on the CPP when CPP test was omitted. Bilateral injection of Tat-GluR23Y, a synthetic peptide that blocked AMPA receptor endocytosis, into the BLA prevented anisomycin-induced disruption of MeAM memory reconsolidation. In addition, Tat-GluR23Y could reverse MeAM-induced increase in surface expression of AMPA receptor in the BLA. Furthermore, we bilaterally injected NMDA receptor antagonist into the amygdala before CPP test, resulting in disrupting

anisomycin-induced MeAM memory impairment. According to these results, we could suggest that AMPA receptor and NMDA receptors might be involved in the destabilization of MeAM memory reconsolidation.

SPP 36
FAPA2014000076 (Poster)

Influence of Tempol and Losartan on Sensitivity of Renal Vascular Responses to Adrenergic Agonists and Angiotensin II in DOCA-Salt Treated Rat Model of Hypertension

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The effect of tempol, losartan and combination of tempol with losartan were investigated by examining the adrenergic receptors and AT_1-receptors responsiveness in DOCA-salt treated rats. DOCA-salt (D-Control), tempol treated DOCA group (3mmol/l) (D-Tempol), losartan treated DOCA group (10mg/kg, last 7 days) (D-Losartan) and DOCA group with combination treatment of tempol & losartan (D-Tempol+Losartan) were studied. On day 43, the animals were anaesthetized with intraperitoneal pentobarbitone for renal haemodynamic studies. Mean arterial blood pressure (MAP) and renal vascular responsiveness (using laser Doppler flowmetry) to noradrenaline (NA), phenylephrine (PE), methoxamine (ME) and angiotensin II (AngII) were investigated. All data were analyzed using repeated measures one-way and two-way ANOVA followed by *Bonferroni post hoc* test with 95% confidence and expressed as mean ± SEM. D-Tempol showed 9% decreased MAP as compared to D-Control. D-Tempol+Losartan group showed higher responsiveness to NA by 59% and PE by 159% in decreasing renal cortical blood perfusion in comparison to D-Losartan. Decreased responsiveness to PE was observed in D-Losartan by 53% as compared to D-Control. The responsiveness to ME in D-Tempol+Losartan was higher than D-Control by 188%, D-Tempol by 102% and D-Losartan by 217%. D-Losartan and D-Tempol+Losartan groups showed 61% and 41%, respectively, decreased responses to AngII as compared to D-Control. D-Tempol+Losartan showed 50% greater responsiveness to AngII than D-Losartan. In contrast, D-Tempol+Losartan showed 28% lower responsiveness to AngII compared to D-Tempol. This suggests that the combination of tempol with losartan improves the responsiveness of renal vasculature responses to adrenergic agonists and AngII in DOCA-salt treated rat model of hypertension.

SPP 37
FAPA2014000175 (Poster)

Depletion of Neutrophil Could Exacerbate Fetal Death Induced by Silica Nanoparticles

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With the recent development of nanotechnology, nanomaterials with innovative functions have been used in various fields such as foods, cosmetics, and medicines. On the other hand, biological effects of

nanomaterials have been a concern. As we could be increasingly exposed to nanomaterials, it is urgent to ensure the safety of nanomaterials. Especially, assessment of effects on pregnancy is essential because effects of exposure to adults extend to fetuses, which are more sensitive to environmental chemicals than adults. In our previous study, we demonstrated that silica nanoparticles with a diameter of 70 nm (nSP70) could induce pregnancy complication such as intrauterine growth retardation and fetal death. Although the mechanism of these phenomena induced by nSP70 has not been well understood, it is reported that neutrophils might relate to pregnancy complication. In this regard, we previously showed that proportion of neutrophil fraction was elevated in peripheral blood in nSP70 treated mice. In this study, we investigated the contribution of nSP70-induced neutrophilia to pregnancy complication induced by nSP70. Pregnant BALB/c mice were treated with anti-Ly-6G antibody (150 μg/mouse), which deplete neutrophils specifically, or PBS intraperitoneally at gestational day 15. The next day, they were intravenously injected with nSP70 (0.8 mg/mouse) or saline (control) via tail vein. At gestational day 17, as we previously reported, maternal body weight declined in nSP70 treated mice. Moreover, in anti-Ly-6G antibody pre-treated mice, nSP70 induced a sharply dropping of maternal body weight and significant depression of fetus number compared with mice treated with nSP70 without anti-Ly6G antibody. As we confirmed that anti-Ly-6G antibody depleted plasma number of neutrophils, these results suggest that neutrophils might correlate with nSP70-induced fetal death. Our previous reports demonstrated that nSP70 might cause damage to placenta. Therefore, it is conceivable that neutrophils could protect from nSP70-induced cytotoxicity in placenta.

SPP 38
FAPA2014000160 (Poster)

Transgenerational Effects of Silica Nanoparticles Focused on Paternal Exposure

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Environmental factors, such as living habits and exposure to chemicals, can influence human health. It is also known that parental environmental factors could effect on their children. To reveal the mechanism of this phenomenon, many research have focused on maternal environmental factors because fetus spends a long term in uterus. On the other hand, recent epidemiological researches have suggested that not only maternal but paternal environmental factors could cause problems to child's health. However, there is still little information of transgenerational effects through father. Therefore, we have been promoting a study of transgenerational effects of chemicals through father, especially focused on nanomaterials. Nanomaterials have been developed with recent progress of nanotechnology. With their useful functions, nanomaterials have already been used in various fields including medicines. We have revealed that amorphous silica nanoparticles (nSP) which is used in medicines as assistant can be distributed to male reproductive organs including testis and sperm. Therefore, transgenerational effects of nSP through father are considered to be important. In this study, we examined potential for nSP to cause transgenerational effects. Male mice were intravenously treated with nSP with a diameter of 30 nm (nSP30) every other day for a total 4 administrations. After 35 days from first administration, a part of male mice were dissected. Others were crossed to female mice. As for male mice which were administrated nSP30, there was no significant difference in body weight, weight of reproductive tissues, and survival rate of sperm compared to control mice. In addition, mating rate, litter size per dams, and male/female ratio of pups did not change between nSP30-treated group and control group. These results suggest that exposure to nSP30 in

this condition did not affect male reproductive functions and birth of neonates. We will examine effects to matured young mice through male parents.

SPP 39
FAPA2014000148 (Poster)

Silver Nanoparticles Induced Inflammatory Response in Human Pulmonary Cells

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It is widely known that the exposure to particulate matter (PM), such as diesel exhaust or yellow dust, exacerbates inflammatory bronchi or lung diseases. In these days, it is suggested that nanometer-scale particles in PM are major factor contributing to these adverse health effects. Under these circumstances, the increasing use of engineered nanoparticles has raised public concern about biological effects of nanoparticle exposure on human health. Therefore, it is indispensable for safety use of engineered nanoparticles to analyze the correlation between their characteristics and the biological effects. However, there are few studies analyzing the effects in terms of long term exposure. In this study, we evaluated the biological effects focused on the inflammatory responses after daily exposure to silver nanoparticles, which are frequently used in our life, toward assessment of long term effects. A549, human pulmonary cells, were treated with silver nanoparticles (10, 50, and 100 nm) for 3 consecutive days. And we evaluated the cell viability and the production level of IL-8, pro-inflammatory cytokine, in the culture supernatant. As a result, we confirmed that 10 nm silver nanoparticles induced a slight decrease in cell viability though the other nanoparticle size induced no significant cytotoxic effect. In addition, 10 nm silver nanoparticles induced daily, markedly IL-8 increase. Furthermore, 10 nm silver nanoparticles induced IL-8 production only after exposure for three days though LPS induced the elevation after for one day. These results suggest that silver nanoparticles induced size-dependent cellular response and that their induced-inflammatory responses showed gradual changes. To elucidate the inflammatory response induced by silver nanoparticles, we are currently investigating the detailed inflammatory mechanisms or exhaustive analysis of other pro-inflammatory markers.

