THE LEVEL OF SELF-EFFICACY

IN OBESITY COUNSELLING AND

ITS ASSOCIATED FACTORS

AMONG PRIMARY CARE DOCTORS

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May Allah rewards all of you with the best of reward, guide and bless all of us in this life and in the hereafter.

Thank you.

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BMI	Body mass index
CPG	Clinical Practice Guideline
CI	Confidence interval
GP	General practitioner
FDC	Family Doctor Concept
HDL	High Density Lipoprotein
NHANES	National Health and Nutrition Examination Survey
NCD	Non-communicable disease
NHMS	National Health and Morbidity Survey
PCD	Primary care doctor
PCP	Primary care physician
SD	Standard deviation
TG	Triglycerides
WHO	World Health Organisation

Abstract (English)

THE LEVEL OF SELF-EFFICACY IN OBESITY COUNSELLING

AMONG PRIMARY CARE DOCTORS AND ITS ASSOCIATED FACTORS

Introduction: Since its recognition as a disease entity in 1948, obesity is now escalating to a global population pandemic. The latest National Health and Morbidity Survey showed an increasing prevalence of overweight, obesity and abdominal girth since 2006. Without effective interventions, it was estimated that at least half of the world's adult population will be either overweight or obese by 2030. Primary care doctors are at the forefront of the healthcare system, acting as both patient closest contact personnel and resources manager to organize preventive measures, to control the disease and to manage its comorbidities. However, in clinical practice, available literature highlighted that physicians often perceived themselves to be less confident and less effective in their counselling towards obesity.

Objective: The aim of this research was to investigate the level of self efficacy in obesity among primary care doctors and its associated factors.

Methodology: This was a cross sectional survey over 151 primary care doctors working in government health clinics in the East Coast of Peninsular Malaysia. Respondents were selected by simple random sampling. An invitation letter was sent to each respondent together with informed consent document. Respondents filled up an online self-administered questionnaire from 1st December 2016 until 15th January 2017. The data was analysed with descriptive analysis to determine the level of self-efficacy. Multiple linear regression was applied to determine relevant factors associated with the level of self-efficacy in obesity counselling.

Results: The response rate of this study was 82.1%. The mean score for self-efficacy in obesity counselling was 66.9% (SD 10.67, 95% CI 65.1, 68.9, p<0.001). From the multivariable analysis, factors found to be associated with the level of self-efficacy include involvement in NCD team (95% CI 0.38, 9.27; p<0.05), formal training on physical activity (95% CI 0.57, 8.48; p<0.05) and knowledge on CPG recommendations (95% CI 0.36, 2.50; p<0.05).

Conclusion: This research found that the level of self-efficacy in obesity counselling among primary care doctors was modest. To address this, a structured training program for primary care doctors that emphasize on multidisciplinary and multicomponent obesity care, empowerment of healthy lifestyle intervention and enhancement of knowledge seem to be associated with confidence and perceived effectiveness of obesity counselling.

TAHAP EFIKASI KENDIRI DALAM KAUNSELING OBESITI OLEH PENGAMAL PERUBATAN PRIMER DAN FAKTOR BERKAITAN DENGANNYA

Pengenalan: Sejak diiktiraf sebagai penyakit pada tahun 1948, kini obesiti menular ke seluruh populasi global. Kajian Kesihatan dan Morbiditi Kebangsaan yang terkini menunjukkan peningkatan kadar berat badan berlebihan, obesiti dan ukur lilit yang berterusan sejak 2006. Tanpa tindakan yang berkesan, adalah dijangkakan sekurang-kurangnya separuh daripada populasi penduduk dunia bakal mempunyai berat badan berlebihan atau mengalami obesiti menjelang 2030. Pengamal perubatan primer adalah barisan terkehadapan sistem penjagaan kesihatan negara, berperanan sebagai personel paling dekat dengan pesakit dan pengurus asset yang menyusunatur langkah pencegahan untuk mengawal penyakit dan morbidity berkaitan dengannya. Walaubagaimanapun, dari segi perkhidmatan klinikal, kajian menunjukkan pengamal perubatan sentiasa merasakan diri mereka kurang yakin dan kurang efektif untuk kaunseling pesakit berkenaan obesiti.

Objektif: Tujuan kajian ini adalah untuk menyiasat tahap efikasi kendiri dalam kaunseling obesiti oleh pengamal perubatan primer dan faktor berkaitan dengannya.

Kaedah: Kajian ini adalah tinjauan hirisan lintang melibatkan 151 pengamal perubatan primer yang bekerja di Klinik Kesihatan di Kelantan, Terengganu dan Pahang. Responden dipilih secara pensampelan rawak mudah. Satu surat jemputan dihantar kepada setiap responden berserta dokumen keizinan. Responden mengisi borang tinjauan secara maya dari 1 Disember 2016 sehingga 15 Januari 2017. Data dianalisa untuk

menentukan tahap efikasi kendiri dan faktor berkaitan tahap efikasi kendiri dalam kaunseling obesiti dianalisa menggunakan analisis regresi linear berganda.

Keputusan: Kadar respon kajian ini adalah 82.1%. Purata skor untuk efikasi kendiri dalam kaunseling obesiti oleh pengamal perubatan primer adalah 66.9% (SD 10.67, 95% CI 65.1, 68.9, $p<0.001$). Daripada analisa berbilang faktor, penglibatan dalam pasukan penyakit tidak berjangkit (95% CI 0.38, 9.27; $p<0.05$), latihan formal mengenai aktiviti fizikal (95% CI 0.57, 8.48; $p<0.05$) dan pengetahuan berdasarkan panduan Panduan Amalan Klinikal (95% CI 0.36, 2.50; $p<0.05$) adalah berkait dengan tahap efikasi kendiri dalam kaunseling obesiti.

