(95%CI: -0.11, 0.11). T2DM patients with complications had systematically higher TTO values than those without complications, with the difference being -0.10 (95%CI: -0.23, 0.03). **CONCLUSIONS:** It appears that diabetes and its complications affect patients' valuation of health states. As a result, the EQ-5D-3L health-state values based on the general population may underestimate the utility of health interventions for T2DM.

PDB37

PATIENT-REPORTED MEDICAL EXPENDITURES FOR INSULIN-TREATED DIABETES PATIENTS IN EASTERN, CENTRAL AND WESTERN REGIONS OF CHINA

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OBJECTIVES: The study aimed to investigate the utilization and expenditures of medical resources, including outpatient visits, hospitalizations, and productivity loss for insulin-treated diabetes patients. **METHODS:** A survey based on self-designed questionnaire was conducted in 7 third-grade class-A hospitals among eastern, central and western regions of China from July to September of 2012, with inclusion criteria of type 1 and type 2 diabetes patients treated with insulin. Diabetes duration and glycemic control for included patients, frequency and expenditures of outpatient visit and hospitalization, and time spending of outpatient visit were collected. Descriptive analysis of the data was performed by SPSS 19.0. **RESULTS:** 602 eligible respondents (95.0% type 2 diabetes, 48.2% male) were included, with mean age of 62.15±13.06 years, mean diabetes duration of 10.62±8.23 years, mean fasting plasma glucose of 8.05±2.89 mmol/L; mean haemoglobin A1c of 7.24±2.10%. Average frequency of outpatient visit was 14.37 times per year, and average cost per outpatient visit was 696.70 CNY. 36.3% of patients were hospitalized because of diabetes and its complications in the previous year, with the frequency of 1.36 times per year and average cost of 11461.51 CNY, resulted in annual hospitalization cost of 15587.65 CNY per inpatient. Total annual medical expenditure was estimated to be 11985.33 CNY per patient, including 10011.58 CNY for outpatient visits and 1973.75 CNY for hospitalizations. In addition, an average of 5.05 hours, including the traffic time, was spent for outpatient visit, and 3.37 more hours were needed for rural patients as compared to urban patients (8.11 hours vs 4.74 hours). **CONCLUSIONS:** In China, Diabetes consumed a great deal of medical resources and imposed a heavy burden on patients treated with insulin, especially when hospitalization needed. More attentions should be paid on diabetes prevention and management to reduce medical resource utilization and burden of diabetes.

PDB38

ASSESSMENT OF DISEASE STATE KNOWLEDGE IN DIABETIC PATIENTS OF QUETTA CITY, PAKISTAN

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OBJECTIVES: The present study aimed to assess disease knowledge of the diabetic patients in Quetta city, Pakistan. **METHODS:** A questionnaire based, cross-sectional observational study was carried out. All residence of the area (age 18 and above) were targeted. The study was conducted from July to October 2013. The questionnaire comprised of two parts. The first part was consist of demographic characteristics. The second part were consist of 15 question related to diabetes basic knowledge. Descriptive statistics were applied to summarize the data. **RESULTS:** A total of 457 registered diabetes patients were approached, and 408 patients were agreed and participated in the study. Majority of the patients (n=285, 69.9%) belonged to age group 41-60 years with almost equal in gender distribution. One hundred and sixty nine (41.4%) had primary level education and majority (n=225, 55.1%) had family history of diabetes. Majority of the respondents had knowledge about disease (98.5%) and its nature (68.4%). Only 280 patients knew about symptoms. 217 (49.3%) patients said obesity can cause diabetes, 49.3% said consumption of sweets and high calories food, 44.8% said alcohol or smoking are major reasons of having diabetes. Seventy percent of the respondents considered it as heredity in nature. Three hundred and twenty five (67.8%) considered mental stress and high blood pressure being risk factor. Majority (69.1%) considered it as treatable disease, while 64% said it require lifelong treatment. Although majority (n=344, 71.7%) of the respondents considered glucose monitoring is necessary, yet only few said regular walk or exercise are important for diabetes control. Only 38.4% considered the uncontrolled diabetes can cause complications and 34.2% believed that uncontrolled diabetes can cause death. **CONCLUSIONS:** The study concluded that although the general populations have knowledge about the diabetes but they lack vital information regarding its treatment, management and severity of the disease.