SPP 40
FAPA2014000153 (Poster)

Distribution of Gold Nanoparticles to the Breast Milk in Mice

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Nanomaterials have already been applied in many fields because of their various useful functions. Nanomaterials are especially expected to be used for medicines. On the other hand, it is known that, in the

case of medication use during lactation, medicines might transfer into milk and induce negative biological influences on infants. Therefore, for safety use of medicines in lactation, evaluation of distribution to milk is important. However, there is almost no information about distribution of nanomaterials to milk. In this study, we evaluated the distribution to milk of two nanomaterials for the purpose of evaluating changes of distribution by difference of composition. Here, silver nanoparticles (nAg), which have the highest degree of commercialization among all nanomaterials, and gold nanoparticles (nAu), which are expected to be used as DDS formulation, were used. Lactating dams were intravenously treated with 500 ng/kg of nAg with a diameter of 10 nm (nAg10) or 4000 ng/kg of nAu with a diameter of 10 nm (nAu10) in postnatal day 3. After 1, 2, 4, 8, and 12 hours from treatment, Ag and Au concentration in blood and milk were measured by inductively coupled plasma-mass spectrometry. As a result, Ag was detected in blood and milk of nAg10-treated mice. The Ag concentration in milk of nAg10-treated mice reached a peak at 8 h post-treatment, and 0.73 % of administrated Ag was detected at the time. On the other hand, Au was detected in blood but not detected in milk of nAu10-treated mice. These results suggest that the composition of nanomaterials is important for their distribution to milk and nAg10 are easy to transfer into milk compared with nAu10. Now, we are collecting more detailed information about distribution of nanomaterials to milk focused on the difference of size and surface modification.

SPP 41
FAPA2014000013 (Poster)

Synthesis and Evaluation of Antimicrobial Activity of Some 6-Chlorobenzothiazole-2-yl-hydrazones Derivatives

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Benzothiazoles are bicyclic ring system with multiple applications. In the 1950s, a number of 2-aminobenzothiazoles was intensively studied as central muscle relaxants. Since then medicinal chemists have not taken active interest in this chemical family. Biologist's attention was drawn to this series when the pharmacological profile of Riluzole was discovered. Riluzole (6-triflurомethoxy-2-benzothiazolamine, PK-26124, RP-54274, Rukytej) was found to interfere with glutamate neurotransmission in biochemical, electrophysiological and behavioral experiments. After that benzothiazole derivatives have been studied extensively and found to have diverse chemical reactivity and broad spectrum of biological activity. Benzothiazole was long known to be effective as bacteriostatic, tuberculostatic, fungistatc and molluscicidal agent. The present work describes the synthesis of new 2-benzothiazole derivatives with potential bacteriostatic and fungistatic activity. A series of 1,3-benzothiazole-2-yl-hydrazones were prepared in satisfactory yield and evaluated for their antibacterial, antifungal study. All the synthesized compounds were in good agreement with elemental and spectral data. 6-chloro-2-benzothiazolamine prepared by interaction of p-chloroaniline with potassium thiocyanate in the presence of bromine. 2-benzothiazolamine was then refluxed with hydrazine hydrate to yield hydrazine derivative, 6-Chloro-2-benzothiazol-2-yl-hydrazine. The final compounds were synthesized by the reaction of hydrazine benzothiazole with appropriate ketones and aldehydes. The compounds were evaluated for their anti-bacterial activity against *Bacillus subtilis* [MTCC 441], *Escherichia coli* [MTCC 43], *Klebsiella pneumoniae* [MTCC 432], and *Pseudomonas alkaligenes* [MTCC 493] with norfloxacin as standard and for antifungal activity against *Aspergillus niger* [MTCC-554], *Candida albicans* [MTCC-183], *Rhizopus oryzae* [MTCC-262], using ketoconazole as standard. Compounds 3a and 3b were found to be highly active against *Bacillus subtilis* and Compound 3a was found to have good activity against *Candida albicans*.

SPP 42
FAPA2014000011 (Poster)

Development and Validation of a Stability Indicating RP-HPLC Method of Pemetrexed API from Its Forced Degradation Products

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The aim of the present study was to develop and validate a stability indicating Reverse Phase High Performance Liquid Chromatographic (HPLC) method for the separation and determination of Pemetrexed in Active pharmaceutical material from its degradation products. Pemetrexed is an metastatic nonsquamous drug used in the treatment of non small cell lung cancer. The method was validated by subjecting Pemetrexed under various stress condition such as acid, alkali, water hydrolysis and oxidation. The drug componentent was simultaneously estimated by simple reverse phase method using Jones C18 (150 x 4.6 mm i.d., 5µ) as stationary phase and 0.1% formic acid : Acetonitrile as mobile phase with flow rate of 1.0 mL min-1. The determination was carried out at the wavelength of 230 nm. The stressed samples were assayed using the developed LC method and thus proving its stability-indicating power. The developed method was validated with respect to linearity, accuracy, precision and robustness. The developed method was validated and can be used in estimation of pemetrexed marketed formulation and in various pharmaceutical developments.

SPP 43
FAPA2014000325 (Poster)

Contribution of Hair Follicular Pathway of Topically Applied and Exposed Chemicals for the Total Skin Permeation

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Generally, blood and skin concentration profiles and steady-state skin concentration of topically applied or exposed chemicals can be calculated from *in vitro* skin permeation profile. However, these calculation methods can be applicable especially for chemicals of which the main pathway route is in the stratum corneum. When hair follicle contribution against the total skin permeation of chemicals could be obtained in detail, their blood and skin concentrations would be more precisely predicted. In the present study, contribution of hair follicle pathway to the skin permeation of topically applied or exposure chemicals was calculated from a difference between their permeability coefficients through skin with and without hair follicle plugging using *in vitro* skin permeation experiment. The obtained result revealed that the contribution of hair follicle pathway could be predicted by their lipophilicities. In a hydrophilic region of chemicals (log*K*o/w < 0), a higher reduction ratio by hair follicle plugging was observed compared with lipophilic chemicals (log*K*o/w ≥ 0). In addition, the reduction ratio was decreased with an increase in the log*K*o/w. This consideration on the hair follicle pathway would be helpful to investigate usefulness and safety of chemicals after their topical application and exposure, because skin permeation and disposition must be changed at different sites of skin due to different site and densities of hair follicles.

