INVESTIGATING PSYCHOSOCIAL FACTORS AND MEDICATION ADHERENCE AMONG MALAYSIANS WITH CORONARY HEART DISEASE USING MIXED METHODS

NOR FIRDOUS BINTI MOHAMED

SULTAN IDRIS EDUCATION UNIVERSITY

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ABSTRACT

Coronary heart disease (CHD) is the leading cause of death in Malaysia, however, adherence to medications remains the main issue in achieving optimal treatment outcomes. This study was conducted to explore the psychosocial relationships model on medication adherence among patients with CHD in Malaysia. The study involved the sequential mixed method design; Firstly, it explores the – psychosocial factors associated with medication adherence through a qualitative interview on the CHD patient's treatment experiences (N=22, 88% males) as well as their family caregivers (N=15). Secondly, questionnaires based on the qualitative findings were developed and validated; and finally, the relationships between the psychosocial factors with medication adherence among the CHD patients (N=235, 73.6% males) were determined. Qualitative findings revealed five factors such as psychosocial beliefs, doctor-patient relationship, seeking information behaviour, social support needs, and lifestyle changes. Following the qualitative findings, two questionnaires were developed and validated which were – the CHD-specific modern medication use questionnaire (CHD-MMUQ) and the CHD-specific complementary alternative medication use questionnaire (CHD-CAMQ). Finally, the multivariate logistic regression analysis was conducted and suggests psychosocial factors such as low concern-specific beliefs on medications, gender, ethnicity, diet control, and performing spiritual practices were statistically significant to predict adherence to medication ($\chi 2 = 61.6$, df = 8, N = 235, $P < 0.001$). The diagnostic test suggested that the Nagelkerke pseudo-R-square of the coefficient of determination indicated that approximately 33% of the factors in CHD patients were related to medication adherence, the model fits well with our data. Assessment of the possible moderating influence of medication adherence suggested that CHD patients who controlled diet based on ethnicity differences (such as Indian ethics) were associated with significant medication adherence, but they were poorly associated with medication adherence if an individual was not controlling their diets. Overall, the final results suggested that besides the patient's treatment psychosocial beliefs, differences based on ethnic practices such as diet control are important factors to be considered for better medication adherence outcomes.

MENGKAJI FAKTOR PSIKOSOSIAL DAN KEPATUHAN UBAT DALAM KALANGAN WARGA MALAYSIA YANG MENGHIDAP PENYAKIT JANTUNG KORONARI DENGAN MENGGUNAKAN KAEDAH CAMPURAN

ABSTRAK

Penyakit jantung koronari (CHD) adalah punca utama kematian di Malaysia, bagaimanapun, pematuhan terhadap ubat-ubatan kekal sebagai isu utama dalam mencapai hasil rawatan yang optimum. Kajian ini dijalankan untuk meneroka model hubungan psikososial mengenai pematuhan ubat dalam kalangan pesakit jantung koronari di Malaysia. Kajian ini melibatkan reka bentuk kaedah campuran berturutan; Pertama sekali untuk meneroka - faktor psikososial yang berkaitan dengan pematuhan ubat melalui temu bual kualitatif mengenai pengalaman rawatan pesakit jantung koronari (N=22, 88% lelaki) serta penjaga keluarga mereka (N=15), yang ditemu bual secara berasingan. Kedua, untuk membangunkan dan mengesahkan soal selidik berdasarkan dapatan kualitatif; dan untuk menentukan hubungan antara faktor psikososial yang dikenal pasti dengan pematuhan ubat (N=235, 73.6% lelaki) dalam kalangan pesakit jantung koronari. Dapatan kualitatif mendapati lima faktor seperti kepercayaan psikososial, hubungan doktor-pesakit, tingkah laku mencari maklumat, keperluan sokongan sosial, dan perubahan gaya hidup. Berikutan penemuan pertama, dua soal selidik telah dibangunkan dan disahkan iaitu - soal selidik penggunaan ubat moden khusus penyakit jantung koronari (CHD-MMUQ) dan soal selidik penggunaan ubat alternatif pelengkap khusus penyakit jantung koronari (CHD-CAMQ). Seterusnya, analisis regresi logistik multivariate telah dijalankan dan mencadangkan faktor psikososial seperti kepercayaan khusus kebimbangan yang rendah terhadap ubat-ubatan, jantina, etnik, kawalan diet, dan melakukan amalan rohani adalah signifikan secara statistik untuk meramalkan pematuhan kepada ubat ($\chi 2 = 61.6$, df = 8 , N = 235, $P < 0.001$). Ujian diagnostik mencadangkan bahawa Nagelkerke pseudo-R-square bagi pekali penentuan menunjukkan bahawa kira-kira 33% daripada faktor dalam pesakit jantung koronari berkaitan dengan pematuhan ubat, model itu sesuai dengan data kajian ini. Penilaian kajian ini menunjukkan pengaruh pematuhan ubat mempunyai hubungan dengan pesakit jantung koronari dari berlainan yang etnik (Seperti etnik India) yang turut mengawal diet mereka dan menunjukkan yang signifikan dengan isu pematuhan ubat, namun begitu jika seseorang individu tidak mengawal diet mereka hasil kajian menunjukkan hubungan yan tidak signifikan. Secara keseluruhan, keputusan akhir mencadangkan bahawa selain daripada kepercayaan psikososial rawatan pesakit, perbezaan berdasarkan amalan etnik seperti kawalan diet adalah faktor penting untuk dipertimbangkan untuk hasil pematuhan ubat yang lebih baik.

CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

BMQ	Beliefs about Medicines Questionnaire
CABG	Coronary artery bypass grafting
CAM	Complementary alternative medicines
CAQDAS	Computer-Assisted Qualitative Data Analysis
CeVD	Cerebral vascular diseases
CHD	Coronary Heart Disease
CHD-CAMQ	CHD-Specific Complementary Alternative Medicine Use Questionnaire
CHD-MMUQ	CHD-Specific Modern Medicine Use Questionnaire
CPG	Clinical Practice Guidelines
CR	Cardiac Rehabilitation
CSM	Common Sense Model
CVD	Cardiovascular diseases
EC	Ethics Committee
HF	Heart Failure
IHD	Ischemic heart diseases
IJN	Institut Jantung Negara
MAS	Medication Adherence Scale
MI	Myocardial infarction

MUHFQ	Medication Use in Heart Failure Questionnaire
NCF	Necessity and Concern framework
NSTEMI	non-ST-elevation myocardial infarction
NYHA	New York Heart Association
PCI	percutaneous coronary intervention
QUAL	Qualitative
QUAN	Quantitative
STEMI	ST-elevation myocardial infarction
TA	Thematic analysis
UA	Unstable Angina
UKMMC	Universiti Kebangsaan Malaysia Medical Centre
WHO	World Health Organization

APPENDIX LIST

CHAPTER 1

INTRODUCTION

1.1 Introduction

Coronary heart disease (CHD) is one of the current global threats that cause death and continues to increase in developing countries (Murray et al., 2012; Sanchis-Gomar et al., 2016). Several European studies have reported a decline in the mortality rate of coronary heart disease (CHD) patients owing to modifications in their risk factors such as changes in diets, exercise, and other health behaviors such as adherence to medication (Berg et al., 2014; Ford et al., 2007; Palmieri et al., 2010; Roth et al., 2017). On the contrary, the aforementioned parameter has substantially increased in developing countries, such as those in South Asia, where almost two-thirds of all deaths were premature among patients age-ranged between 15-59 years (Mathers et al., 2008; Mathers, 2020). Moreover, recent national health and morbidity survey reported by the Ministry of Health Malaysia (2020) clearly showed a significant

overall increase in the occurrence of risk factors of CHD from 1996 to 2019 which remains the commonest cause of death among Malaysians.