Kesimpulan: Berbanding kajian terdahulu, kajian ini mendapati tahap efikasi kendiri dalam kaunseling obesiti dalam kalangan pengamal perubatan primer adalah sederhana. Untuk itu, struktur program latihan untuk pengamal perubatan primer yang menekankan komponen-komponen utama dalam rawatan obesiti, pemerkasaan gaya hidup yang sihat dan pemantapan ilmu pengetahuan adalah berkait dengan tahap efikasi kendiri yang lebih baik.

Chapter 1: Introduction

It was in 1948 when the World Health Organization officially recognised obesity as a disease (James, 2008). Today, obesity is recognised as a global pandemic. The prevalence of overweight and obesity has increased by almost three-fold for the past three decades (Ng *et al.*, 2014). Worldwide, the WHO factsheet reported that 39% of adults aged 18 years and above were overweight and 13% were obese (World Health Organization, 2016). Malaysia's latest National Health Morbidity Survey (NHMS) in 2015 established that, in adult, the prevalence of overweight was 33.4% and the prevalence of obesity was 30.6%, demonstrating persistent increase since 2006 (Institute for Public Health, 2015).

In many diseases, the responsibility of health management falls mostly on the ability of the healthcare provider to empower changes in patients lives. With significant burden on the person and the society, primary care doctors who are at the forefront of healthcare system will be the best people to deliver the essence of obesity care. They act as both patient closest contact personnel and resources manager to organize preventive measures and to control the disease and its comorbidities.

Self-efficacy refers to the belief in one's ability to organize and execute the course of action required to produce given attainments (Katz *et al.*, 2005). It is an important contributor towards performance accomplishments. Elsewhere, previous studies have found that the level of self-efficacy among physicians in obesity counselling are generally low to average (Ashman *et al.*, 2016). Hence, this is the first cross sectional survey in Malaysia that investigate primary care doctors' self-efficacies in obesity counselling and its associated factors. Hopefully, it will contribute towards evidence-based interventions in addressing the complexity of obesity management.

1.1 Problem statement & Study rationale

Obesity is a major global health challenge (Ng et al., 2014). In 2010, a systemic analysis of studies on Global Burden of Disease showed that obesity and overweight were estimated to have resulted in 3.4 million deaths, 4% of year live lost and 4% of disability-adjusted life-years (Lim *et al.*, 2012). In the United States, the medical cost associated with obesity accounted for more than 20% of total annual healthcare spending (Spieker and Pyzocha, 2016). For Malaysia, the Asian Development Bank Institute estimated that 13.3% of total expenditure on health was due to overweight and obesity (Helble and Francisco, 2017).

With status quo, it was estimated that by 2030, 38% of the world's adult population will be overweight and another 20% will be obese (Smith and Smith, 2016). In Malaysia, the prevalence of overweight and obesity was higher than the world average and highest among the South East Asian nations (Ng et al., 2014). The National Health Morbidity Survey (NHMS), which was conducted every 5 years since 2006, has reported continuous increment in the prevalence of overweight, obesity and abdominal obesity of epidemic proportions (Chan *et al.*, 2017).

However, despite well-established health risks and solid evidence on its increasing prevalence across different age strata and geographical boundaries, no single nation has stood up with an effective intervention to curb obesity in the last three decades (Lagerros and Rössner, 2013). The National Strategic Planning for Non-Communicable Disease (2010-2014) has put a great emphasis on capacity building (Non-Communicable Disease Section, 2010). It was designated to continually improve the skills, knowledge and attitude of health care personnel in dealing with the challenges of chronic disease management. Consequently, the Eleventh Malaysian Plan 2016-2020 has outlined

improving healthcare delivery system as one of the key strategies to advance nation wellbeing. This includes best practice approach to improve patient satisfaction and optimization of healthcare resources utilization.

Since the introduction of Clinical Practice Guideline on Management of Obesity in 2004, further information and evidence on the clinical practice are required to adequately formulate healthcare reform policies and approaches. There is a growing body of literature that emphasize primary health care as the focal point for prevention and management of obesity. A literature review and meta-analysis of survey data has shown that primary care physicians' advice on weight lose seem to confer a significant impact on patients' weight related behaviour (Rose *et al.*, 2013). Yet, there was also amounting evidences that indicates suboptimal engagement by healthcare professional in addressing obesity (Kahan, 2018). A cross sectional evaluation of the US National Health and Nutrition Examination Survey (NHANES) involving 31,039 non-pregnant adults revealed that the provision of overweight management by primary care physicians had been significantly decreasing from 1994 until 2008 ($P<0.05$) (Yates *et al.*, 2012).

More worrying trend is the ambivalence and prejudice towards patients with obesity by the healthcare system itself. Evidence from an experimental trial indicates that physicians tends to view patients with obesity negatively (i.e. less self-discipline, more annoying) and spent less time during the consultation, despite ordering more laboratory investigations (Hebl and Xu, 2001). In a study of over 600 primary care physicians, more than half viewed patients with obesity as awkward, unattractive, ugly and non-compliant (Puhl and Heuer, 2009). These poor experiences and unmet expectations by the patients may result in a vicious cycle due to elements of distress, avoidance, mistrust and non-adherence to treatment strategy (Phelan *et al.*, 2015). Furthermore, despite the best

intention to provide the highest quality of care, most physicians had to endure lack of confidence and lack of effective interventions which lead to hopelessness in providing obesity management.