SPP 44
FAPA2014000326 (Poster)

The Potential of *Phyla nodiflora* as Chemopreventive Agent in Human Breast Cancer Cell Line, MCF-7

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Breast cancer is one of the most prominent diseases that cause major death in women. Currently there are a lot of researcher focuses on finding of new chemopreventive agents from natural sources. In this study, the ability of *Phyla nodiflora* to be used as chemopreventive agent was investigated. *Phyla nodiflora* extracts were obtained from different parts of plants such as leave (LMPN, LEPN, LCPN, LDPN, LHPN), root (RMPN), fruit (FMPN) and stem (SMPN, SEPN, SCPN, SDPN, SHPN) through soxhlet extraction and liquid-liquid partition using five different solvents such as methanol, ethyl acetate, chloroform, distilled water and hexane. From the antioxidant assays, we found that the total phenolic and flavonoid contents of these extracts were correlated to their antioxidant activity. To examine whether *Phyla nodiflora* extracts prevent the proliferation of MCF-7 cell line, MTT assay was performed. Our results showed that only certain extracts (RMPN, FMPN, LEPN, LDPN, LCPN, SMPN, SEPN and SCPN) were capable to inhibit the cell growth of MCF-7. To understand their mechanistic action, SEPN, LEPN, SMPN and RMPN were chosen based on IC_{50} value for apoptosis study. Among the four extracts, only LEPN and SEPN treated cells showed DNA laddering pattern at the range of 200 bp to 700 bp indicating the occurrence of DNA fragmentation upon treatment. Therefore, *Phyla nodiflora* extracts inhibit the cancer cells growth through apoptosis or other mechanisms. In conclusion, *Phyla nodiflora* has the potential to be developed into chemopreventive agent.

SPP 45
FAPA2014000008 (Poster)

Synthesis of Amino Acid Conjugates of Dopamine for the Enhancement of Brain Targeted Delivery of Dopamine

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This study aimed to assess the synthesis and characterization of various conjugates of amino acids like phenylalanine, valine, leucine, tyrosine and dopamine to determine which indicate increase of bioavailability by enhancement of permeability to brain and lower rate of clearance by reduction of metabolism and elimination of undesirable effects. Synthesized dopamine-amino acid conjugates were characterized by infrared spectroscopy. The partition coefficient of dopamine and dopamine conjugates were determined in n-octanol and phosphate buffer saline of pH 7.4, in which conjugates exhibit 8 to 12 fold increase in their partition coefficient. While the synthesized conjugates have less protein binding capacity as compared to dopamine and *in vitro* hydrolysis, the study revealed that dopamine-amino acid conjugates have long duration of action due to slow rate of hydrolysis. The dopamine-amino acid conjugates have reduced chlorpromazine-induced catatonia more than as compared with plain dopamine and combination of levodopa and carbidopa. All the synthesized conjugates of dopamine-amino acids have an effective antiparkinson activity due to higher partition coefficient of the compounds. This lead to higher lipophilicity which also improved the ability of drug to cross BBB, with hydrolysis of conjugates

in brain producing corresponding amino acid and dopamine. All synthesized conjugates have prolonged duration of action due to slow rate of hydrolysis and less plasma protein binding ability of conjugates.

SPP 46
FAPA2014000074 (Poster)

Effect of Peroxisome Proliferator-Activated Receptor (PPAR) Agonist, Pioglitazone on Vasopressor Responses to Adrenergic Agonists and Angiotensin II in Diabetic and Non-diabetic Spontaneously Hypertensive Rats

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Hypertension is common in type 2 diabetes; hence, hypertensive patients are subjected to combination therapy of antihypertensives and antidiabetics. Pioglitazone, a PPAR-γ agonist, is an useful agent for diabetes. This study compared the vasopressor responses to intravenous administration of angiotensin II (Ang II) and alpha adrenergic agonists to investigate the interaction between PPPAR-γ and pioglitazone. Diabetes was induced with a single i.p injection of STZ (40 mg kg^{-1}). Two diabetic (1 & 2) and two normal groups (3 & 4) of rats were used. Group 1 and 3 received pioglitazone (10mg/kg) orally for 21 days. On day 29, animals were anaesthetized with Na pentobarbitone (60mg/kg) i.p. Dose-response relationships of mean arterial blood pressure in response to intravenous injection of noradrenaline (NA), phenylephrine (PE), methoxamine (ME), and Ang II were determined. Data (mean±SEM) was analysed by using two way ANOVA with significance at $p<0.05$. The responses (%) to NA, PE, ME and Ang II in non-diabetic rats were significantly lower than diabetic SHRs (DBTC vs C, 45% vs 37, 48% vs 40, 30 % vs 24 and 49 % vs 37%). Pioglitazone treatment significantly decreased responses to NA, PE, ME in non-diabetic rats (PIO vs DBTC, 27% vs 45%, 32% vs 48%, 19% vs 30%). The responses to Ang II were significantly accentuated (PIO vs DBTC, 55% vs 49%). Therefore, PPAR-γ plays role in systemic haemodynamics in diabetic model and cross-talk exists between PPAR-γ and α_1-adrenoceptors and Ang II in systemic vasculature of diabetic and non-diabetic SHRs.

SPP 47
FAPA2014000010 (Poster)

Tracking Cardiovascular Disease (CVD): Development of Genotyping Methods for Various Polymorphism Implicated in CVD Therapy

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Cardiovascular disease (CVD) is a serious issue in Malaysia as it is the cause for 32% of deaths across all ages according to NCD Country Profile published by WHO. CVD accounted for 147,843 admissions or about 6.91% of total admissions in Ministry of Health (MOH) hospitals in year 2009 and in 2010. CVD were the cause for 24.5% of death in government hospitals in year 2010. In light of this, strategies to optimize therapeutic efficacy and minimize the potential for toxicity in the process of guiding the cardiovascular drug development and selection would aid in the management of the disease.

Development of molecular diagnostic tools that could aid clinicians to tailor CVD therapy suited for individual patients would be highly beneficial. This study was designed to develop PCR–based diagnostic methods for *CYP2C19*3, CYP2C9*3, ACE* and *ALDH* which were selected based on their relevance to CVD. Allele-specific primers were designed for this each polymorphism and optimization of the run profile parameters was carried out to determine the optimum annealing temperature, primer concentration and $MgCl_2$ concentration. The results were assayed using 1.5% agarose gel electrophoreses. The genotyping methods were then validated via gene sequencing. Genotyping methods for five gene polymorphisms have been successfully developed and validated. These genotyping methods could be utilized to aid in optimizing therapy for CVD patients.

SPP 48
FAPA2014000272 (Poster)

Social Interaction with a Helper Rescues Memory Deficit in an Animal Model of Alzheimer's Disease by Increasing BDNF-dependent Hippocampal Neurogenesis

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It has been recognized that the risk of cognitive decline during aging can be reduced if one maintains strong social connections, yet the neural events underlying this beneficial effect have not been vigorously studied. Here, we show that Amyloid precursor protein (APP) and presenilin 1 (PS1) double-transgenic (APP/PS1) mice improved memory after co-housing with wide-type (WT) mice. The improvement was associated with increased protein and mRNA levels of BDNF in the hippocampus. Concomitantly, the number of BrdU+/NeuN+ cells in the hippocampal dentate gyrus was significantly elevated after co-housing. Methylazoxymethanol acetate (MAM), a cell proliferation blocker, markedly reduced BrdU- and BrdU/NeuN-positive cells and abolished the companion effect. Selective ablation of mitotic neurons using diphtheria toxin (DT) and retrovirus vector encoding DT receptor (DTR) system abolished the beneficial effect of company. Knockdown of BDNF by shRNA transfection blocked while overexpression of BDNF mimicked the memory improving effect. A tropomyosin-related kinase B (TrkB) agonist, 7,8-dihydroxyflavone (7,8-DHF), occluded the companion effect. These results provide the first evidence that increased BDNF expression and neurogenesis in the hippocampus underlie the reversal of memory deficit by co-housing in APP/PS1 mice.