Secondary prevention such as cardiac rehabilitation (CR) is suggested as an effective treatment and proven cost-effective for recurrent CHD (Barrios et al., 2017), which includes medication and other healthy lifestyle changes as the main intervention approach (Arnett et al., 2019; Bansilal et al., 2015; Baum et al., 2012; Perk et al., 2014; Smith et al., 2013). However, poor adherence behaviour has also been discussed as a major challenge to achieving effective and efficient treatment planning specifically among chronic illness patients that require long-term therapies (Fernandez-Lazaro et al., 2019). In addition, some studies had reported that around 50% of patients with chronic illness do not adhere to prescribed treatment (Nieuwlaat et al., 2014); and only 35% or less of eligible patients taken up the CR globally (Mosleh et al., 2014).

In the Asian context, CR shows limited significant results, and implementing effective culturally-tailored interventions is challenging due to the lack of evidence-based guidelines from Asian studies (Choo et al., 2018). A recent Asian study that was done in Malaysia claimed that different ethnicities in Malaysia have different perceptions towards CR, particularly in terms of adherence to prescribed medication. Furthermore, the factors that contribute to CR adherence in Malaysia are still unknown and hence, require further investigation (Lee et al., 2013). Owing to the heterogeneity and non-uniformity of CHD risks in different ethnic groups in Malaysia, there was a crucial need for exploration into the factors for adherence to medication among CHD patients. Previous studies examined the prevalence of CHD

patients' non-adherent to medication, controlling diet, or physical activity (Chow et al., 2010; Lee et al., 2013; Roger et al., 2011). However, to our knowledge, scarce studies have gathered detailed information about the risk factors associated with adherence characteristics among multi-ethnic CHD patients in Malaysia by looking from multiple backgrounds such as psychosocial factors, sociodemographics, and other adherence behaviours such as controlling diet and physical exercise. Therefore, we completed an exploratory mixed-method research among recurrent CHD patients to understand and assess the associated factors of adherence to medications.

1.2 Background of the study

1.2.1 Cardiac rehabilitation as secondary prevention for CHD patients

CHD is categorized as one of the major chronic diseases. It is due to the fact that it has similar characteristics as chronic diseases such as permanent presence, residual disability, illness caused by non-reversible pathological alteration special requirement for rehabilitation training for patients, and or long period of supervision (World Health Organization, 2008). According to Savarese and Lund (2017), CHD also places a great deal of global burden on the patients' families and wider society. According to recent reviews by Ahmed et al. (2018), CHD is prevalent among South Asians worldwide as compared to other ethnicities. Common burdens such as economical repercussions due to early CHD onset, higher loss of productivity, and finally premature death.

Reviews have recommended both primary and secondary prevention as the main intervention approaches for CHD (Boon et al., 2014; Eckel et al., 2014; Perk et al., 2012; World Health Organization, 2003). Nevertheless, Cochrane medical systematic reviews have suggested that secondary prevention delivered for patients with recurrent heart diseases is more cost-effective as compared to primary prevention. This is due to primary prevention being more costly with respect to the health resources that require specialties and continuous health promotion programs specifically among those with low risks of cardiovascular diseases (Ebrahim et al., 2011).

1.2.2 The adherence and cultural challenge in secondary prevention medication use among low- and middle-income countries.

According to World Health Organization (2007), cardiac rehabilitation (CR) specifically on medication is one of the important secondary prevention for CHD because of evidently cost-effectiveness (Mendis & Chestnov, 2014; Taylor et al., 2022). Nevertheless, adherence issue to medication treatment remains a major challenge in particularly low- and middle-income countries (Chauke et al., 2022; Kronish & Ye, 2013; Mendis et al., 2012).

Qualitative systematic reviews by Neubeck et al. (2012) suggest that CR which is specifically tailored to cultural beliefs and needs could increase programme participation among ethnic minorities with CHD. For example, an exploratory study on psychosocial risk factors among South Asians in the UK showed heterogeneous

views and experiences along with strong cultural influences which suggests CR should be flexibly tailored to the individual's cultural context (Bhattacharyya et al., 2016). Despite the challenges in tailoring an intervention programme specifically for chronic illness patients (Figueiras & Neto, 2019), several systematic reviews of clinical trials on CR for CHD patients from minority ethnic groups in developed countries (e.g. the UK), have shown that patients who are unable to participate in hospital-based programs will receive similar positive outcomes from specially tailored CR programmes (Anderson et al., 2017; Clark et al., 2010; Dalal et al., 2010; Neubeck et al., 2009). Therefore in light of these data, it is important for culturally based factors to be identified and tailored into the CR programme (Sun, 2015) for enhancing the efficiency of care for multicultural ethnic minorities in Malaysia.

1.3 Structure of the thesis

This thesis is organized into six chapters. Chapter one focuses on the background of the study, the problem, and the research gaps that lead to the current study. Chapter two focuses on the relevant literature studies. Chapter three explains the method of sequential exploratory mixed methodology designs employed in the current study, the qualitative exploration, the questionnaire development, and validation that was developed from the initial qualitative exploration and cross-sectional survey by using a validated questionnaire to determine the factors in medication use with medication adherence, and finally the association of the factors with medications adherence. Whereas, chapter four reported on the findings of both qualitative interviews, questionnaire development, and quantitative survey on the relevant factors, and their

association. Chapter five discusses the findings of both qualitative and quantitative phases respectively in an overall discussion as a response to the objectives of the study. The strengths and limitations of the methodology are discussed, as also the implications of the current study for future references in secondary prevention medications research.

1.4 Problem statement

1.4.1 Qualitative exploration: Factors in medication adherence among CHD patients

Reviews suggest that surgery intervention modalities for CHD are high-cost burdens and less effective if compared to standard medication prevention, and risk factors modification such as monitoring healthy eating and physical activity (Boden et al., 2014). For instance, coronary re-vascularization was reported to contribute to only a 5% reduction in CVD mortality while a major reduction was due to cardiac risk factor changes such as healthy lifestyle modification and improvement in drug treatments (Ford et al., 2007).

Healthcare professionals in hospitals usually employ CR which focuses on medication treatment as the main intervention approach for recurrent CHD (Bansilal et al., 2015) and has also proven to be cost-effective (Barrios et al., 2017; Singh et al., 2018). The medications-based CR also comprises comprehensive support and follow-up toward patients' positive recovery progress (Piepoli et al., 2017). However, as aforementioned problems in adhering to medication remain a major challenge

globally (Bansilal et al., 2015), and unfortunately, similar problems are also evident in several studies conducted among Malaysians with CHD. For instance, several CHD research in Malaysia suggests patient's adherence to prescribed medications is still suboptimal as reported in several local studies (Ang & Chan, 2016; Ganasegeran & Rashid, 2017; Kassab et al., 2015; Lee et al., 2013). For example, a prospective study conducted on 190 patients with CAD by Kassab et al. (2013a) reported there are higher levels of low medications adherences among the patients after 6 months of discharge from the hospital. Surprisingly, continuous follow-up for another 2 years on the aforementioned group of patients with retain 151 patients from the original cohort suggested a significant downward trend in the level of adherence to medications from a mean score of 6.39 at 6 months to 5.72 at 2 years (Kassab et al., 2015).