Self-efficacy is an accurate predictor of individual current motivation and future performance (Bandura, 1977; Lunenburg, 2011). It is a determinant of affect, cognitive, motivation and behaviour in executing specific task or procedure (Bandura, 1994). Higher level of self-efficacy was shown to enhance accomplishment and ensure endurance in obesity counselling (Thompson *et al.*, 1993).

Nevertheless, research have shown that the level of self-efficacy in obesity counselling among doctors was persistently low to average (Ashman *et al.*, 2016). This study offered an important insight on the level of self efficacy of Malaysian primary care doctors and its associated factors. It was hoped that the outcome of this research will assist in formulation of specific interventions and strategies for human resources training and development of high-quality care for obesity.

Chapter 2: Literature review

2.1 The epidemiology of obesity in Malaysia

Among adult, recently published report from the National Health Morbidity Survey (NHMS) 2015 showed that the national prevalence of overweight (BMI 23.00 - 27.49 kg/m^2) was 33.4% (95% CI: 32.5, 34.4), the national prevalence for obesity (BMI more than 27.5 kg/m^2) was 30.6% (95% CI: 29.5, 31.6) and the prevalence of abdominal obesity was 48.6% (95% CI: 47.4,49.9). Compared to NHMS 2011, there were increment by 0.6%, 2.6% and 2.0% respectively (Institute for Public Health, 2015). As it stands, the prevalence of overweight and obesity in Malaysia is higher than the world average and highest among the South East Asian nations (Ng et al., 2014).

Based on NHMS 2015, the sociodemographic factors for higher prevalence of overweight were urban residents [34.1% (95% CI: 33.0, 35.3)], males [35.8% (95% CI: 34.5, 37.1)], adult aged 50 - 54 years old [41.1% (95% CI: 38.2, 44.2)], other Bumiputras [35.8% (95% CI: 33.2, 38.6)], married adults [36.8% (95% CI: 35.7, 37.9)], those with primary education [36.0% (95% CI: 34.1, 38.0)] and retirees [36.8% (95% CI: 32.8, 41.1)]. Higher prevalence of obesity was reported among females [33.6% (95% CI: 32.2, 35.0)], Indians [43.5% (95% CI: 39.4, 47.7)], married adults [33.8% (95% CI: 32.6, 35.1)], secondary education attainders [32.1% (95% CI: 30.7, 33.4)] and government employees [40.3% (95% CI: 37.4, 43.2)].

The NHMS 2015 also reported higher prevalence of abdominal obesity among females [60.2% (95% CI: 58.5, 61.8)], adults aged 60 - 64 years old [66.4% (95% CI: 62.7, 69.9)], Indians [66.2% (95% CI: 61.6, 70.6)], widower or divorcee [63.3% (95% CI: 60.2, 66.3)], primary education attainders [53.3% (95% CI: 50.9, 55.6)], unpaid

workers or homemakers [67.3% (95% CI: 64.8, 69.6)], and those earning between RM 9000 – RM 9999 [56.7% (95% CI: 48.4, 64.6)].

In addition, the NHMS 2015 reported that 33.5% of Malaysian were not physically active and 41.1% were only minimally active. As expected, the rural population were more active than urban, adult with education were more active than adult with no formal education and self-employed adult portrayed significantly higher level of physical activity compared to those from other occupational category. From ethnicity perspective, 'other ethnic group' had the highest prevalence of physical activity followed by 'other Bumiputras', Malays, Indians and Chinese. For dietary practice, 94.0% (95% CI: 93.3, 94.7) of Malaysian adults did not take adequate fruits and/or vegetables as recommended by WHO. There were higher prevalence of inadequate fruits and/or vegetable intake among urban population, males and adults aged 35-39 years old.

In relation to obesity and physical activity, further analysis of NHMS 2015 data by Chan and his colleague proved that the level of physical activity were inversely related to the risk of overweight and obesity, especially in male (Chan *et al.*, 2017). It was observed that overweight and obese men reported a significantly lower level of total physical activity than normal weight men (p<0.001) and a low level of physical activity was associated with risk of overweight and obesity compared to high level of physical activity in male (adjusted OR = 1.14, 95% CI: 1.01-1.3).

Nevertheless, the extent of relationship between physical activity and obesity among Malaysia's women were less clear. Furthermore, there were few limitations of NHMS 2015 as highlighted by the authors: 1) It is a cross-sectional study which could not establish a causal relationship between physical activity and obesity 2) Only energy

expenditure is measured 3) The measurement of physical activity is subjective (Chan *et al.*, 2017). This highlighted the need for a longitudinal and prospective research in the future.

2.2 Primary Care Doctors and Obesity Counselling

The Declaration of Alma-Ata was launched during International Conference on Primary Health Care in 1978. It affirms that primary care is the first level of contact for individuals, the family and the community with the national health system. It also emphasizes comprehensive and accessible care which form an important element of continuing healthcare process (World Health Organization, 1978).

Worldwide, there is an ample variation in the delivery of primary healthcare services especially in terms of personnel involved, financing, the integration with tertiary care and hence, the quality of care. In most developed nations, doctors who are working in the primary care are required to have a minimum post graduate qualification, mostly in family medicine or general practice. In the United Kingdom, every citizen is required to register with a General Practitioner, who provide the first-contact care and serves as the gate keeper to the tertiary care. Meanwhile, in eastern European countries and north America, the first contact care is provided by non-primary care specialists (Jones, 2017).