SPP 49
FAPA2014000265 (Poster)

Palladium-Catalyzed Allylation of Indoles with Allylic Acetates in PEG-Water System

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The palladium-catalyzed allylation is a powerful tool for C-C, C-N, and C-O bond formation, which has been widely applied to organic chemistry. The processes have been shown to proceed by attack of

nucleophiles on intermediate η3-allylpalladium (II) complexes generated by oxidative addition of allylic compounds including halides, esters, carbonates, carbamates, phosphates, and related derivatives to a Pd(0) complex. Indoles and indole-derived heterocycles are prevalent structural motifs in natural products, medicinal compounds, and organic materials. Utilizing the prevalence of indole nucleus in biologically active compounds, the direct C3-functionalization or N-functionalization of indoles represent an important problem. With green chemistry processes and the concerns over the environmental impacts of using volatile organic solvents, the promising potentials of water and other non-conventional solvents have become highly noteworthy in designing organic syntheses. Water has become a highly recommended solvent for organic reactions in terms of cost, safety, availability, and more friendly to environmental concerns. In this study, the palladium-catalyzed indoles with allylic acetates in PEG-water was investigated under various conditions.

SPP 50
FAPA2014000077 (Poster)

Hydrochlorothiazide and Candesartan Treatment Improves Blood Pressure, Renal Haemodynamics and Renal Function in Spontaneously Hypertensive Rats

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This study aimed to explore the impact of hydrochlorothiazide and candesartan alone or in combination on cardiovascular and renal haemodynamics in spontaneously hypertensive rats (SHR). SHR (n = 6 each group) were treated for 1 week either with hydrochlorothiazide (SHR-HCTZ), candesartan (SHR-CST), or hydrochlorothiazide plus candesartan (SHR-HCTZ + CST) while two groups that is, one SHR and one WKY that received vehicle served as controls. Non-invasive blood pressure and metabolic studies were performed on days 0, 21, and 28, after which the animals were anaesthetized with 60 mg/kg pentobarbitone i.p to measure cardiovascular and renal parameters and pulse wave velocity. Treatment with HCTZ or with CST alone reduced blood pressure and improved renal haemodynamics and excretory function in comparison to untreated SHR. Combination treatment with HCTZ and CST in SHR rats resulted in a significant attenuation in blood pressure, increase in creatinine clearance, urinary sodium excretion and fractional sodium excretion and also renal cortical blood perfusion compared to HCTZ or CST alone (all $P < 0.05$). In summary, these findings suggested that HCTZ and CST given together potentiated the reduction in blood pressure, normalization of kidney function and renal hemodynamics compared to either compound alone. These data suggested that a combination therapy of HCTZ and CST may be a potential option for the treatment of hypertension in renal failure.

PHYTOPHARMACY & PHARMACOPEIA

PPP 01
FAPA2014000130 (Poster)

Inhibitory Effects of Polyphenolic Extract of *Ichnocarpus frutescenes* on Carbohydrate Digestive Enzymes

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Inhibition of α-glucosidase diminishes glucose absorption and prostprandial hyperglycemia. Recently, there has been an enormous interests in the development of alternative medicines for Type II diabetes mellitus, specifically screening for phytochemicals with the ability to delay or prevent glucose absorption. This study focused on evaluation of total polyphenolic content, pancreatic α- amylase inhibition, rat serum α-amylase inhibition and rat intestinal α-glucosidase inhibition of polyphenolic extract (PPE) of *Ichnocarpus frutescens* by *in vitro*. PPE shows appreciable pancreatic α-amylase inhibitory activity *in vitro.* The extract also showed appreciable α-glucosidase inhibitory effect in a concentration-dependent manner with a moderate α-amylase inhibitory activity. The *in vitro* examination of the inhibitory effect of PPE on maltase and sucrase activities revealed that PPE inhibited rat small intestine disaccharidase (α-glucosidase) activity. Taken together, these results suggest that inhibitory effect of PPE on α- amylase and α-glucosidase activities might contribute to delay in carbohydrate digestion and absorption and subsequent lowering of blood glucose level leading to prevention of postprandial hyperglycemia in diabetes and its complication.

PPP 02

FAPA2014000234 (Poster)

Acylated Flavonoids as α-Glucosidase Inhibitors from *Tinospora crispa* Leaf

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Tinospora crispa Miers (Menispermaceae) is widely distributed in tropical and subtropical Asia, including Philippines, Indonesia, Malaysia, Thailand, India and Vietnam. The dried vines of this plant have been used as a folk medicine to treat fever, hypertension, inflammation and diabetes. A preliminary study indicated that the ethanolic extract of *T. crispa* leaf was active against α-glucosidase, whose inhibitors such as acarbose have been used to treat diabetes. Thus, the aim of this study was to investigate the active constituents from this part. To achieve this goal, bioassay-guided fractionation and separation works were applied. The ethanolic extract (205.6 g) of *T. crispa* leaf was divided into water, n-BuOH and chloroform soluble parts. The n-BuOH soluble fraction (43.6 g), which displayed a better inhibitory activity against α-glucosidase, was separated by a Sephadex LH-20 column with 100% MeOH to give 14 fractions. The fraction 10 (13 mg) showed the highest inhibition compared to the others. However, due to its limited amount, this minor fraction was analyzed by the combination of HPLC-DAD-SPE-NMR and HPLC-HR-MS techniques. Sixteen flavonoids were identified from the fraction 10 on the basis of spectroscopic analyses (NMR & HR-MS spectra). Among them, five new compounds were elucidated as apigenin-6-C-α-altroside(6), isoorientin-2'-O-(E)-sinapate(7), isovitexin-2'-O-(E)-p-coumarate(9), cosmosiin-6'-O-(E)-ferulate (10) and cosmosiin-6'-O-(E)-cinnamate (16), respectively. Bioassay of the isolated compounds against α-glucosidase indicated that 9 possessed highest inhibitory activity with an IC50 value of 4.3±1.4 μM. Other related acylflavonoids including cosmosiin-6'-O-(E)-ferulate (10, 8.8±2.9 μM), cosmosiin-6'-O-

(E)-p-coumarate(11, 14.6±4.8 μM), cosmosiin-6'-O-(Z)-p-coumarate (12, 10.1±3.5 μM) and cosmosiin-6'-O-(E)-cinnamate (16, 11.3±2.0 μM) exhibited similar inhibitory activity. In conclusion, the acylated flavonoids as α-glucosidase inhibitors may contribute to parts of anti-diabetic activity for *T. crispa* leaf.

PPP 03
FAPA2014000132 (Poster)

Antinociceptive Effects of Alkaloids Rich Fraction of *Aidia densiflora* in Mice

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Pain sensation is the major problem worldwide which may affect human health and lifestyle. The search for pain relieving agents continued to rise over time. Alkaloid is believed to stimulate analgesic activity via blocking transmission of pain stimuli on both central and peripheral pain. The study aimed to investigate the antinociceptive effects of alkaloids rich fraction of *Aidia densiflora* (AD) in albino ICR mice via acetic acid-induced writhing and the hot plate tests, which was reversed by aspirin. Four groups of mice were separated and treated with alkaloids extract from AD at increasing doses of 100, 200, 500, 1000 mg/kg. In writhing test, subcutaneously administered AD extract was reported to maximally block abdominal contraction by 71.1% at 1000 mg/kg ($p<0.05$) as compared to lower doses. Meanwhile, the hot plate test (55 C) revealed that intraperitoneally administered AD showed that there was no significant difference between lower doses which corresponded to 100 and 200 mg/kg AD. However, higher doses of 500 and 1000 mg/kg were statistically significant ($p<0.05$). Therefore, the results suggested that the alkaloid extract possessed potential analgesic activities which demonstrated to act through both peripheral and central mechanisms of pain. Despite safety and effectiveness profile of the extract, the present data may serve as the basis for the rational utilization of AD in alleviating symptoms including pain.