Overall, despite the cost-effective secondary prevention medications that have been offered in CR, the underlying issues to understand the factors that contribute to participation in the CR program among Malaysian are still lacking and need further investigation (Lee et al., 2013). Specifically, in addressing the ethnic differences in Malaysia which would have a different response to CR, particularly on treatment participation and adherence (Lee et al., 2013). Moreover, others suggested associated risk factors related to higher medication-no adherence rate among Malaysians with CHD such as older age, unemployed, multiple comorbidities, polypharmacy, patient-provider relationship, therapy-related factors, and psychosocial factors (Ganasegeran & Rashid, 2017; Kassab et al., 2013a).

Further investigation is needed to provide more concrete scientific evidence on CHD patients, and to have a better understanding of the factors that may affect

secondary prevention medication adherence among Malaysians as a minority ethnic with CHD from a global perspective. Cochrane medical review by Ebrahim et al. (2011) suggests that an in-depth exploration using qualitative methods is needed for better research implications prior to conducting any quantitative studies. In addition, a qualitative systematic review by Clark et al. (2012) suggests the importance to understand the underlying issues related to CHD patients' decision to participate in secondary prevention, the supportive system's characteristics, and their treatment preferences that can be enhanced through preliminary in-depth qualitative exploration. Similarly, Rouleau et al. (2018) and Jolly et al. (2007) suggest that qualitative studies allow a complex and subjective process of understanding how patients experience their illness-related symptoms, cope with the recovery progress, and decide to participate in the secondary prevention program. Hence, based on the reviews and previous findings, the first phase of this study was conducted qualitatively to find the answer to the first research problem through the exploration of the factors that contribute to medication adherence among the Malaysian population with CHD.

1.4.2 Quantitative generalization: Relationships of psychosocial factors with medication adherence among the Malaysian population with CHD.

There are several findings reported on the declining mortality rate among patients with CHD that is related to risk factors modification in European countries (Bennett et al., 2006; Berg et al., 2014; Ford et al., 2007; Palmieri et al., 2010; Unal et al., 2004).

Nevertheless, contrary to developing countries such as South Asia, the mortality rate among CHD patients has experienced substantial increases. For

instance, a study in China suggests that a 67% increase in CHD mortality from 1999-2010 was due to demographic changes and the continuation of worsening risk factors (Cheng et al., 2009). South Asians in the UK also have been shown to have higher cardiovascular risk factors (Cappuccio et al., 1997) and suffer up to 50% higher CHD mortality and morbidity rates compared to white European ethnic groups in the UK (Balarajan, 1991). Similarly in Malaysia, the most recent data from the national health and morbidity survey has evidenced a significant increase in the collective risk factors for CHD between 1996 and 2019 (Ministry of Health Malaysia, 2019).

CHD and stroke are also significantly higher in low and middle-income countries as compared to high-income countries. Almost two third of all deaths are premature death ranging from 15-59 years old (C. Mathers et al., 2008). Similarly in Malaysia, CHD also is the most prevalent cause of premature death for people aged between 30 and 70 years in Malaysian cause of death statistics in 2008 as in Table 1.1, Page 12 (Department of Statistics, 2008). Nevertheless, CHD remains the main cause of death for both males and females in three major ethnic Bumiputera, Chinese, and Indian until currently (17.0 percent of the 109,155 medically certified death in 2020) (Department of Statistics, 2021). Therefore, increasing mortality prevalence indicates the importance of CHD being treated effectively, which triggered further research toward a better prevention strategy.

According to Choo et al. (2018), cardiac rehabilitation (CR) did not show significant results in Asian samples. Furthermore, reviewers also suggested that the implementation of effective culturally-tailored interventions among the South Asian ethnic community remains a major challenge due to the lack of evidence-based

guidelines from Asian studies (Gholap et al., 2011). Several reviewers have recommended that every published intervention needs to add information on particular cultural elements to enhance the care efficiency in CR for multicultural ethnic minorities (Ski & Thompson, 2011).

Despite that, there are several reviews on health prevention among the minority suggest the importance to include local ethnic and cultural perspectives in that particular population (Banerjee et al., 2010; Jolly et al., 2007; Katigbak et al., 2018; Lee et al., 2013; Netto et al., 2010; Patel et al., 2012; Shin et al., 2018; Ski & Thompson, 2011; Teo et al., 2013). In addition, reviews also suggested factors such as identification on the individual psychosocial underlying issues (Piepoli et al., 2010, 2017); multifactorial lifestyle change such as controlling diets and exercise (de Waure et al., 2013; Goodwin et al., 2016); continuous social support and follow up after discharge (Jolly et al., 2006; Mondesir et al., 2018; Murphy et al., 2009); Doctor - patient's relationship (Lewis, 2012; Pereira Gray et al., 2018; Stavropoulou, 2011; Ting et al., 2016; Wroth & Pathman, 2006), ethnics differences (Leigh et al., 2016), gender related differences to medication adherence (Mosca et al., 2011; Putignano et al., 2017; Raparelli et al., 2019); level of educational background (Amin et al., 2014; Khan et al., 2006); treatment related knowledge factors (Bahall, 2019; Ghisi et al., 2014); spirituality (Osokpo & Riegel, 2019); treatment beliefs (Al-Noumani et al., 2019; Horne et al., 2013, 2019) and misconception treatment beliefs held by patients and their respective cultures (Jin et al., 2008); cultural attitudes (Jalal et al., 2019) are among factors to be considered to be associated with medication adherence.

Psychosocial treatment related to beliefs on secondary prevention medication is reported as a significant barrier to successful treatment uptake among heart diseases

patients, particularly among populations who are strongly attached to respective cultural beliefs (Byrne et al., 2005; Dias et al., 2014; Eyholzer et al., 2019; Ganasegeran & Rashid, 2017; Kassab et al. 2013a; Khanderia et al., 2008; LaPointe et al., 2011; Magadza et al., 2009; Sjölander et al., 2013; Sud et al., 2005). However, some systematic reviews had also pointed out the limited number of published studies on the factors related to beliefs and adherence to prescribed treatment (Bishop et al., 2007; Hirani & Newman, 2005). Based on the aforementioned data, there are many statistically tested models to be considered particularly on associated factors with secondary prevention medications adherence however, these factors are not based on the Malaysian population. Therefore, during the second phase of this study, a cross-sectional survey using a newly developed questionnaire based on the construct that was identified from the first qualitative study was used to assess the model related to psychosocial factors of adherence to medications among CHD patients.

Table 1.1

The major cause of death in Malaysia from the year 2005-2008

Criteria	2005		2006		2007		2008	
	Male	Female	Male	Female	Male	Female	Male	Female
The highest cause of death among the 10 principal causes of total death in Malaysia	CHD 11.5% of 65,941		CHD 12.0% of 68,124.		CHD 12.8% of 71,030		CHD 12.9% of 76,016.	
The highest cause of death among the 10 principal causes of total death according to age 15-64 years old	CHD 12.9 % of 23,532	Septicaemia 9.5% of 10,882	CHD 13.3% of 23,858	Septicaemia 9.2% of 11,160	CHD 12.9% of 23,532	Septicaemia 8.5% of 11,594.	CHD 14.6% of 26,412	8.3% of 12,070
The highest cause of death among the 10 principal causes of total death according to age 65 years old and above	CHD 14.8% of 14,562	13.1% of 12,175	CHD 15.4% of 15,580	13.2% of 13,069	CHD 16.2% of 16,335	14.0% of 13,582	CHD 16.3% of 17,935	13.9% of 14,808

1.5 Rationale of the study

An exploratory study is much needed which may inform the CHD patient's medication adherence and its determinants according to local contexts (Ebrahim et al., 2011; Lee et al., 2013). This is important for future reference on CR development and ensures the effectiveness of the CR intervention or programme. Besides that, the information from the qualitative exploration was used for the development of a construct in measuring factors in medication adherence among CHD patients at the individual level and local contexts. This validated construct in a questionnaire format is a triangulation process that is culturally tailored from the initial qualitative findings. Next, these questionnaires could also be used by other researchers in relevant research studies. Besides that, significant factors related to medication adherence were determined and evidently reported to be used for future cardiac rehabilitation programmes to ensure optimal medication adherence among CHD patients.