Malaysia, on the other hand, is at a crossroad in empowering its primary healthcare services. Currently, other than full registration with the Malaysia Medical Council, no specific post graduate requirement or training is mandated for doctors who practice in primary care, public or private. The government's primary healthcare system is manned by family medicine specialists and medical officers, who also serve as the gatekeeper to the healthcare system. Though, the citizens are not required to be registered

with a primary care doctor (PCD) and may directly see a specialist by referral from the hospital casualty or by going to a private hospital. In term of quality of chronic disease management, this might result in lack of longitudinal continuity in primary care services (S Sivasampu *et al.*, 2015). Recently, Family Doctor Concept (FDC) has been gradually implemented. Medical officers in governments' health clinics are now in charge of patients' primary healthcare based on assigned locality under the supervision of a Family Medicine Specialist (May, 2018).

Evidently, there is an unequivocal recognition of the pivotal role played by primary care doctors in managing obesity. PCDs are judged to be a trustworthy source of preventive health care information and are uniquely placed to provide counselling, guidance, referrals, assessment of BMI and systematic tracking of patients' diet, physical activity and weight (Kahan, 2018; S Sivasampu *et al.*, 2015; Steeves *et al.*, 2015). Previous researches have also shown that patients who receive weight counselling from PCDs are more likely to change diet, improve physical activity behaviours and lose weight (Kahan, 2018; Wadden *et al.*, 2013; Whitaker *et al.*, 2015).

Critical appraisal of available literatures persistently highlighted the positive impact of physicians' advice on patient action on weight loss. In 2013, Rose and her colleagues conducted a literature review and meta-analysis of 12 published studies on the association between physician weight loss advice and changes in patient weight loss behaviour. They found that patients were almost 4 times more likely to actually attempt weight loss when their physicians deliver weight loss advice, OR=3.85 (95% CI 2.71, 5.49; Z=7.47, P < 0.01) (Rose *et al.*, 2013).

The rapport between a patient with his or her PCD contribute to sustainable behavioural changes and continuity of care (Al-Ghawi and Uauy, 2009). Analysis on the cost effectiveness of nutritional counselling showed that PCD were efficient to affect dietary changes in patients with obesity (Olsen *et al.*, 2005; Pritchard *et al.*, 1999). However, several existing studies highlighted that PCDs do not sufficiently address obesity in their clinical practice (Albright *et al.*, 2000; Bleich *et al.*, 2012; Kahan, 2018; Smith *et al.*, 2011).

In a nationally representative survey of 1,211 PCDs in the United States (US), less than half of the respondents reported always providing specific guidance on diet, physical activity or weight control (Smith *et al.*, 2011). In term of content of the counselling, PCDs preferred to advice on physical activity compared to diet or weight control ($p < 0.05$). Interestingly, from the patient's perspective too, most PCDs (58%) do not perform weight counselling during any visits (Kraschnewski *et al.*, 2013). In a cross sectional study on the epidemiology of weight counselling for adults in the US, the researchers examined data from the National Ambulatory Medical Care Survey (NAMCS) in 2007-2008 and found that only a minority of the physicians (8.9%) provided weight counselling in the majority of the visits (Kraschnewski *et al.*, 2013).

In another study among US firefighters in 2011-2012, 69% reported receiving no weight advice despite 96% of them visited healthcare workers in the past year (Wilkinson *et al.*, 2014). Higher BMI was associated with obesity counselling OR=12.98 (95% CI: 5.38-31.34) even though 48% of class I to III obese firefighters received no weight advice (Wilkinson *et al.*, 2014). Furthermore, another cross-sectional survey in the UK found that only 17% of overweight and 42% of obese subjects were able to recall having weight lose advise by healthcare workers. This was despite its positive association with

motivation and effort to loose weight, independent of baseline weight and sociodemographic characteristic (Jackson *et al.*, 2013). It was also noted that younger respondents received less counselling compared to older respondents, which could signify a missed opportunity to prevent weight gain and its co-morbidities (Wilkinson *et al.*, 2014).

A more recent study by Lewis and her colleague found that almost 25% of 2,752 respondents with mean BMI of 37.1 kg/m^2 never had any discussion on their weight with healthcare staff albeit at least a third of them would welcome deliberation on the issue (Lewis *et al*., 2016). A study which examined longitudinal changes in general practitioners' perceptions towards obesity care in 1992 and 2007 highlighted a declining level of self-efficacy in obesity management over the years (Visser *et al.*, 2008). In comparison to 1992, the respondents professed less success in the overweight treatment in 2007. There is, however, still hope as the author established that overweight education and prevention were always favorable among the general practitioners.

Thus, in the face of obesity epidemic with cultural inactivity and habitual excess calories, there is a monumental task on the shoulder of primary care doctors to improve the management of obesity. As part of broader response to this complex condition, PCDs are key players, providing counselling as an interface between the patient, the multicomponent multidisciplinary treatment approach and the policy makers (Cochrane *et al*., 2017).

2.3 Pharmacotherapy for obesity

An expert group investigating interventions to maintain weight loss reported that achievable weight loss by lifestyle changes alone is limited to 3-10% of bodyweight with significant subsequent regain of weight among most patient over a period of 12 months (MacLean *et al.*, 2015). Thus, there is greater emphasize on the role for pharmacotherapy and surgery as an adjunct to behavioral adaptations in managing obesity.