PPP 04

FAPA2014000016 (Poster)

Inhibitory Effect of Some Herbal Extracts against *Streptococcus mutans*

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Health industries, including dental care business, have contributed huge effort on production of natural substances since consumers mostly have a concern of adverse effects caused by chemical agents. Dental caries is an infectious disease associated with Streptococcus spp., mainly *Streptococcus mutans*. This study was to investigate the inhibitory effect on *S. mutans in vitro* of the 95% ethanol extracts from five herbs, *Psidium guajava* L., *Momordica cochinchinensis* Spreng., *Glycyrrhiza glabra* L., *Syzygium aromaticum* L. and *Piper retrofractum* Vahl. Antimicrobial activity was primarily tested using disc diffusion method. A two-fold broth dilution method was then used to determine the minimum inhibitory concentration (MIC) of the extracts. All the extracts showed

activity against *S. mutans*. The largest mean diameter of inhibition zone was 16.7±0.5 mm produced by the *S. aromaticum* extract. *G. glabra* extract showed the lowest MIC (0.195 mg/ml) and minimum bactericidal concentration (MBC) (3.125 mg/ml). The combination inhibitory effects of extracts against *S. mutans* were determined using checkerboard assay. A combined extract of *S. aromaticum* (0.195 mg/ml) and *P. guajava* (0.195 mg/ml) showed a synergistic effect (FICI 0.25) in inhibiting the growth of *S. mutans*. The results showed that these herbal extract may be potential candidates for the prevention and management of dental caries.

PPP 05
FAPA2014000257 (Poster)

In vitro* Antibacterial Effects of *Alteranthera sessilis* Leaves Extracts on Common Bacteria Associated with Wound Infections with Emphasis on Methicillin-Resistant *Staphylococcus aureus

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Alteranthera sessilis is an aquatic plant known by several common names, including sessile joywead. A decoction of *A. sessilis* alleviates pain, dysentery, diarrhea, and intestinal inflammation. Also, *A. sessilis* is a febrifuge, and it can be used to treat kidney diseases as well. It is often consumed as vegetable in India. Several therapeutic benefits of the wild (green) *A. sessilis* have been investigated which include anti-inflammatory effect, the nootropic activity, cytotoxic effect towards pancreatic cancer cell lines, and the free radical-scavenging ability. The aim of this study was to evaluate the antibacterial effects of hexane, ethylacetate, methanol and water extracts of *A. sessilis* leaves against common bacteria found in wound infections with primary focus on methicillin-resistant *Staphylococcus aureus* (MRSA). The extracts from *A. sessilis* leaves were obtained using sequential extraction with hexane, ethyl acetate, methanol and water. The antibacterial activities of extracts were investigated using disk diffusion assays and broth microdilution assays. The ethyl acetate extract of leaves showed significant antibacterial activity against wide range of gram positive and gram negative bacteria including MRSA. The extract produced the largest inhibition zone of 21.0 mm against MRSA while its inhibition zone against MRSA was only 8.5 mm. Its minimum inhibitory concentration (MIC) was 19.5 μg mL^{-1} and minimum bactericidal concentration (MBC) was 39.0 μg mL^{-1} against MRSA.

PPP 06
FAPA2014000156 (Poster)

Chemometric Analysis of *Labisa pumila* (Kacip Fatimah) Variants by Fourier Transform Infrared (FT-IR) Spectroscopy

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Labisia pumila, better known as Kacip Fatimah is a traditional herb commonly used as post-partum medication to regain the body shape, strength and toning the body muscles in Malay women. Recently, there is an influx of Kacip Fatimah products in Malaysian market to gain energy and libido, as well as to treat many other ailments. Despite high commercialization potential, there is dire need of rapid authentication for the use of quality control and standardization of these products. This study was conducted to investigate the chemometric analysis of *L. pumila* varients by infrared spectroscopy precisely using principle component analysis (PCA) for the discriminate analysis of three closely associated varieties of *L. pumila.* A total of 171 samples were used consisting of 63 each for *L. pumila var. alata* and *L. pumila var. pumila* while 45 samples were of *L. pumila var. lanceolata* collected across 19 locations in Peninsular Malaysia. Infrared (IR) analysis revealed a total of 16 peaks that were present in *Labisia pumila*. A total of 15 PCA scores plots were generated, with 3 PCA scores involving samples that are originated from the same location, showing 3 clusters that corresponded to each individual variants of *Labisia pumila (var. alata, var. pumila* and *var. lanceolata).* Chemometric analysis is able to discriminate between samples of *Labisia pumila* with different secondary metabolic profile that arises due to different variants, geographical location origin and parts of the plant. These findings may be useful for a non-destructive analysis as an alternative methodology to implement QbD aspects for the evaluation of herbal related products or raw materials.

PHARMACY EDUCATION AND STUDENT AFFAIRS

PEP 01
FAPA2014000022 (Poster)

Analysis of Student Satisfaction on Service Quality in the Faculty of Pharmacy Universitas Ahmad Dahlan Yogyakarta

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Faculty of Pharmacy, University of Ahmad Dahlan, Yogyakarta is one of the private moslem institution that organizes educational services. Thus, this institution should improve its services to get better student quality. The objective of this study was to find a description about the students' satisfaction and to understand the ratings of student satisfaction gap arising from several dimensional measurements. Student satisfaction measurement was done with populative observation and data collection prospectively at the fourth level students of the Faculty of Pharmacy, University of Ahmad Dahlan in Yogyakarta. The data was collected using satisfaction questionnaire. We recruited 212 students, which consisted of 22.16 % male students and 77.84% female students. The value gap that appeared on the dimensions of responsiveness, empathy, reliability, assurance and tangibles were -0.70, -0.70, -0.80 , -0.70 and -1.00, respectively. Each statement item used as a known valuation, was significantly different from students' expectations ($p < 0.005$). In general, the service elements in the Faculty of Pharmacy, have not fulfilled the students' expectations which was characterized by an absence of positive value or close to zero for a range of each gap values.

PEP 02
FAPA2014000283 (Poster)

Fun Competition of Public Education on Drug Use Safety

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The pharmacists play an important role in ensuring the drug use safety. However, the public awareness in this regard is still far behind the existing profession of pharmaceutical service provided by pharmacists. The aim of this study was to lift the public awareness on drug use safety and promote the partnership between pharmacists and the public in terms of consumer protection. Taipei Pharmacists Association launched a public education project in 2013 under the collaboration with Health Bureau and Education Bureau of Taipei City Government. The methodology of the project was to conduct fun competition of drug use safety in primary schools in Taipei and select 8 winners for advanced competition. The fun competition of drug use safety attracted very much the students of primary schools. The information on drug use safety has been easily digested by all the participants. Almost all the participating schools anticipated continuously to join the fun competition in future. In conclusion, the concept education is important to kids. The impressive information on drug use safety will be helpful to the participating kids over their life time and also of benefits to their families and the society.