1.6 The aims of the study

This study aims to explore and assess the factors associated with medication adherence among CHD patients from the Malaysian local perspectives (Ang & Chan, 2016; Devaraj, 2017; Ganasegeran & Rashid, 2017). To achieve these aims is to determine the association model between the psychosocial factors that were qualitatively explored (such as beliefs on modern medicines, doctor and patient's relationship, information-seeking behaviour, gender-relevant differences, ethnicity, level of education, spiritual practice, controlling diet, and exercise) with the CHD

patients' adherence to their prescribed medicines. In which the intent of the first phase of the qualitative study is to explore the associative factors with adherence to secondary prevention on medications through the CHD patient's and family caregivers' perspectives. Next, to achieve the main aims of determining the relationships model; two questionnaires based on the qualitative findings were developed and validated. These questionnaires were used to further quantitatively assess the association model based on the adaptation of the theory of necessity and concern-specific beliefs framework by Horne et al. (1999) as in Figure 1.3, page 28 with initially explored factors from CHD patients in Malaysian population. Finally, in the third phase, the statistics of the aforementioned factors were analyzed for generalization of the explored psychosocial factors and association model development. Therefore, it was hypothesized that these factors are associated with adherence to medication in absence of any direct intervention.

1.7 Research questions

1. What are the psychosocial factors associated with medication adherence among multi-ethnic CHD patients in Malaysia from the patients and their caregiver's perspectives?
2. How to measure the psychosocial factors of medication adherence among multi-ethnic CHD patients in Malaysia?
3. What is the relationship between psychosocial factors with medication adherence among multi-ethnic CHD patients in Malaysia?

1.8 Objectives

1.8.1 General objectives

The general objective of this research was to explore psychosocial factors related to medication adherence among CHD patients from the perspective of Malaysian patients and their family caregivers, as well as to determine the relationship between these new factors that emerged from the initial qualitative findings related to medication adherence among CHD patients in Malaysia.

1.8.2 Specific objectives

1. To explore the psychosocial factors of medication adherence among multi-ethnic CHD patients in Malaysia from the patients and their family caregivers' perspectives.
2. To develop a valid questionnaire measuring the psychosocial factors of medication adherence among multi-ethnic CHD patients in Malaysia.
3. To determine the relationship model between psychosocial factors of medication adherence among multi-ethnic CHD patients in Malaysia.

1.9 Research hypothesis

This study is an exploratory work that does not require a hypothesis for the first and second phases of the study. However, the third phase of the exploratory relationships

model-building phase consists of a hypothetical study that suggests there is an association between psychosocial factors and medication adherence among individuals with coronary heart disease.

1.10 Theoretical Models: Health Psychology Theory Adherence Behavior

1.10.1 Theory of Planned Behaviour

A social cognition model that is widely used to explain and predict a variety of cognitive determinants of health behaviours is The 'Theory of Planned Behaviour, (TPB)' (Ajzen, 1985, 1991, 2006; Conner & Sparks, 2005; Sutton, 2010). The TPB is an extension of the theory of reason action (Ajzen, 1991). In TPB, behaviour is determined by the strength of a person's intention to perform that behaviour and the amount of actual control that the person has over the behaviour (Figure 1.1, Page 17). The strength of an individual's intention towards performing the actual behavioural control is determined by three factors: 1) attitude or overall evaluation of performing the behaviour, 2) the subjective norms of how the individual thinks others would want them to perform it; and 3) perceived behavioural control such as an individual's perceptions of their ability to perform the behaviour (Mendez et al., 2010). Meta-analysis suggests that TPB explains between 35 and 50 percent of the variance in intention and between 26 and 35 percent of the variance in behaviour (Sutton, 2010).

Despite that, a meta-analysis by Rich et al. (2015) suggests that the behaviour intention variable in TPB (attitudes, subjective norm, and perceived behavioural

control) are statistically significant predictors of adherence behaviour intention with ranged from 0.22 to 0.51, and the intention was a statistically significant predictor for treatment adherence. Among these three variables, perceived behavioural control is suggested to be the strongest predictor of intention with an effect that was significantly larger than the effects of attitude and subjective norm. Further comparison from several systematic reviews on social-cognitive models of health psychology theory, the meta-analysis by Rich et al. (2015) also suggests that the TPB is more favourable than the health belief model (DiMatteo et al., 2007) and common sense model (Aujla et al., 2016; Brandes & Mullan, 2014) in predicting treatment adherence among the chronic illness.

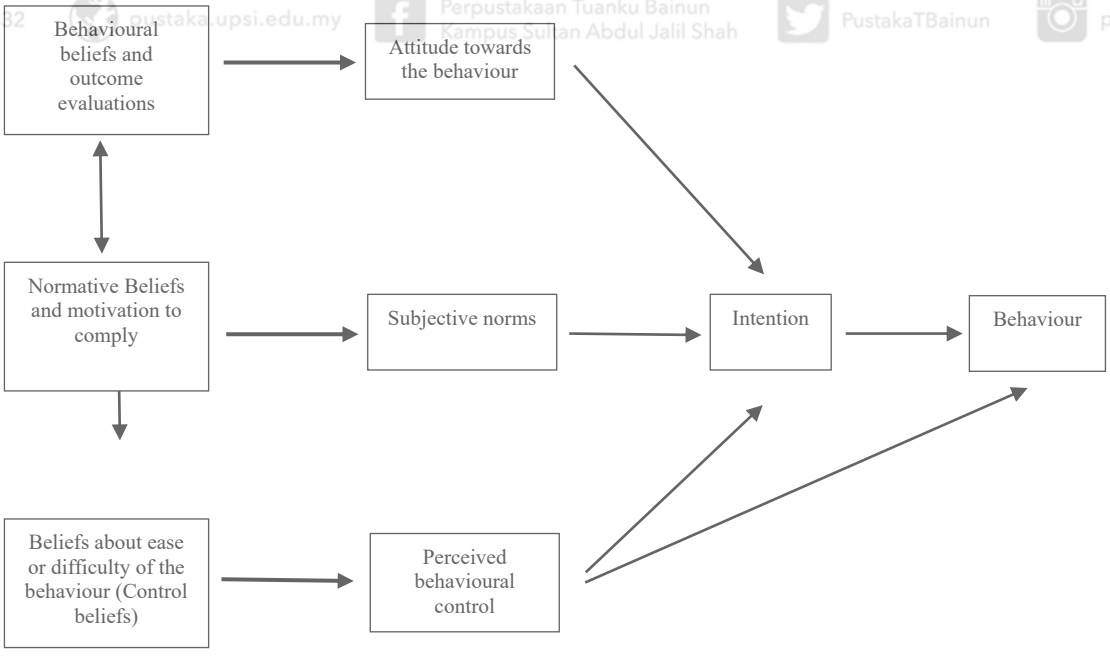

Figure 1.1. Theory of Planned Behaviour

A prospective study by Orbell et al. (2006) proves that both the social cognitive of TPB and the Self-Regulation Theory of the Common Sense Model (SR-CSM) were used to determine conceptual understanding of treatment adherence among cervical cancer patients. Their findings suggest that by combining both TPB and SR-CSM models, the variable of intention in TPB such as attitude, subjective norm, and perceived behavioural control are significant predictors that mediated the effects of treatment control of SR-CSM on intention. Thus, TPB provided an optimal prediction of intentions and completion of treatment than the SR-CSM. Furthermore, the efficacy of TPB on medication treatment adherence also shows better than widely accepted psychosocial factors predictors such as depression (Grenard et al., 2011), and communication skills of the physician (Zolnierek & DiMatteo, 2009).