PDB39

ASSESSMENT OF KNOWLEDGE REGARDING DIABETES: A COMPARATIVE ANALYSIS OF DIABETES PATIENTS AND HEALTHY POPULATION OF QUETTA CITY, PAKISTAN

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OBJECTIVES: The present study was design to compare the knowledge regarding diabetes between the diabetic patients and healthy population in Quetta city, Pakistan. **METHODS:** A questionnaire based, cross-sectional observational study was carried out. All the registered diabetes patients (DP) of Bolan Medical Complex hospital and Sandman Provisional hospital were targeted and for healthy individual (HP), all residence of the area (age 18 and above) were targeted. The study was conducted from July to October 2013. The questionnaire comprised of two parts. The first part was consist of demographic characteristics. The second part were consist of 15 question related to diabetes basic knowledge. Descriptive statistics were applied to summarize the data. Mann-Whitney test was used to compare the study groups. **RESULTS:** Out of 1248 participants 623 (408:DP, 215:HI) were males with mean age of 36.9±9.9 (38.6±9.5:HP, 32.7±9.4) years, majority 462 (352:DP, 110:HI) had primary level of education, 551 (358:HP, 193:HI) were employed. Six hundred and fifty six (431:DP, 225:HI) having family history of diabetes. The mean diabetes knowledge score was 8.2±2.1, (8.5±2.7:DP, and 8.1±2.6:HI). There is no significance different was found between the diabetes knowledge score of both the groups (i.e. diabetes patients and healthy individuals), $p < 0.05$. **CONCLUSIONS:** Results of the present study show that there is no significance difference between the two groups i.e. diabetes patients and healthy individuals regarding the knowledge regarding diabetes. It is important to educate both patients and healthy individuals for management and prevention of the disease.

PDB40

ASSESSMENT OF DIABETES KNOWLEDGE IN HEALTHY POPULATION OF QUETTA CITY, PAKISTAN

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OBJECTIVES: The present study was conducted to evaluate the knowledge regarding diabetic in healthy population of Quetta city, Pakistan. **METHODS:** A questionnaire based, cross-sectional observational study was carried out. All residence of the area were targeted from July to October 2013. The questionnaire comprised of two parts. The first part was consist of demographic characteristics. The second part were consist of 15 question related to diabetes basic knowledge. Descriptive statistics were applied to summarize the data. **RESULTS:** A total of 1000 general people were approached and 840 respondents were agreed and participated in the study. Majority of the respondents (72.0%) belonged to age group 18-40 years with almost equal in gender distribution. Majority (51.3%) had family history of diabetes. Majority (96.7%) had knowledge about disease and its nature (64.0%), and knew about symptoms (62.5%). Fifty four percent said obesity and (46.7%) said alcohol or smoking are major causes for diabetes. Seventy eight percent considered diabetes is as heredity.. Fifty percent of participants considered mental stress and high blood pressure being risk factors for diabetes. Fifty Eight percent considered it as treatable disease, while 45.6% said it require lifelong treatment. Sixty eight percent said regular walk or exercise are important for diabetes control, 83.3% believed that diet control is important in diabetes prevention, majority (76.7%) considered the uncontrolled diabetes can cause complications and (43.3%) believed that uncontrolled diabetes can cause death. Although majority (56.9%) of the respondents considered glucose monitoring is necessary, yet only few said regular walk or exercise are important for diabetes control. Only 17.1%) considered the uncontrolled diabetes can cause complications and 31.4% believed that uncontrolled diabetes can cause death. **CONCLUSIONS:** The study concluded that although the general populations have knowledge about the diabetes but they lack vital information regarding its treatment, management and severity of the disease.