PEP 03
FAPA2014000192 (Poster)

Breat Cancer Knowledge and Attitude, Self-efficacy and Practice of Screening Methods Among Female Students in a Private University

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Breast cancer is the most common cancer in women of both developed and developing countries and the leading cause of cancer deaths among women, accounting for more than half a million deaths in 2012. In Malaysia, breast cancer tops the most frequent cancer in all ethnic groups with 3,242 new cases in 2007. Besides, women between 20-29 years experienced 72.4% mortality rate due to lack of breast cancer awareness among young women. Several studies reported inadequate knowledge towards risk factors awareness and screening methods, including among educated women and healthcare providers. Furthermore, it was reported that women with a positive attitude and self-efficacy towards BSE have greater tendency to practice BSE. Therefore, this study aimed to determine the knowledge, attitude, self-efficacy and practice associated with breast cancer among different courses of health sciences female undergraduate students in AMU Cheras, Malaysia. A cross sectional study was conducted from June to July 2014 using self administered questionnaire among 180 students. The 49-item questionnaire included 10 socio-demographic, 16 knowledge of breast cancer and screening methods, 12 attitude, 6 self-efficacy and 5 practice pertaining to breast cancer screening methods. The response rate was 91.67% and the mean age of respondents was 23.5 years old. About 55% of respondents claimed they practice BSE with 35% performing it at correct frequency as recommended by guidelines. Although 82% knew that breast cancer is the leading cause of death among Malaysian women, and were aware of its signs and symptoms, only 52% knew its risk factors. Significant positive correlation were found between practice and other variables, namely, knowledge, $r = 0.29$ ($p < 0.05$), self-efficacy, $r = 0.37$ ($p < 0.01$) and attitude, $r = 0.52$ ($p < 0.01$). Since attitude has a strong correlation with practice, efforts should be taken to educate these students focusing on breast health awareness and positive attitudes.

PEP 04
FAPA2014000054 (Poster)

Student's Perception of Objective Structured Clinical Examination (OSCE) among Taiwan Pharmacy Students

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The use of objective structured clinical examination (OSCE) for formative assessment has great potential to develop clinical competencies for students. An 8-station OSCE was designed and applied to assess the clinical skills for final-year undergraduate pharmacy students, learned during their internship in 2013-2014. The main objective of this study was to evaluate students' consciousness about OSCE. All students were divided into 4 groups. Students were asked to finish a questionnaire immediately when their group completed the examination. The questionnaire contained 5 items, difficulty of the tasks, adequate duration of each station, perceived degree of learning gained and needed, the suitability of the references or literature resources provided, and overall satisfaction of the test. For each item, there were five ordered response levels which were strongly disagree, disagree, neither agree nor disagree, agree and strongly agree. Thirty eight (38) pharmacy undergraduate students who completed the OSCE were included. All

of the students felt satisfied with the test and substantial proportions of students (97%) reported that the references and literature resources provided were suitable. 18(47%) perceived that the duration of station was adequate. Moreover, 28(74%) of the students felt that a higher degree of learning was needed to accomplish the tasks and 3(8%) of the students reported difficulties with the task. In conclusion, the overall student's evaluation of OSCE was very positive and encouraging. However, some students felt the tasks required in some stations required a higher degree of learning than they had achieved. This may indicate deficiencies in the students' learning abilities. Therefore, improvements of the course curriculum and the OSCE station design should be included in future efforts.

PEP 05
FAPA2014000205 (Poster)

Needlestick Injuries among Six-Year Pharm D Students during Pharmaceutical Care Clerkships: A Survey Study

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Needlestrick injuries are burden of healthcare workers. We conducted the study to evaluate the prevalence of needlestick injuries and the activity related to needlestick injuries among Thai pharmacy students in the Doctor of Pharmacy program. The subjects were the 6th year pharmacy students in Faculty of Pharmacy, Silpakorn University, Thailand. Pharmacy students are trained in pharmaceutical care clerkships which are core subjects in the last year of Pharm D programme from February to May 2014. Data from students were gathered by a self-administrating questionnaire. Forty participants with 120 rotations, in the academic year 2014 were included this study. Of the 40 students, 6 cases (15%) experienced the actual events of needlestick injuries and the prevalence of needlestick injuries per rotation was estimated to be 5% (n=120) The clerkships without activity related to needlesticks were 113 rotations and there were 7 rotations associated with needlesticks. Among 7 rotations, 3 activities were classified as activities with high risk of bloodborne disease (2.5%), including a fingerprick capillary blood glucose monitoring (n=2) and insulin injection demonstration (n=1). Among the 40 participants, fourteen students (35%) reported that they had knowledge of needlestick injury obtained from literature or preceptor education before training. In conclusion, this study showed the activities of fingerprick capillary blood glucose monitoring and insulin administration related to needlestick injury. This issues need to be part of the education and training for pharmacy students prior to practice.

PEP 06
FAPA2014000082 (Poster)

The Roles of Clinical Pharmacists: Knowledge and Perceptions of Malaysian Medical Students Receiving Education in Various Countries

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Physicians and clinical pharmacists are the healthcare team. Harmonizing the medical students' knowledge and understanding on the clinical pharmacist's role is necessary. The aim of this study was to measure and determine the knowledge and perception of Malaysian medical students pertaining to the roles of clinical pharmacists and to investigate whether there were significant differences in the knowledge and perception on the roles of clinical pharmacists among Malaysian medical students

studying in Malaysia and other countries abroad; the United Kingdom, Republic of Ireland, Australia, Czech Republic, Egypt, India, Indonesia, Jordan, New Zealand, and Russia. The questionnaire was distributed via online and in person. Close-ended questions and Likert scales were used to quantify the results. Descriptive, Pearson's correlation and One-Way-Anova analysis were used, accordingly. A total of 146 respondents responded. The results revealed that the Malaysian medical students possessed average knowledge regarding the roles of clinical pharmacists. There were no significant differences in the knowledge scores among Malaysian medical students studying or have studied in in Malaysia and other countries abroad. Malaysian medical students had strong awareness towards the roles of clinical pharmacists. There were no significant differences in the perception scores among Malaysian medical students studying or have studied in in Malaysia and other countries abroad. There was a positive correlation between the knowledge and the perception of the Malaysian medical students on the roles of clinical pharmacists. As a conclusion, Malaysian medical students have corresponding positive knowledge and perceptions regarding the roles of clinical pharmacists, regardless of the countries of study and increasing the medical students' knowledge regarding the roles of clinical pharmacist will enhance their awareness pertaining the matter. Further studies are needed to define optimal strategies for improving the medical students' knowledge on the roles of clinical pharmacists.

PEP 07
FAPA2014000081 (Poster)

Knowledge about Sexual Transmitted Disease (STD) Among CUCMS Medical and Pharmacy Students and in Comparison with Public in Putrajaya and Cyberjaya

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Sexual transmitted disease (STD) rank among the most important health issue for the people especially the young adults worldwide. However, there are limited findings and evidence that focus on the knowledge regarding sexual transmitted disease (STD) in Malaysia. A study was conducted in Cyberjaya and Putrajaya, Malaysia to gather the baseline information about student and general public level of knowledge on STD to help establish control and education programmes. A total of 575 respondents were surveyed, with 215 respondents from Cyberjaya University College Medical Science (CUCMS) and another 360 respondents from the general public in Putrajaya and Cyberjaya. A convenient sampling technique was employed. The questionnaire consists of two sections which were demographic data and knowledge regarding STD. Mean age of respondents surveyed was 22.6 years for the students and 23.7 years for the general public. More than 60% of both groups of respondents were female. Results showed that the student respondents had moderate level of knowledge regarding STD (mean = 21.88) and public respondents had low level of knowledge regarding STD (mean = 12.61). There was significant difference ($p = 0.001$) in level of knowledge regarding STD between students and the general public. Furthermore, there was significant difference ($p = 0.027$) between gender of student respondents and level of knowledge regarding STD. The results also showed that there was significant difference ($p = 0.008$) between education level of public respondents and level of knowledge regarding STD. This study showed that level of knowledge regarding STD was influenced by gender and level of education. Future research and interventions in this area are acquired to help the public increase their knowledge and awareness about STD.