However, the meta-analysis on medication adherence among chronic illness patients suggests TPB shows generally lower effect size in the variables of behaviour intentions and health behaviour of treatment adherence (Rich et al., 2015). This contradicts the earlier meta-analysis findings among healthy participants that suggest TPB shows high effect sizes in predicting changes in the variable of behaviour intention and health behaviours (Armitage & Conner, 2000; McEachan et al., 2011). This difference is due to the study's participant criteria and their health behaviours. The majority of the TPB studies focus on healthier samples and single health behaviours, such as predicting behaviour changes in healthy dietary intake, physical activity, or lessening in alcohol drinking (Rich et al., 2015). On the other hand, the chronic illness sample consists of older populations and those socially deprived and the illness requires them to adhere to many prescribed treatments with different

dosages of medications and to perform various health behaviours changes (Alwan, 2011).

Therefore, the reviews further suggest other strong predictive factors such as treatment beliefs of the Self-Regulation Common Sense Model (SR-CSM), which is significantly related to chronically ill patients on treatment adherence (Horne et al., 1999, 2013; Langebeek et al., 2014) along with the theory of planned behaviour to improve their intention or behavior on treatment adherence (Rich et al., 2015).

1.10.2 The Self-Regulation Common Sense Model – The Necessity Concern Framework

The Self-Regulation model (SRM) or the Common-Sense Model (CSM) of illness behaviour is developed by Leventhal et al. (1984). The SR-CSM proposes that in response to illness and other health threats, people develop parallel cognitive and emotional representation, which in turn give rise to problem-based and emotion-focused coping procedures, respectively (Leventhal et al., 2001). It also emphasises personal, common-sense beliefs about illness (Cameron & Moss-Morris, 2010) and it is one of the major frameworks used to understand –the adaptation of people to health threats (Leventhal et al., 1980; Leventhal & Ian, 2012).

The fundamental mechanism of the SR-CSM involves a dynamic problem-solving model with three main stages, which are interpretation, coping, and appraisal. The interpretation stage is about the individual developing thoughts and ideas about

illness based on five domains of illness beliefs construct. The illness beliefs construct is based on the individual constructs of their illness and will then influence their coping strategies decision. Finally, during the appraisal stage, the individual will evaluate the effectiveness of their chosen coping strategies. Alongside, these problem-solving processes is a parallel emotional response (Wyer et al., 2001).

1.10.2.1 The Illness Beliefs Component

The five domains of the individual's illness beliefs such as identity (beliefs on the illness label or diagnosis and associated symptoms), causality (beliefs on the factors that caused the illness), consequences (beliefs on expected effects of an illness on physical, social, and psychological wellbeing), timeline (beliefs on the expected duration of the illness), and cure or control (beliefs on the extent to which the illness can be controlled or cured through treatment measures and behaviours) (Cameron & Moss-Morris, 2010).

These illness beliefs were shown as significant predictors in various types of cardiac health-related behaviours outcomes. For instance, the five domains of the illness beliefs have predicted various health behaviour outcomes in patients diagnosed with CHD such as attributions to diet and exercise were associated with lifestyle changes in these behaviours (Coutu et al., 2003; Martin et al., 2005; Perkins-Porras et al., 2006), the severity of the myocardial infarction symptoms, consequence and controllable stronger beliefs associated with greater participation on recommended cardiac rehabilitation (Cooper et al., 1999; French et al., 2007; Petrie et al., 1996),

clinical intervention by enhancing control/ cure belief and reduced the timeline and consequences influence in a faster return to work (Broadbent et al., 2009; Petrie et al., 2002), improvement in mood and quality of life (Foxwell et al., 2013; Stafford et al., 2009) and help-seeking behaviour in-hospital recovery and functional status (Darr et al., 2008).

However, the recent meta-analysis and systematic reviews on the SR-CSM model in predicting treatment adherence among chronic illness (Aujla et al., 2016), and self-management adherence (Brandes & Mullan, 2014) suggest that illness beliefs are a weak predictive factor in treatment adherence. Furthermore, a meta-analysis by Mika (2016), among CHD patients also suggests that psychological cardiac intervention is not significantly efficacious as compared to non-psychological based intervention, as a small reduction of maladaptive illness perceptions was reported. Therefore, the treatment beliefs component of the extended SR-CSM is suggested to be considered as an integrated model with illness beliefs in future studies toward a better treatment adherence model.

1.10.2.2 The Treatment Beliefs Component

Another component of the SR-CSM model besides the illness beliefs is the treatment beliefs. The treatment beliefs are an additional construct in extended Leventhal's Common-Sense Self-Regulation model (Leventhal et al., 1992). Treatment beliefs are defined as patients' beliefs about the treatments or interventions that are being offered to help with their illnesses (Newman et al., 2012). The illness beliefs component of

SR-CSM will only encourage the patients to seek appropriate treatment such as performing health behaviour changes, which must be coherently linked to the treatment beliefs component (Cameron & Moss-Morris, 2010). The overview of how the illness and treatment representation works in the SR-CSM is in Figure 1.2, Page 23.

Reviews suggest that the inter-relationship of both treatment and illness beliefs may improve the treatment adherence to self-care management among chronic illnesses (Aujla et al., 2016), but there are still limited studies conducted on this model as a whole, and the model based on treatment beliefs only. Therefore, this highlights the need for future studies to include the treatment beliefs component as one of the important variables for medication adherence.