DIABETES/ENDOCRINE DISORDERS – Health Care Use & Policy Studies

PDB41

THE EXPANDING ROLE OF THE PATIENT VOICE IN MEDICAL DECISION MAKING IN ASIA

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OBJECTIVES: Self-reported indices of health care related attitudes and behaviors, health status, and work productivity are compared between Chinese and Japanese diabetics to illustrate the various kinds of information that can only come from the patient that is pertinent to the medical decision making process. **METHODS:** Data were obtained from the 2012 Japan (N=30,000) National Health and Wellness Survey (NHWS) and 2013 China (N=19,987) NHWS, administered on-line to representative adult samples (18+ years). Generalized linear models and Tukey's HSD procedure were used to estimate differences between respondents without diabetes (Japan n=25,338; China n = 16,816), respondents with Type 2 diabetes without complications (Japan n=929; China n=408), and respondents with Type 2 diabetes with complications (Japan n = 125; China n = 184). Respondent age, sex, and BMI served as covariates in all models. The SF-36 and the WPAI were used to measure health status and utilities and work productivity respectively. **RESULTS:** The relationship between the patient reported outcomes of mental and physical health status, level of depression, health utilities, work productivity, activity impairment, days missed from work and level of diabetic condition was consistent. Diabetic complications were associated with greater levels of health/activity/work impairment and lower health utilities ($p < .0001$ for all comparisons). Chinese respondents reported greater levels of impairment and lower health utilities relative to Japanese respondents ($p < .0001$ for all comparisons). **CONCLUSIONS:** The patient voice varies across countries, cultures, and conditions. Treating the whole patient versus treating only the presenting disease requires a shift in how health care is delivered and medical decisions are made. Patients can provide reliable and valid information regarding their health and wellness status through the use of validated methods and tools. Amplifying the patient voice and integrating it with clinical expertise may be the best way maximize the positive outcomes for the patient.

PDB42

THE IMPACT OF DRUG PRICE CONTROL POLICY FOR DIABETES MEDICATION: A LONGITUDINAL ANALYSIS IN TAIWAN

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OBJECTIVES: Medication costs accounted for 25% of total medical expenses in Taiwan. Reduction in price of drug is the major policy to control the medication costs. Diabetes drugs is a major factor contributing to high and rapidly growing prescription medication costs. This study was to examine the determinants for diabetes drug expenditures inflation in Taiwan's National Health Insurance (NHI). **METHODS:** This retrospective and longitudinal used NHI claim data to quantify the different

factors driving to increases in diabetes medication costs from 2000 to 2010. Changes in diabetes drug spending are decomposed to eight components: (1) the growth of user population; (2) the growth of number of prescription per user; (3) the growth of number of drug item of per prescription of established drugs; (4) the growth of number of drug item of per prescription of new entrant drugs; (5) the growth of Defined Daily Dose (DDD) of established drugs of average drug item per prescription; (6) the growth of DDD of new entrant drugs of average drug item per prescription; (7) change of average price of established drugs per prescription ; (8) change of average price of new entrant drugs per prescription; (9) change in therapeutic and strength mix. **RESULTS:** Changes in user population, number of drug item of per prescription, and therapeutic and strength mix caused diabetes spending to increase. The drug price and DDD caused diabetes spending to decrease. Over half of drug spending growth was accounted for user population. The rest of spending growth was from the change in drug treatment intensity. The results also reveal the care pattern change to more drug item with low-dose therapy. **CONCLUSIONS:** The results suggest that use drug pricing policy to lower drug spending is limited. The policy makers should consider put more effort to manage treatment intensity in diabetes medication.