Significant advances in the biological understanding of weight regulation has not resulted in parallel paradigm shifts among physicians with regard to the use of anti-obesity drugs. A study on the impact of safety communications by Food and Drug Administration (FDA) showed low and declining prescription over time (Block *et al.*, 2014). This highlighted a palpable tendency among physicians to simply hold patients accountable to 'eat less and exercise more' (Bessesen and Van Gaal, 2018). Whereas, with established profiles of current anti-obesity drugs and promising therapeutic agents in various phases of clinical trials, physicians ought to feel comfortable and confident to discuss risks and benefits of these medications.

There is a body of evidence from clinical trials that pharmacotherapy produce sustainable weight loss unrivalled by lifestyle changes alone (Bessesen and Van Gaal, 2018). As an adjunct to comprehensive lifestyle interventions, anti-obesity medication help patients adhere to a lower calorie diet more consistently in achieving weight loss and health improvement. To date, several approved anti-obesity drugs with varying efficacy and side effects profiles include sympathomimetics, pancreatic lipase inhibitors, $GABA_A$ receptor activators, a serotonin 2C receptor agonist, opioid antagonist, dopamine-

norephoneptine reuptake inhibitors and glucagon-like peptide-1 (GLP-1) receptor agonists.

Like other chronic diseases, a combination of anti-obesity medication with robust lifestyle interventions will produce greater positive outcome. Yet, unlike other chronic diseases, the use of medications in the management of obesity are exceedingly low despite conventional guidelines and recommendations (Zhang *et al.*, 2016). A retrospective analysis of Health National Prescription Audit reported that the number of anti-diabetes prescriptions was 15 times the number of anti-obesity (Thomas *et al.*, 2016). Another retrospective cohort study among more than 2 millions obese veterans in the US found that in those who were more likely to met the criteria for use, only 2.5% had at least been on a prescription for orlistat (Del Re *et al.*, 2014). Factors that were associated with obesity pharmacotherapy were higher BMI, female, single, younger, on obesogenic psychiatric medications and obesity-related comorbidities (Del Re *et al.*, 2014; Zhang *et al.*, 2016). As expected, Family Medicine/General Practice, Internal Medicine and Endocrinology specialist formed the majority of anti-obesity prescriber (Thomas *et al.*, 2016). Since 2004, Malaysia's Clinical Practice Guideline has recommended medications as part of its long-term management strategy. However, based on literature search, there is no published data or trials on the use of anti-obesity medication in Malaysia.

The American College of Cardiology, American Heart Association together with The Obesity Society published an expert consensus that recommends initiation of pharmacotherapy in patients with BMI more than 30 kg/m^2 or more than 27 kg/m^2 with a comorbidity related to obesity (Jensen *et al.*, 2014). Physicians were expected to be proficient with regard to the potential risk of the medications being considered against the potential benefits of successful weight loss. The National Institute for Health and Care

Excellence (NICE) guideline advocates drug treatment for adults after targeted weight loss is not achieved or plateaued despite dietary, exercise and behavioral approaches have been commenced and evaluated (National Institute for Health and Care Excellence, 2014).

In counselling patients on anti-obesity medications, it is paramount to stress that anti-obesity medications are for long term use and compliance is essential. Prior to starting the medications, physicians should advise patients that individual response to anti-obesity medications variably differ. The medications are normally prescribed at the lowest effective dose and stopped if 4-5% weight loss is not attained within 3-4 months of maximum tolerable dose (Bessesen and Van Gaal, 2018).

For patients with Diabetes Mellitus, there was an appreciable improvement in glucose concentration despite unremarkable weight loss. The combination of medication and weight loss resulted in improvement of surrogate cardiovascular markers such as reduced triglycerides, increased HDL cholesterol concentration and better blood pressure control. However, available evidence has not shown reduction in cardiovascular disease endpoint (Bessesen and Van Gaal, 2018).

Advancement in the understanding of complex regulation of the neuroendocrine pathways has allowed further development and evolving use of medications for obesity. In an attempt to analyze currently approved anti-obesity drugs, a systemic review and meta-analysis of 28 randomized controlled trials involving 29 018 patients was conducted by Khera *et al* (2016). In term of efficacy, the authors found that with at least 1 year of treatment with orlistat, lorcaserin, naltrexone-bupropion, phentermine-topiramate and liraglutide, all are associated with higher probability to achieve weight loss compared to

placebo. This is supported by a recently published review article on efficacy that estimated a net weight loss of 3-7% (Srivastava and Apovian, 2018). Taking into account available evidence on the safety, it is plausible to conclude that phentermine-topiramate ER is the most effective drug, orlistat and lorcaserin are less effective with fewer side effects, naltrexone-bupoprion and liraglutide are of intermediate efficacy and side effect profile (Bessesen and Van Gaal, 2018).

The selection of anti-obesity medication, however, continue to be an art especially in facing the era of personalized medicine. Variation in safety profiles, efficacy and distinctive therapeutic response will necessity highly individualized approach (Khera *et al.*, 2016). Specific medical condition might indicate preference for certain medication. In diabetes patient for example, liraglutide may be a more appropriate agent due to its hypoglycemic properties. Though in patient with chronic opiate or alcohol dependence, naltrexone-bupoprion is least preferable for its association with neuropsychiatric complications (Khera *et al.*, 2016). Thus, patient phenotyping seems to be the first step in providing accurate therapy selection and filling the gap in the therapeutic algorithm (Srivastava and Apovian, 2018). As researchers continue to shed the light on this conundrum, primary care doctors are key component in rousing a thoughtful, informed conversation with the patients about the risks and benefits of these medications. Especially in Malaysia, where obesity is everywhere but anti-obesity medication has not been making the scene.