PEP 08
FAPA2014000267 (Poster)

The Analysis of the Training Effectiveness of Professional Seminar Performed By Post-Graduated Year Pharmacists

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To improve the communication skills of Post-graduated Year(PGY) pharmacists. In the "Pharmacists two-year training program", we planned training courses of the professional seminar performance capabilities. Every once a year, we assessed the training effectiveness of the course by 3 main items: knowledge, attitudes and skills. From January 2012 to May 2014, the clinical teachers assessed the performance of seminar according to the criteria of "Assessment score sheet". The following were the 3 main items of assessment: (1) the knowledge: scoring items included "Meet the topic", "Easily understood", "The contents is complete" and "The summary"; (2) the attitude: "Body language", "Interactive teaching" and "Speech without notes"; (3) the skills: "Triggered the learning motivation", "Time control" and "The usage of teaching tool". The score of each item is 6-10 points. Statistical analysis was done by the Compare Means method. There were 17 PGY1 and 15 PGY2 pharmacists participated in the assessment. Between the overall score of the items, the score of "Meet the topic" was the highest(9.28±0.17) followed by "Easily understood"(9.18±0.22) and the score of "Interactive teaching" was the lowest(8.85±0.26), there were statistically significant differences among the three items(P=0.00). The average total score of PGY2 was higher than PGY1, the score is 91.75±1.89 and 90.99±1.55 respectively (P=0.22). In the item of "Triggered the learning motivation", the performance of PGY2 is better than PGY1 (9.13±0.21 vs 8.98±0.17; P=0.03). In the other items, there were no statistically significant differences between PGY2 and PGY1. The training effectiveness of the knowledge was the best among 3 main items of assessment. All PGY pharmacists need to practice more in the item of "Interactive teaching". And PGY1 pharmacists need to improve the skill of "Triggered the learning motivation".

PEP 09
FAPA2014000327 (Poster)

Dispensing Separation Policy: Attitudes of Future Physicians and Pharmacists For Inter-Professional Collaboration

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Collaboration between physicians and pharmacists is one of the strategies for improving healthcare delivery. Strong working relationships are believed to improve patient outcomes. There appears to be little to no collaborative working relationship between physicians and pharmacists in the private, as well as public sector, hence it is crucial to develop an understanding of the determinants in developing necessary collaborations. Supposing structural system is hard to overcome, changing negative attitudes among future practitioners might be equally difficult. This study aimed to examine attitudes toward collaboration; inter-professional learning and dispensing separation policy among pharmacy and medical

students. Three sets of questionnaires, demographic characteristics, Scale of Attitudes Toward Physician-Pharmacist Collaboration ($SATP^2C$), Multiprofessional Shared Learning Questionnaire (MSLQ), were convenient sample and self-administered by the final year medical and pharmacy students in Universiti Teknologi MARA, Malaysia. A total of 255 completed questionnaires were returned from 108 medical students and 147 pharmacy students. The factor analysis confirmed the validity of the Scale of Attitudes Towards Physician-Pharmacist Collaboration ($SATP^2C$). The majority of students reported positive attitudes towards shared learning from Multiprofessional Shared Learning Questionnaire (MSLQ) and divergent agreement regarding dispensing separation policy. The findings showed that there were inconsistent attitudes among the two groups of future professionals regarding the policy. Effort on collaboration between physicians and pharmacists may be affected by these differences and thus justify for an interdisciplinary education system to be formulated.

PEP 10
FAPA2014000328 (Poster)

To Validate the Scale of Attitudes Towards Physician-Pharmacist Collaboration ($SATP^2C$) Questionnaire on Medical and Pharmacy Students

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Collaboration between physicians and pharmacists is vital. However, positive attitudes of medical and pharmacy students towards collaboration can be a determinant for its success at practice level. This study aimed to examine and validate the $SATP^2C$ questionnaire among pharmacy and medical students. Students were conveniently sampled. The questionnaire was distributed and self-administered by the final year medical and pharmacy students in Universiti Teknologi MARA, Malaysia. A total of 255 completed questionnaires were returned from 108 medical students and 147 pharmacy students. The validity and reliability assessment of $SATP^2C$ were determined by estimating the Underlying Construct Item-Total Score Correlations and the Reliability Coefficients. Kaiser's measure of sampling adequacy was used prior to factor extraction which resulted in an overall index of 0.91, which confirmed the adequacy of data for factor analysis. Bartlett's test for sphericity showed that the intercorrelation matrix was factorable ($x^2_{(120)} = 1381.7$, $p<0.001$). The mean score for the total sample was 55.2, median of 56, and the standard deviation of 5.5. The Cronbach reliability coefficient alpha for the entire sample was r = 0.88 while the score of 0.84 and 0.89 were obtained for the pharmacy and medical students. The reliability coefficient for factor 1 were r = 0.78, 0.75, 0.77 for the entire sample, pharmacy and medical students, respectively. Results for factor 2 were r = 0.77, 0.71 and 0.77 respectively. As for factor 3, r = 0.74, 0.67 and 0.80 were obtained. These findings showed support of the significant contribution of each item to the total score, and the internal consistency reliability of the instrument. The findings confirmed the validity of the $SATP^2C$ questionnaire as a tool to assess the attitudes of medical and pharmacy students towards collaboration.

PEP 11
FAPA2014000184 (Poster)

The Impact of Facebook on the Academic Performance among Pharmacy Students of International Islamic University Malaysia Kuantan

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Nowadays, Facebook becomes one of the most important communication mediums in our daily life. The existense of Facebook is aimed to maximize the connection between people globally, information sharing, business promotion, academic, leisure chatting and many more. Many research claimed that Facebook has advantages and also disadvantages towards students' academic performance. There are many opinions and views of the researchers regarding the effects of Facebook on the academic performance of the students in the whole world. Some studies stated that Facebook can become a good learning tool in order to improve students' academic performance while some studies stated that Facebook can cause addiction and misleading to the students from the academic pathway and will result in the drop of their academic performance. The objectives of this study were to examine the impact of Facebook on the academic performance among the Pharmacy students of International Islamic University Malaysia (IIUM) Kuantan.

PEP 12
FAPA2014000330 (Poster)

Continuing Education for Young Pharmacists in Taiwan: the Experience from Taiwan Young Pharmacists' Group

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As a bridge between pharmacy students and young pharmacists, the aim of Taiwan Young Pharmacists' Group (TYPG) is to facilitate smooth transition into the practice and to help the young generation of pharmacists in Taiwan develops their career pathway. Additionally, the TYPG is aimed to serve as a platform for Taiwan's young pharmacists to share innovative ideas and network worldwide. Pharmacists' continuing education in Taiwan typically focuses on the development of specific professional knowledge and skills which may only be applicable to certain fields of pharmacy practice (that is, hospital). As recognizing the diversity of pharmacy practice, the TYPG organized a series of career development sections, which emphasized career planning across different ages (for example, 25, 35 and 45 years old) and settings (for example, hospital, community, industry). The sections consisted of various workshops and senior pharmacists were invited to share their experiences in career life. To understand the motivation and outcomes of the participants in the career development sections, a satisfaction questionnaire was delivered which help gain the insights of future needs of young pharmacists. The pharmacist participants revealed higher satisfactory to the career development sections and looked forward to further workshops and experiential sharing.