PDB43

PHYSICIANS AS DOUBLE AGENTS IN A UNIVERSAL HEALTH CARE SYSTEM: EVIDENCE FROM GENERIC PHARMACEUTICAL ADOPTION IN TAIWAN

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OBJECTIVES: Physicians' generic pharmaceutical adoption are responsible for patients, insurance payers, and their own interests. This study examines this double agency problem for physicians by using Taiwanese data, because physicians can both prescribe and dispense drugs in Taiwan. The universal health care system in Taiwan also causes the problem to be a public concern. **METHODS:** This study begins with a theoretical model of physicians' prescription behavior that includes both the patients' and physicians' utilities, and government's share of patients' medical expenditure. To empirically estimate this model by using the Taiwanese data, a panel framework is structured by adopting *visit-physician-drug* as a unit of observation. Empirical results were obtained after controlling the physicians', patients', and hospitals' characteristics; and time-, location-, and drug-fixed effects. The physicians' unobserved, time-invariant heterogeneity was also controlled by applying Chamberlain's correlated random effects probit model. **RESULTS:** The empirical results show that a larger price difference between brand-name and generic drugs increases physicians' likelihood for prescribing generic prescriptions. However, for physicians in hospitals, this effect decreases as the payer's cost share percentage increases. These results indicate that physicians' prescriptions decision internalize patients' utility but not the payer's cost. This study also demonstrates that physicians who are more responsive to profits prescribed more generic drugs, including owners of hospitals and clinics, and physicians in clinics and private institutions. However, this effect decreases as the number of competitors in the drug market increases. **CONCLUSIONS:** The reported findings suggest that physicians' double agent role in a universal health care system is responsible for part of the pharmaceutical expenditure in Taiwan, where brand-name drugs were probably prescribed more than necessary. Taiwanese government is advised to encourage generic prescriptions by providing incentives for physicians, increasing the patients' share of their medication cost, and increasing patients' and physicians' access to the information on generic drugs.

PDB44

LOYALTY TO A PHARMACY IS ASSOCIATED WITH A BETTER QUALITY OF ANTIDIABETES DRUG USE

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OBJECTIVES: Among individuals newly treated with oral antidiabetes drugs (AD), to assess the effect of pharmacy loyalty on compliance with AD and on the use of guidelines-recommended medications: 1) ACE inhibitor (ACEi) or angiotensin receptor blocker (ARB); 2) lipid-lowering drug. **METHODS:** Using Quebec administrative databases we carried out a cohort study of individuals aged ≥18 years who had started an OAD between 2000 and 2006 and for whom we had at least 3 years of follow-up after OAD initiation. Individuals who had filled all their prescriptions in the same pharmacy during the 2nd year after OAD initiation were considered loyal. Compliance with OAD (Medication Possession Ratio ≥ 80%) and use of an ACEi/ARB and of a lipid-lowering drug were measured in the 3rd year. Outcomes were assessed using multivariate logistic regressions. **RESULTS:** Among 97,927 eligible individuals, 64% were loyal to their pharmacy, 64% were compliant with their AD, 64% used an ACEI/ARB and 60% used a lipid-lowering drug. Loyal individuals were more likely to be compliant with their AD (Odds ratio: 1.26; 95% CI: 1.22-1.30), to use an ACEI/ARB (1.17; 1.14-1.21) and to use a lipid-lowering drug (1.15; 1.12-1.18). **CONCLUSIONS:** Pharmacy loyalty is associated with a better quality of AD use. It is likely due to the fact that pharmacists can better play their role in optimizing their clients' drug use for patients loyal to their pharmacy as they can then rely on recorded drug use information that is comprehensive.

PDB45

CONTENT ANALYSIS AND EFFECTIVENESS OF INTERVENTIONS TO ENHANCE ORAL ANTIDIABETIC DRUG (OAD) ADHERENCE IN ADULTS WITH TYPE 2 DIABETES: A SYSTEMATIC REVIEW AND META-ANALYSIS

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OBJECTIVES: OAD adherence interventions are available but their pooled effectiveness has not yet been estimated. Also, in order to develop effective interventions, it is important to explore the behavior change techniques (BCTs) employed and their contribution to pooled effectiveness. This paper aimed to estimate the pooled effectiveness of OAD adherence-enhancing interventions and identify BCTs applied that had a modifying effect on the pooled estimate of effectiveness. **METHODS:** We performed a systematic review and meta-analysis of RCTs conducted to evaluate the effectiveness of adherence-enhancing interventions targeting adults receiving OADs. Articles were searched using PubMed, Embase, Psych-Info, the Cochrane Library, CINAHL PLUS, Current Contents Connect and Web of science, and included articles references and relevant review articles. Two authors independently selected eligible articles and coded study details including BCTs applied in intervention and control groups. Each intervention's effectiveness (effect size) was estimated using Hedges's g. Pooled effectiveness and its heterogeneity (Higgins I^2) were estimated using a random effect model. For BCTs applied in intervention but not in control groups, we assessed their modifying effect on the pooled effectiveness by comparing interventions in which a specific BCT was applied with those in which it was not. **RESULTS:** A total of 10 studies were included. Globally, the pooled effectiveness (g) was 0.21 (95%CI=-0.05–0.47; I^2=82%). Out of eight BCTs analysed, *cope with side-effects* (P=0.003) and *general intention formation* (P=0.006) had a modifying effect on the pooled effectiveness. The pooled effectiveness of interventions, in which *cope with side-effects* was applied, was moderate (g=0.64; 95%CI=0.31–0.96; I^2=56%). **CONCLUSIONS:** Globally, effectiveness of interventions offered in intervention groups was almost equivalent to that of those offered in control groups. However, interventions that include helping people to cope with side-effects, when this was not done for control patients, are particularly effective in improving adherence to OAD.