2.4 Surgery for obesity

Bariatric surgery has emerged as a powerful instrument to combat obesity and diabetes mellitus. Randomized controlled trials and prospective cohort studies have

established its safety and effectiveness for weight maintenance and optimization of obesity-related co-morbidities (Welbourn *et al.*, 2018). In 2013, Gloy and his colleagues conducted a systematic review and meta-analysis of 11 randomized controlled trials comparing surgical to non-surgical treatment for morbid obesity to discover that bariatric surgery was associated with greater weight loss, higher remission rates of type 2 diabetes mellitus and metabolic syndrome, better lipid profiles and quality of life and remarkable reduction in medication requirement over the two years follow up (Koliaki *et al.*, 2017).

The systemic review reported that, after bariatric surgery, a mean difference of 26 kg weight loss was reported (95% CI: -31 to -21 P<0.001). Compared to non-surgical approach, the relative risk to accomplish diabetes remission was 22 times higher (95% CI: 3.2-154.3, p=0.002) and the mean changes in glycated hemoglobin HbA was -1.5% (95% CI: -1.9 to -1.1, p<0.001). The relative risk to accomplish remission of metabolic syndrome was 2.4 times higher (95% CI: 1.6-3.6, p<0.001). The level of triglycerides decreased more with bariatric surgery, mean difference of -0.7 mmol/L (95% CI: -1.0 to -0.4, p<0.001). Changes in total plasma cholesterol and low-density lipoprotein were not significant but there was increased in high density lipoprotein concentration with bariatric surgery, mean difference of 0.21 mmol/L (95% CI: 0.1 to 0.3, p<0.001). In term of safety, there were no perioperative deaths or cardiovascular events reported at 2 years follow up. The most common adverse events reported were iron deficiency anaemia (15%) and reoperations (8%) (Gloy *et al.*, 2013).

A worldwide bariatric surgery registry from 31 countries reported that the 1 year total weight loss for 54,490 patients from 2013-2015 cohort was 30.53% (95% CI: 30.22-30.84%) and follow up from 2009-2015 cohort revealed that 64.7% of 66,560 patients

who were on treatment for diabetes mellitus preoperatively, were not on treatment postoperatively (Welbourn *et al.*, 2018).

Apparently, despite comprehensive evidence and recognised cost-effectiveness, only a fraction of patients who meet the criteria and would benefit from surgery are referred, assessed, considered for surgery and eventually operated. In the UK, the cost of surgery is recouped within 3 years through reduced prescription, yet less than 1% of patients who could benefit actually receive the treatment (Welbourn *et al.*, 2016). Meanwhile, a survey among representative of Asia-Pacific Metabolic and Bariatric Surgery Society (APBMBSS) reported 449% of absolute growth rate of bariatric surgery from 2004-2009 (Lomanto *et al.*, 2012).

In Malaysia, bariatric surgery is increasingly being marketed as part of medical tourism, but published data on its prevalence and outcome is still scarce. A study among 33 obese patients with pre-operative mean BMI of 59.37 kg/m^2 at a local university hospital found that the mean percentage total body weight loss was 33.11%, the mean reduction in BMI was 20.5 kg/m^2, the mean reduction in HbA1c was 1.17% and the remission of diabetes mellitus was 68.31% after 1 year post surgery (R. Rajan *et al.*, 2017).

Another unpublished study at Universiti Malaya Medical Center retrospectively investigated the outcome of 82 bariatric surgeries from 2009 to 2017. The pre-operative mean BMI was 47.1 kg/m^2. At 1 month, the average weight loss was 23.1% with average BMI of 42.6 kg/m^2 and at 6 months the average weight loss was 50.8% with average BMI of 37.8 kg/m^2. Of all the participants, 57.3% were diabetes patients and 14.9% of them achieved diabetes remission at 6 months (Idris and Choong, 2018). Pending randomized

controlled trials, these initial findings underscored potential positive outcome of surgical intervention among Malaysian patients with obesity.

Still, one of the leading concerns with regard to surgical intervention in obesity is the inertia among primary care doctors to refer patients to secondary care obesity clinic. Barriers include lack of standardization for referral threshold, tendency to stick with unsolicited cliché advice such as 'eat less, exercise more', prolonged non-surgical treatment pathway causing disinterest in patients and wrong perceptions on the fatality or morbidity of surgery (Welbourn *et al.*, 2016).

To overcome these barriers, Welbourne *et al* (2016) also recommended the following suggestions 1) communication skills workshop for healthcare provider to eliminate prejudice and encourage promotion on surgical intervention, 2) dietetic services need to be integrated and accessible, providing adequate support especially during the post-operative period, 3) investment in multidisciplinary team is also crucial to bridge the gap between the medical and surgical management to allow earlier access to surgical assessment (Welbourn *et al.*, 2016).

2.5 Self-efficacy and obesity counselling

As part of health belief model, self-efficacy has been instrumental in the application of social cognitive theory to empower health promotion and disease prevention (Bandura, 2004; Clark and Dodge, 1999). Nevertheless, since its conception by Albert Bandura in 1977, self-efficacy was utilized mainly in the work place environment because of its implication on personal motivation and performance. Self-efficacy refers to beliefs in one's capabilities to organize and execute the courses of action required to manage prospective situations (Lunenburg, 2011). Self-efficacy is

conceptually distinct in term of its relation to theory describing level of beliefs as well as capability, whereas confidence is a non-specific term for belief in something (Bandura, 1997).