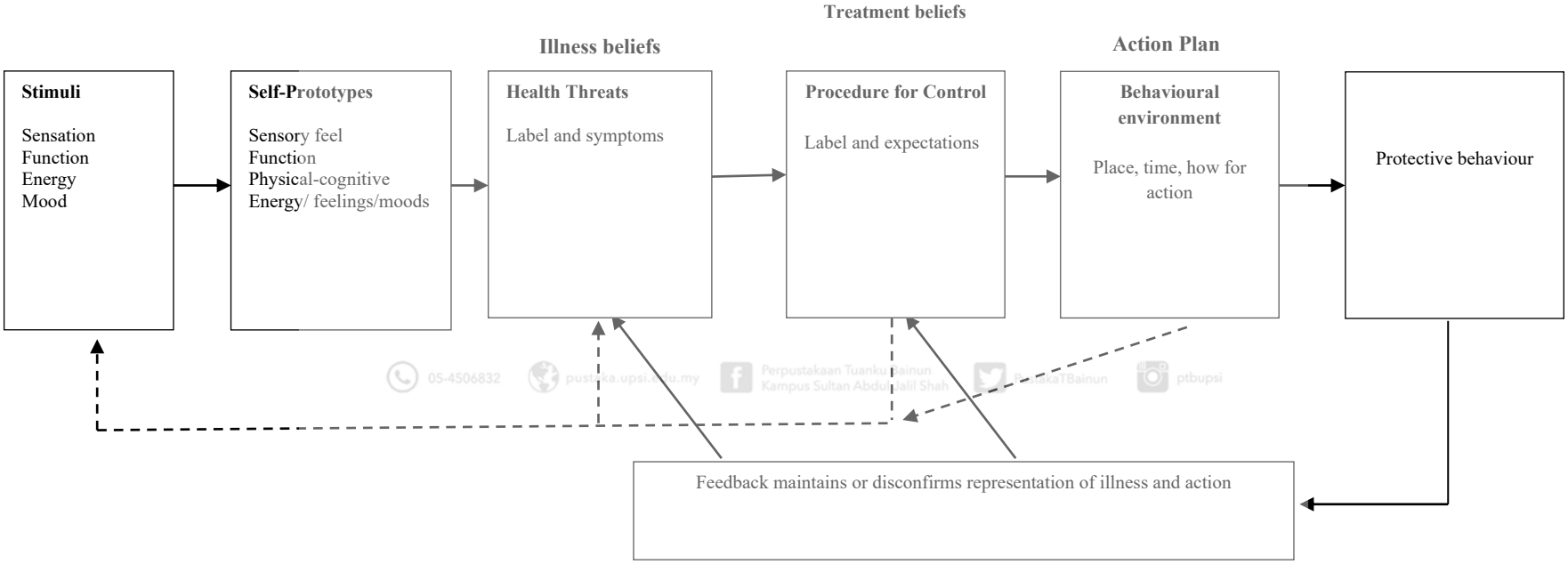

Figure 1.2. The Common-Sense Model of Illness cognitions (Leventhal, et al., 2012)

1.10.3 Application of the Treatment Beliefs - Necessity-Concern Framework

The treatment beliefs component of the Self-Regulation Common Sense Model is developed based on the Necessity Concern Framework (NCF). The NCF is based on the individual's perception of how the treatment will benefit them, and the potential personal impact of the treatment costs. It is also based on emotional and cognitive components and is associated with the operationalised concepts in adherence to treatment recommendations (James et al., 2014). The NCF framework was developed to understand the patient's decision on treatment adherence based on how patients perceive the need for a prescribed treatment (called *necessity constructs*) and their worries about the potential adverse effects as an outcome (called *concern constructs*).

Based on the literature, the necessity concern framework has been used in a broad range of different quantitative studies that suggest individuals with lower beliefs in specific concern components reported higher rates of adherence to medication (Horne & Weinman, 2002; Llewellyn et al., 2003; Neame & Hammond, 2005), especially for cardiovascular diseases (LaPointe et al., 2011; Magadza et al., 2009; Sud et al., 2005) and CHD patients (Dias et al., 2014). Most of these findings suggest those with higher scores on concern treatment beliefs will be less likely to adhere to the prescribed treatment.

The *necessity* beliefs are affected by perceptions of the illness condition being treated (Horne & Weinman, 2002), and also by symptom expectations and experiences that predict adherence such as in patients taking highly active antiretroviral therapy (HAART) (Cooper et al., 2009). The *concern* beliefs are about

the potential negative effects such as unpleasant symptoms and long-term consequences of adhering to the medications (Horne, 2006; Horne et al., 2004; Horne & Weinman, 2002). For instance, in a study involving patients from several illness groups (asthma, diabetes, heart disease, and cancer), reported non-adherence was related to doubts about the necessity of prescribed medication and concern about potential adverse effects (Horne et al., 1999).

Further findings on *concern* beliefs in medication are related to the negative social perceptions of the adverse effect of taking medicine that contains an intrinsically harmful addictive substance that is overused by healthcare practitioners such as doctors (Horne & Clatworthy, 2010). Besides, findings from a survey conducted by Calnan et al. (2005) suggests that social perception is linked to wider concern and suspicion of science and its benefit such as medicine, poor trust in healthcare practitioners, and also increasing interest in using CAM.

Reviews and meta-analysis on treatment adherence among patients with acute coronary disease by Crawshaw et al. (2016), suggest the NCF shows only a small effect size with a magnitude, but still comparable to other predictors of adherence such as depression, type D personality, and social support. Amongst all psychosocial determinants, only depression is identified data for meta-analysis as a significant predictor of non-adherence (OR = 2.05, 95% CI 1.39–3.03, p = 0.003). Similarly, a meta-analysis on treatment adherence on multi-illness conditions also suggests the NCF as one important factor to consider when understanding reasons for non-adherence, even with the effect sizes were mostly small with a magnitude but still comparable to other significant predictors of adherence such as physician

communication (r = 0.19) (Zolnierek & DiMatteo, 2009) and as well as adherence and perceived illness severity (r = 0.22) (DiMatteo et al., 2007). Thus, as suggested by reviews studies focus on treatment beliefs are stronger predictors of adherence particularly on medication compared to clinical and sociodemographic factors (Hirani & Newman, 2005).

The treatment beliefs component has a validated measure that is useful in investigating medication adherence in a range of chronic illness samples. The measure is known as the Belief about Medicines Questionnaire (BMQ) (Horne et al., 1999). However, the BMQ is only able to measure medication adherence due to its specific items (Llewellyn et al., 2003). Qualitative findings by (Cooper et al., 2005) suggest that NCF is still suitable to assess adherence behaviour among heart disease patients in cardiac rehabilitation such as exercise and diet changes.

1.10.4 The health psychology theories' limitation on medication adherence among chronic illness

Reviews by Stavri and Michie (2012) conclude that improvement in medication treatment adherence needs to be informed through the understanding of all health psychology theoretical frameworks. The major health psychology theoretical framework, the view of socio-cognitive, self-regulation, and social support aspects should be within the range of sub-ordinate existing models such as the Health Belief Model (HBM), Theory of Planned Behaviour (TPB), and self-regulation model

(SRM). Besides that, the individual components of variables such as perceived barriers, perceived benefits, and treatment beliefs needed to be considered.

Nevertheless, a systematic review by Kardas et al. (2013) identified 771 individual factors that may influence non-adherence in chronic treatment regimens which suggests the challenges in developing a theoretical model that can fully explain adherence complexity among chronic illness, particularly in the unexplained factors. Similarly, others reviews on existing health psychology that predict medication adherence suggest that due to the determinant variations and complicated outcome measurement, there is no single theory or model that can able to explain the complexity of adherence behaviour (Holmes et al., 2014). Therefore, Rich et al. (2015) further suggest that future research should examine more than a single theory's utility in predicting adherence, its development, and the evaluation of adherence interventions.

In this study, the main aim is to explore the associative factors with medication adherence based on the Malaysian context from both patients and their family caregivers' perspectives. To understand these factors, the initial exploration was not based on any existing predictive theory to ensure the findings are unique specifically based on the Malaysian with CHD, however, this study is not a grounded theory-based research.

In this study after objective 1 was fulfilled, emerging factors associated with medication use were elicited from the initial phase of qualitative explorations as in Chapter 4, Section 4.2, Page 145, the qualitative factors exploration was then

followed with extensive literature reviews to conclude on specific factors to be included in the instrument development in the second objective. Theoretically, based on the qualitative findings in Chapter 4, as in Section 4.2, Page 145, and supported with literature reviews; our findings suggest adherence to medication would be positively correlated with patients' necessity-specific beliefs; and negatively correlated with concern-specific beliefs of the medicines. Hence, the necessity and concern framework by Horne et al. (1999) was adapted as the theoretical framework for the second phase of quantitative investigations. However, the overall conceptual framework proposed for this study is illustrated in Figure 1.4, Page 29 with consideration of the local context factors associated with medication use among CHD patients in Malaysia as explained in Chapter 2, Section 2.4, and Section 2.5, Pages 53 – 72. These factors are based on qualitative findings as in Chapter 4, Section 4.2.3, Page 149, such as psychosocial beliefs, doctor-patient relationship, treatment-relevant knowledge through information-seeking behaviour, and lifestyles changes; whilst the socioeconomic determinants such as education level, marital status, gender, ethnicity, and lifestyle changes were included.