PEP 13
FAPA2014000155 (Poster)

Integrated Behaviour Model and Pharmacy Students Intention to Provide Smoking Cessation Counselling

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The main objective was to assess smoking cessation counselling competency among pharmacy students in a private institution. The role of prior exposure to tobacco-related topics and relationships between constructs were also explored. A 69-item questionnaire was developed, pilot-tested and administered to 140 pharmacy undergraduates to assess their knowledge, self-efficacy, attitudes, perceptions of ideal pharmacists' role and practice pertaining to smoking cessation counseling. The mean, standard deviation and bivariate correlation for practice and other smoking cessation counselling competency-related constructs were determined. Independent samples t-test was performed to examine differences between students who had previous exposure to tobacco-related topics and the students which did not have any such exposure. The questionnaire was completed by 137 students, yielding about 98% response rate. Students who had prior exposure to tobacco-related topics had significantly higher self-efficacy. Generally, low scores were obtained for practice activities and knowledge. Self-efficacy was positively and significantly correlated with practice and knowledge constructs. Ideal pharmacists' role perception was positively and significantly correlated with practice and positive attitudes while negative attitudes were negatively and significantly correlated with positive attitudes and ideal pharmacists' role perception. There is scope for improvement in terms of tobacco-related and smoking cessation counselling knowledge and continuous emphasis on the importance of tobacco-related and smoking cessation counselling training should be placed throughout the undergraduate training program. Opportunities to develop competency as well as to practice smoking cessation counselling should be provided to students at higher education institutions and other possible settings during community attachment and hospital clerkships.

PHARMACEUTICAL LEGISLATION & ETHICS

PLP 01
FAPA2014000027 (Poster)

ASEAN Harmonisation; Compliance of Cosmetics Regulatory Scheme in Thailand within 5 Years

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The ASEAN Harmonisation was aimed to stabilise politics, and improve economic, social, and cultural aspects of the region. In the healthcare sector, cosmetics was the first to be harmonised and committed to implement the ASEAN Harmonised Cosmetics Regulatory Scheme (AHCRS) in January 2008, with full implementation expected in January 2011. This study was conducted to determine whether Thailand has complied with ASEAN Cosmetic Directive (ACD) after 5 years of implementation in 2012. Thai cosmetics Act B.E. 2535 and ACD were compared in 2008, and in 2012. Content analysis and in-depth interviews were performed. The study revealed that Thailand has highly complied with ACD in all regulated areas; (i) definition and scope of cosmetics products (ii) ingredients' listing (iii) labelling (iv) product claims and (v) good manufacturing practice. To officially implement ACD, the Thai regulator has to transpose the directive into local law. During the legal process, one might notice discrepancy between these two laws. Although the country regulator intended to fully harmonize, some minor issues such as the ingredients' listing and labelling, these cannot be implemented all at once. In summary, it can be concluded that the main objectives of AHCRS have been achieved. Harmonization in Thailand happened in an ASEAN way.

PLP 02
FAPA2014000090 (Poster)

Reducing Medication Supplementing Errors by a Quality Improvement Program

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Dispensing errors can directly harm patient safety, and it can be occurred due to the medication supplementing process at the beginning of dispensing. Supplementing errors may cause the different levels of injury to patients. Notably, this type of error is usually hard to detect and track. In this study, the occurrence rate of medication supplementing error was defined by the quality control circle (QCC) team from September to October of 2013 at a regional teaching hospital in southern Taiwan. Seven basic quality tools and the four steps of the Deming cycle (plan-do-check-act, PDCA) were used by the QCC team to analyze and solve problems systematically. Data was collected retrospectively and interventions were conducted based on the identified reasons from the occurred errors. A total 24 week period of data was further collected. Four major interventions were applied including improving the format of storage label posted on automated drug dispensing machines, improving the medication storage space, establishing the standard steps of triple check during supplementing, and improving the attitudes and behavior of pharmacist operating the medication supplementing. After 24 weeks of interventions, the incidence rate of the medication supplementing error was significantly decreased from 8.1 ppm to 0.0 ppm. In conclusion, reducing medication supplementing errors by a quality improvement program such as QCC activities can provide a safer medication use to patients.

PLP 03
FAPA2014000263 (Poster)

Public Accessibility and Preference Towards Media Channels in Delivering Drug-Related Information: Comparison of Urban and Rural Pupulation in Sarawak

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Media channels are tools for the transfer of information and concepts to audiences especially sophisticated societies in delivering health information. However, health promotion through media channels can be counterproductive and not cost-effective if they are not suitable with the niche of the audience. This cross sectional study determined the public accessibility and preferences toward types of media channel in delivering drug related information in urban and rural areas of Sarawak. A self-administered questionnaire was developed through panel of experts to explore public accessibility towards media channels, trend of media utility, preference toward media channels in delivering drug related information and the perceived most credible media channel in delivering drug related information. A total of 228 respondents with proportionate cluster sampling from urban area and 212 respondents from rural area were recruited. The ranking of most accessible media channels in urban area are television (87.3 %), internet (75.4%) and followed by newspaper (68.9%) while in rural area there are television (90.1%), radio (73.6%) and followed by newspapers (68.4%).Study also revealed that urban respondents mostly obtain drug related information from the internet (69.7%) while rural respondents mostly obtain it from the television (73.6%). Meanwhile, both urban and rural respondents perceived that television has the highest credibility in delivering drug related information. In conclusion, this study reveals social media of choice for people in Sarawak. These data is important for relevant agencies in the planning interventions in disseminating drug related information to the people in Sarawak.

EMERGENCY MEDICINE AND OTHERS

EMP 01
FAPA2014000172 (Poster)

The Haiyan Super Typhoon in Philippines: Malaysian Military Pharmacist Experience

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Disaster is a challenging scenario for healthcare workers. In late 2013, the strongest typhoon hit the Philippines and claimed more than 6,300 lives. Malaysian National Security Council established and deployed a disaster relief team to provide medical aid to the survivors. Pharmacist(s) was/were involved in this mission from day 5 to day 18 of the disaster in Tacloban district. The objectives were to document common diseases after typhoon, to list essential medications and to share experience during the mission. The top 3 clinical diseases were upper and lower respiratory infections (55%), infected wounds and lacerations (14%) and acute gastroenteritis (10%). Top 2 age groups treated were 18-65 years old (55%) and 1-12 years old (33%). The top three fast-moving medicines were diphenhydramine expectorant, oral rehydration salt and cloxacillin capsule. Typhoon took away all medicines especially from survivors with chronic diseases and majority cannot remember their medicines. Therefore, learning common local words made dispensing and counselling easier, especially to elderly survivors. Extreme tropical weather contributed to not only high respiratory illnesses but created logistics issues, especially during outreach program. Thus, waterproof tents, containers and pallets usage were vital to minimize damage from heavy rain during storing and transporting of medicines. Communicable diseases such as leptospirosis and dengue amplified 2 weeks after disaster. Survivors had to live in area without clean water supply and poor sanitation. Pharmacist involved in supplying clean and safe drinking water by using Malaysian invention of Field Water Purification System known as JERNIH. In conclusion, for water-based disaster, an increase in patients presenting with infected wounds and lacerations should be expected. Pharmacist can strategize to prepare sufficient pharmacological support. As pharmacists, our responsibility can go beyond providing safe and effective medicine during this kind of mission. Networking with other pharmacists, local health authorities and other volunteers helped in coordinating and sustaining medical logistics.