The primary source of self-efficacy are past performance, vicarious experience, verbal persuasion and emotional cues (Bandura, 1977). It has imperative roles in influencing goals that employees choose for themselves. It also adds persistence to the learning effort that people exert to complete a specific task. At organizational level, self-efficacy is implicated in 1) selection and promotion decision 2) training and development 3) goal setting and performance (Lunenburg, 2011). Nine large scale meta-analyses consistently demonstrate that the efficacy beliefs of organization members contribute significantly to their level of motivation and performance (Bandura, 2003).

Self-efficacy has been advocated as a surrogate marker for behavioral performance. It conceptualizes the cognitive processes of human functioning to execute a requisite activity (Bandura, 1997). The likelihood of patients' self-efficacy for a healthy transformation will depend on physicians' self-efficacy to deliver the intervention. Thus, enhancing self-efficacy is the first step to improving obesity management within the primary care (Sturgiss *et al.*, 2017). A survey among medical practitioners with an average of 19 years of practice found that physicians with a stronger sense of counselling self-efficacy were more aggressive counsellors (Thompson *et al.*, 1993). This indicates that efficacy belief is a key factor in generating competence at a specific task such as obesity counselling. Higher level of self-efficacy contributes to stronger intellectual struggle to overcome the challenges and deeper intrinsic interest to improve the effort (Katz *et al.*, 2005).

It is now well established from a variety of studies that doctors' self-efficacies concerning obesity counselling are low to fairly average (Ashman *et al.*, 2016; Katz *et al.*, 2005; Smith *et al.*, 2015; Steeves *et al.*, 2015; Sturgiss *et al.*, 2017; Thompson *et al.*, 1993; Visser *et al.*, 2008; Welsh *et al.*, 2015). A systemic review of 13 studies from 1991 to 2011 on beliefs and practice of healthcare providers regarding obesity concluded that there is perceived lack of confidence and lack of ability to deal with obesity. This has contributed to the development of ambivalence, negativity, lower expectations of successful weight loss and skepticism towards efficacy of interventions (Teixeira FV *et al.*, 2012). Whereas, high level of self-efficacy has been evidently associated with high outcome expectations and greater amount of obesity counselling performed (Lowenstein *et al.*, 2013; Thompson *et al.*, 1993).

In health promotion, the social cognitive theory links patient's self-efficacy to initiation and maintenance of healthy lifestyle and therapeutic behaviors. These changes occur through patients' belief that they can perform the acquired behaviour (efficacy expectation) and this new behaviour will lead to desired health outcome (outcome expectation) (Sturgiss *et al.*, 2017). In clinical practice, the strongest source of physicians' self-efficacy is performance mastery (Katz *et al.*, 2005). Hence, the mantra 'see one, do one, teach one'.

Physicians who had direct experience of counselling a patient on obesity and observed a meaningful weight reduction in that patient will perceived growing level of self-efficacy. The problem is, however, physicians do not necessarily follow up or received feedback on their counselling effort to always learn the impact of their interventions (Thompson *et al.*, 1993). Especially in Malaysia, where most patients might

inevitably see different primary care doctors during their clinic visits for various reasons. So, the establishment of Family Doctor Concept is a crucial step in providing personalized and continuous obesity care, at the same time allows primary care doctors to gain 'performance mastery' by monitoring patients' progress and interacting with the outcome over the course of treatment. One's effort and perseverance in overcoming obstacles will add to the resilience sense of self-efficacy (Thompson *et al.*, 1993).

Vicarious experience is another principle source of self-efficacy. Observation of one's performance of a specific task that is met with success will produce greater behavioral improvement (Bandura, 1977). Role-modelling, the process of witnessing successful attempts by colleague or other health professionals in delivering effective obesity counselling will, at least, enhance one's own sense that counseling can be worthwhile (Thompson *et al.*, 1993). This could emphasize the importance of teamwork in the management of obesity. Sharing insights to analyze patients' performance and feedback by physicians, pharmacist, dietitians, physiotherapist and nurses are invaluable in raising the belief that capabilities needed to conquer counselling skills for successful weight loss is not impossible at all.

Thompson and colleagues also proposed that the level self-efficacy can be increased by training in health promotion counselling (Thompson *et al.*, 1993). In a survey over 85 physicians in California, they found that doctors who had received more health promotion training were more likely to have a greater sense of counselling self-efficacy ($r = 0.26$, $P<0.05$) and provide more advice on effective weight loss interventions. (Thompson *et al.*, 1993). This could be related to another widely used principle source of self-efficacy, verbal persuasion. Albeit a weaker inducer of efficacy

expectations due to its lack of authentic empirical base, verbal persuasion works by leading people into believing that success is conceivable despite past overwhelming experience (Bandura, 1977).

However, results from lines of studies proved that personal disconfirming experience will diminish positive expectations originating from others' verbal persuasion, highlighting its limitation in bringing behavioral changes by simply telling them what to expect (Bandura, 1977). Thus, Bandura proposed that verbal persuasion has to be integrated with effective interventions to improve perceived capabilities and expectations. In obesity counseling, it has been found that, physicians who are aware of effective interventions and incorporate that into interactions with patients will be more likely to counsel more patients confidently (Thompson *et al.*, 1993).

Meanwhile other studies have shown various practical barriers and factors that are associated with obesity care. The specific determinants for perceived confidence and capability in obesity counselling are age (Ammentorp *et al.*, 2007), gender (Lowenstein *et al.*, 2013; Steeves *et al.*, 2015), presence of other health professionals (Perrin *et al.*, 2005), formal training (Katz *et al.*, 2005), availability of structured toolkits (Perrin *et al.*, 2005; Sturgiss *et al.*, 2017) and practices in obesity management (Steeves *et al.*, 2015).