PDB46

DECOMPOSING GROWTH OF DIABETES DRUG EXPENDITURE IN KOREA

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OBJECTIVES: Pharmaceutical expenditure is determined by both price and volume. Volume control is important despite that public policies to control drug expenditure in Korea have focused on price control. In this study, we decomposed growth of diabetes drug expenditure in Korea. **METHODS:** The study used National Health Insurance Service (NHIS) claims data on diabetes drugs for 10 years between January 1, 2003 and December 31, 2012. We included new or incrementally modified diabetes drugs for which listing prices were negotiated between firms and NHIS and their generic counterparts. Drug expenditure was decomposed into price and volume. Volume is further decomposed into the proportion of monthly volume for each drug in its therapeutic class (composition mix), the proportion of sum of quantity used in new and existing drugs (therapeutic mix) for a given therapeutic group, and the total volume used for new and existing drugs (total volume). We generated Fisher's Ideal Index to calculate contribution of each component of total drug expenditure to its growth. **RESULTS:** The price of diabetes drugs as a whole decreased total drug expenditure since 2006, whereas growth of volume explained most of the growth of total pharmaceutical expenditure during 2006 and 2010. Particularly between 2011 and 2012 when price decreased 12% due to nationally implemented price cut for almost all listed drugs, the volume still increased 5%. Further decomposition of volume showed that the change in the proportion of volume of new diabetes drugs in total volume minimally contributed to growth in total diabetes drug expenditure. **CONCLUSIONS:** Our results showed that growth in quantity (volume) index explained most of the growth in total pharmaceutical expenditure for diabetes drugs, whereas price index overall decreased for the same time period. These results imply that volume control is more critical for policy measured related to drug expenditure control.

PDB47

ESTIMATED ECONOMIC BURDEN OF INSULIN INJECTION-RELATED LIPOHYPERTROPHY IN CHINESE PATIENTS WITH DIABETES

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OBJECTIVES: Lipohypertrophy (LH) is a relatively common complication of injecting insulin. It is reported to impair insulin absorption, and may increase total daily dose (TDD) of insulin and associated costs. The economic burden of LH is unknown in China. This study aims to evaluate the effects of LH on TDD of insulin and explore potential health economic implications for China. **METHODS:** The following data were extracted from literature review and the IMS Health Report (Diabetes China 2013): (i) insulin-injecting diabetes population in China[1], (ii) prevalence of LH among insulin-injecting Chinese patients[2], (iii) TDD of insulin among patients with LH (estimated from a recent Spanish study[3]), (iv) average unit cost of insulin in China[1]. Cost of excess insulin use was calculated per annum. All monetary values were converted to 2013 RMB, with a RMB-USD exchange rate of 6.14:1. **RESULTS:** There are approximately 8.4 million insulin injectors in China, mostly type 2 diabetes (T2D)[1]. The prevalence of LH in China was previously reported to be 31%[2]. In the Spanish study, patients with T2D and LH used 21 IU/day more insulin[3]; we estimated 15 IU/day excess usage vs non-LH injectors in China. The average insulin price in China is 0.215 RMB per IU[1]. The estimated cost of excess insulin use due to LH is approximately 3,065,233,500 RMB ($498,991,500 USD) per year. **CONCLUSIONS:** LH may represent a significant, addressable, economic burden in China due to excess insulin consumption. Taking steps to reduce LH may reduce health care costs in China. Additional studies should be conducted on LH prevalence, glycemic control (HbA1c, hyper- and hypoglycemia) and health resource utilization patterns specifically among the Chinese insulin-injecting population to validate and extend these findings.

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