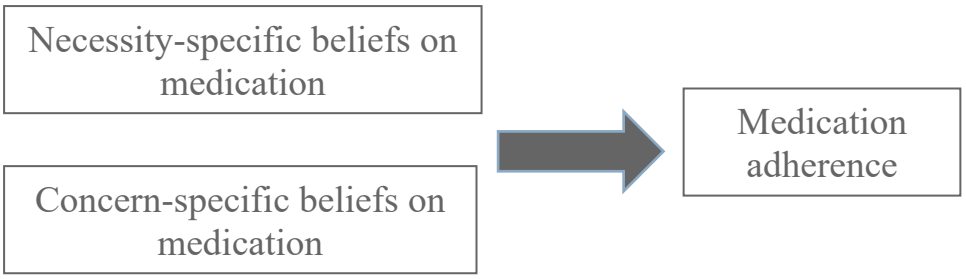

Figure 1.3. The Necessity and Concern Framework *(Horne et al., 1999)*

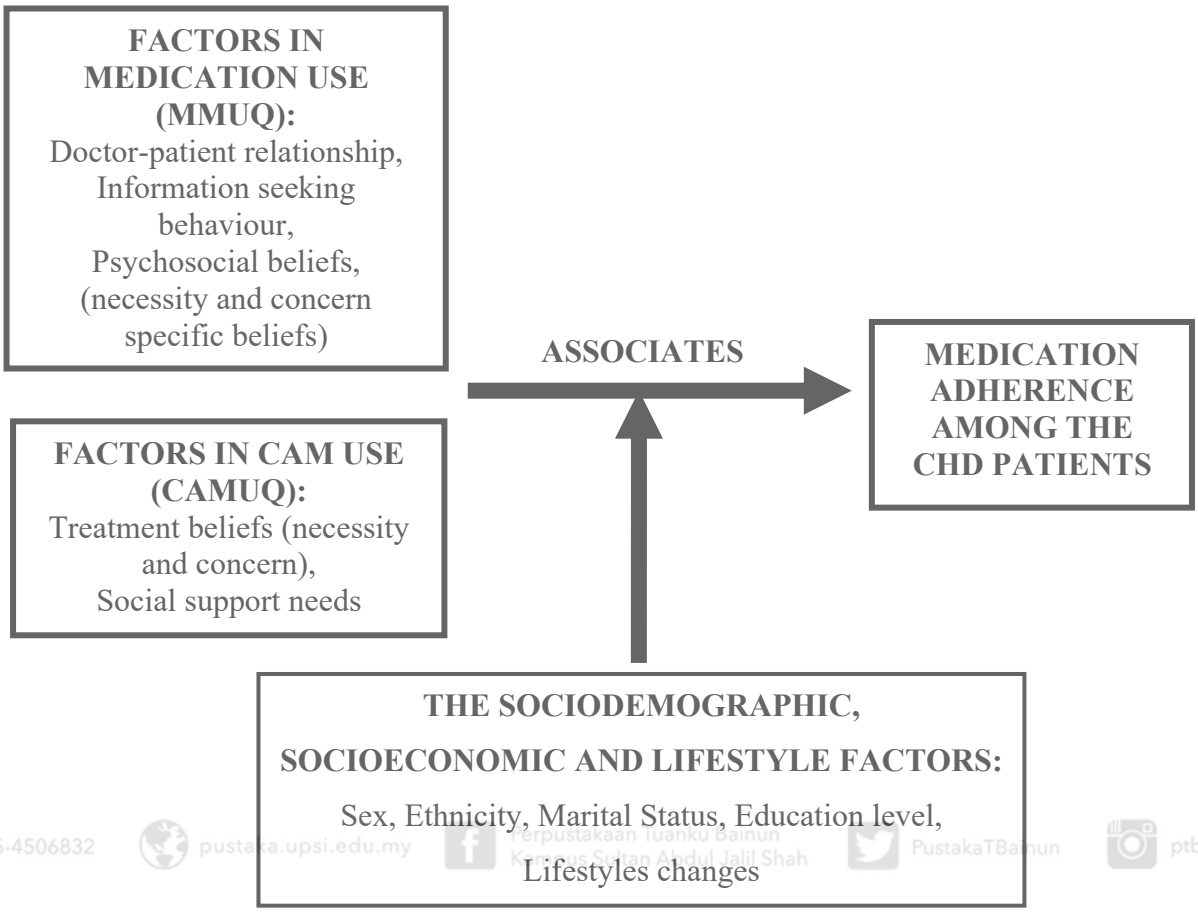

Figure 1.4. The conceptual framework for medication adherence among CHD patients and the associated factors.

1.11 Conceptual definition

1.11.1 Secondary prevention medication – cardiac rehabilitation

Secondary prevention medication in this study is referring to attempts to prevent complications in high-risk people with established CHD such as cardiac rehabilitation that focused on medication intervention. The medication treatment in secondary prevention includes anti-hypertensive, acetylsalicylic acid drugs, lipid-lowering, hypoglycaemic, antiplatelet drugs, anticoagulant treatment, and surgery such as coronary re-vascularisation and carotid endarterectomy as the standard medical treatment for prevention of re-current CHD (heart attacks) and cerebral vascular diseases (CeVD) such as strokes events (World Health Organization, 2003).

1.11.2 Clinical features of coronary heart disease

Coronary heart disease (CHD) is a type of cardiovascular disease, which occurs when the heart is supplied with inadequately oxygenated blood (Baum et al., 2012). Coronary heart disease occurs due to an accumulation of fat that forms a plaque around the lining of the coronary arteries. This chronic inflammation of the arteries is known as atherosclerosis leading to thrombosis that causes inadequate oxygenated blood supplies in the blood arteries and an increase in blood pressure (Baum et al., 2012).

Coronary arteriosclerosis is a substrate for several heart disease conditions such as CHD. It occurs due to the accumulation of fat and other substances that form plaque on the lining of the coronary arteries. As blood vessels become severely narrowed or as the plaque ruptures, a platelet-clotting cascade may culminate in thrombosis that causes a sudden increase in the restriction of blood flow. In certain cases, these plaques may completely block the blood vessel. CHD has several clinical manifestations as follows (Baum et al., 2012):

1.11.2.1 Myocardial Infarction (MI), or 'heart attack'

MI, or 'heart attack', is the death portion of the heart muscle caused by prolonged and/or severe ischemia. Symptoms of MI include chest pain, shortness of breath, nausea, vomiting, palpitation, sweating, and anxiety.

1.11.2.2 Angina pectoris

Angina pectoris refers to pain in the centre of the chest that may radiate along the left arm to the jaw or the back.

1.11.2.3 Sudden cardiac death

Sudden cardiac death is referring to cardiac death without warning. It involves cardiac arrest (i.e. sudden loss of heart function), which occurs when the electrical impulses in the diseased heart become rapid, chaotic, or extremely slow.

1.11.2.4 Heart failure

Heart Failure is a condition in which a damaged heart is unable to pump adequately to meet the demands of the body for oxygen and nutrition. It can be grouped into systolic or diastolic dysfunction.

1.12 Operation definition of the variables

1.12.1 Dependent variables

World Health Organization (WHO) described adherence as a phenomenon determined by five dimensions: patient-related factors, social and economic factors, health care team and system-related factors, condition-related factors, and therapy-related factors (Sabaté, 2003). Adherence is also defined as the ability and willingness to abide by the prescribed therapeutic regimen (Inkster et al., 2006; Jin et al., 2008). For instance, there are many terms used besides adherence, such as ‘compliance’, and

'concordance'; in which all of these terms are used to describe the level at which patients use, or maintain the prescribed medication regimen.