2.6 Measurement of self-efficacy in obesity counselling

Due to its widespread use and application, self-efficacy has been measured in various ways (Bleich *et al.*, 2015; Gulbrandsen *et al.*, 2013; Katz *et al.*, 2005; Shama *et al.*, 2009; Smith *et al.*, 2015). In 2006, Albert Bandura himself had dedicated a chapter

of his book on the guide for constructing self-efficacy scales. He declared that there is no universal scales of perceived self-efficacy (Bandura, 2006). Due to its concern on subject's beliefs in their capability to produce given achievements, scales of perceived self-efficacy has to be tailored to the particular domain of functioning that is the object of interest (Bandura, 2006). He elaborated that to ensure construct validity, the items should be appropriately phrased to differentiate self-efficacy from other construct such as self-esteem, locus of control and outcome expectation. He also emphasized that a sound efficacy scale must be tailored to activity domains and assess the multifaceted ways in which efficacy beliefs operate within the selected activity domain (Bandura, 2006). He went on further insisting that self-efficacy should be measured across a gradation of challenge to see whether one has efficacy to do them regularly in the face of different types of dissuading conditions. For example, in counselling elderly patients with obesity, one's self-efficacy is challenged by self perceived ability to effectually discuss physical activity in the setting of joints pain or immobility.

2.7 Online research tool and informed consent

This study employed its designated research tool at Surveymonkey.com In 2008, research protocols involving online or web surveys were the most often reviewed by American Universities Human Research Ethics Boards (Buchanan and Hvizdak, 2009). A survey over 750 members of Human Research Ethics Boards (HREB) found a growing prevalence for application of online research tool in academic research (Buchanan and Hvizdak, 2009). Despite its efficiency and cost effectiveness (Wright, 2005), respondents in the study believed that the online nature of these survey data challenges conventional research ethics components such as informed consent, risk, privacy, anonymity, confidential and autonomy. It also elevated the methodological complexities to a new

level where issues surrounding data storage, security, sampling and survey design came into contentions (Buchanan and Hvizdak, 2009). Following specific guidelines and recommendations, most UK and US universities' human research ethics board allowed implied informed consent; completion and submission of online questionnaire maybe seen as a proxy of valid informed consent (Harriman and Patel, 2014; Office of Research Integrity and Assurance, 2010; Penn State University, 2007; Society, 2013; University of Connecticut, 2010)
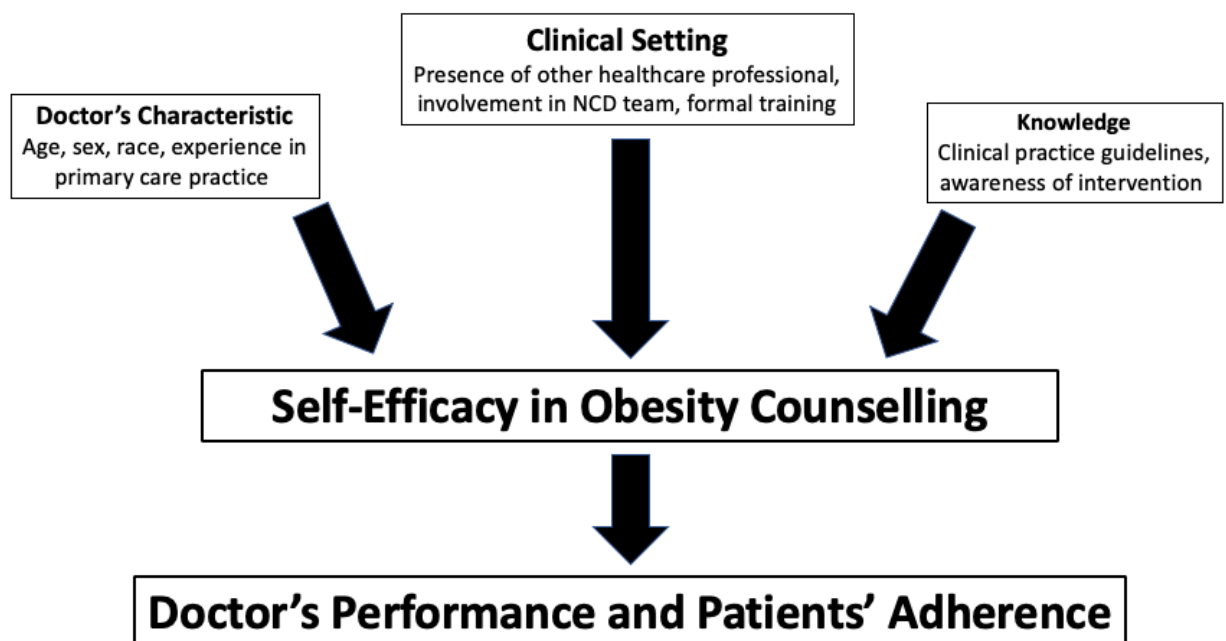
The Conceptual Framework

Figure 1: Conceptual Framework

Chapter 3: Objective

General objective:

> To determine the level of self-efficacy in obesity counselling and its associated factors among primary care doctors.

Specific objective:

1. To determine the level of self-efficacy in obesity counselling among primary care doctors.
2. To determine factors associated with primary care doctors' self-efficacy in obesity counselling.

Hypothesis

Self-efficacy in obesity counselling is associated with doctors' characteristics, working experience, involvement in NCD team, formal training, presence of other healthcare professionals and knowledge on CPG recommendation.