Specifically, the term 'adherence' refers to the attachment or commitment that patients have to medication uptake and the capability to control its use (Keenan, 2017). Whereas, adherence to long-term therapy is the extent to which a person's behaviour on taking medication, following a diet, and/or executing lifestyle changes, corresponds to agreed recommendations from the health care provider for successful intervention (Sabaté, 2003).

In this study, medication adherence was assessed using the medication adherence scale by Ramli, Ahmad, & Paraidathathu (2012) and containing 7 items. The answers to the items were calculated as the total score which can range between 0 to 35. The total score was categorized into two categories as not adherence (0-27), and adherence (28-30). In the analysis, medication adherence was categorized into 2 categories:

i) Not adherence: Coded as 0; with 0 as the references, and
ii) Adherence: Coded as 1.

1.12.2 Independent variables

Reviews by Leslie, McCowan, & Pell (2019) on systematic reviews suggest that adherence to cardiovascular medications was associated with disease factors, therapy factors, healthcare factors, patient factors, and social factors. In addition, reviews by

Keenan (2017) emphasize psychosocial factors such as patients' perceptions and treatment beliefs associated with optimum medication adherence to be addressed adequately by their health professionals. Consequently, the absence of these factors will results in poorer clinical health outcomes among the patients as described in detail in Chapter 2, Section 2.4 and Section 2.5, Pages 53 - 72. In this study, the factors in medication adherence were measured objectively by using a newly developed questionnaire called 1) the CHD-specific modern medicine use questionnaire (CHD-MMUQ) and 2) the CHD-specific complementary alternative medicine use questionnaire (CHD-CAMQ). Hence, the following are operational definitions specifically on both questionnaires as independent variables of this study.

1.12.2.1 Factors in modern medication use

Modern medicine in this study refers to secondary prevention on modern medication as prescribed by doctors. There are four types of important drugs such as β blockers, angiotensin-converting-enzyme (ACE) inhibitors, statins, and antiplatelets were standard modern medicines prescribed to CHD and stroke patients (Yusuf et al., 2011). Whereas, the factors in modern medication use consist of the patient's psychosocial beliefs on the treatment (necessity-specific beliefs or concern-specific beliefs), doctor-patient relationship, treatment-related knowledge through information-seeking behaviour, and social support needs. These factors were elicited from the qualitative interviews with the patients and their family caregivers as in Chapter 4, Section 4.2.6, Page 155. The item scoring of this questionnaire is based on the Likert format, and construct scoring is a continuous scoring format. Based on the

mean of the total scores, higher means of the total score indicate higher level of each construct and vice versa. Details on the factors in medication use scores as in Chapter 4, Section 4.4.2, Page 232. For instance, higher scores for necessity beliefs in medicines use is associated with adherence in medication adherence, and vice versa as based on the study by Horne et al. (1999).

1.12.2.2 Factors in complementary alternative medicines use

Complementary alternative medicine (CAM) in this study is referring to traditional medicine in Malaysia such as Malay medicine, Islamic medical practice, traditional Chinese medicine, traditional Indian medicine, homeopathy, and complementary therapies (Ministry of Health Malaysia, 2011). In specific CAM treatments such as home remedies or lifestyle modification (Devkota et al., 2016). Factors in complementary alternative use medicines use are also factors that emerged as associative factors with medication adherence among CHD patients. Specifically, factors such as patient's treatment psychosocial beliefs (necessity-specific beliefs or concern-specific beliefs), and social support needs were elicited from the Phase One qualitative interviews between the patients and their family caregivers as in Chapter 4, Section 4.3, Page 216.

The item scoring of this questionnaire is based on the Likert format, and construct scoring is a continuous scoring format (Chapter 3, Section 3.5, Page 112). Based on the mean of the total scores, higher means of the total score indicate a higher level of each construct and vice versa. Details on the factors in complementary

alternative use scores as in Chapter 4, Section 4.4.2, Page 232. For instance, higher scores for necessity beliefs alternative medicines use is associated with low medication adherence, and vice versa based on a study by Grant et al. (2012).

1.12.2.3 Sociodemographic factors

a) Ethnicity

Ethnics is based on the respondent's fathers' ethnicity. It was categorized into Malay, Chinese, and Indian which belong to the three major ethnic groups in Malaysia. A study by Ramli et al. (2012) suggested that Malay ethnicity is the most adherent followed by Chinese ethnicity and the least adherence from Indian ethnicity. Therefore, ethnicity was categorized into 3 categories as the following:

i) Malay: Coded as 0; with 0 as the references and
ii) Chinese: Coded as 1
iii) Indian: Coded as 2

b) Gender

Gender is according to the respondent's birth as female or male. In this study, gender was divided into two categories which were based on a study in Malaysia, that suggest men with CHD were more prevalent than women to be non-adherent to medication (Ganasegeran & Rashid, 2017). The category is then defined as the following:

i) Female: Coded as 0; with 0 as the references and
ii) Male: Coded as 1

c) Marital Status

Marital status is referring to the marital status of the respondent. Those who are married and have spouses are defined as married, and those who are divorced, widowed or unmarried are defined as single. A previous study suggests a married person is more adherent to the medications as compared to those who are single (DiMatteo, 2004). The categories are coded as the following:

i) Single: Coded as 0; with 0 as the references and

ii) Married: Coded as 1.

d) Education Level

Education level was divided into three categories that suggest higher education level indicates better medication adherence, as in a study among Malaysians (Amin et al., 2014) and Pakistanis (Khan et al., 2006). For analysis purposes, the variables under education level were categorized into the following:

i) Low Education level: Coded as 0; with 0 as the references and

ii) Moderate Education level: Coded as 1

iii) High Education level: Coded as 2.

e) Lifestyles Changes

Lifestyle changes were assessed categorically i.e. part of the sociodemographic section, to determine whether respondents practiced lifestyle changes after suffering from coronary heart disease. We are using direct questioning to limit the number of questionnaires that would likely burden respondents to answer because of their current illness condition.

1.12.2.4 Diet controls

Diet controls were divided into two categories which are controlling diet, and not controlling diet. The items consist of closed-ended questions indicating to the participants that controlling diet practice is defined as monitoring daily diet intake through healthier food options and lessening the rice and other carbohydrate sources, sugary drinks, and oily and fatty foods. Whereas, not controlling diet is defined as routine food without considering high carbohydrates, sugary drinks, and oily and fatty foods in their daily food intake. The controlling diet participants aim on improving their health in order to avoid recurrent coronary heart diseases. This was based on the study by Ling et al. (2020) that suggest patients with CHD in the controlling diet category are more adherent to medication. Therefore, the categories are coded as the following:

i) Not control diet: Coded as 0; with 0 as the reference and
ii) Control diet: Coded as 1

1.12.2.5 Exercise

The exercise was divided into two categories which are exercise, and not exercise. The items are closed-ended questions indicating the participant's exercise practice which is defined as exercise if the participants perform any level of exercise activities within 7 days (1 week) based on Godin and Shephard (1985), such as easy walking to jogging. The exercise practice aims of enhancing their physical wellness in order to avoid recurrent coronary heart diseases. The category was divided into two:

i) Not exercise: Coded as 0; with 0 as the references and

ii) Exercise: Coded as 1

1.12.2.6 Spiritual practice

Spiritual practice is divided into two categories, namely doing spiritual practice, and not doing spiritual practice. Doing spiritual practice refers to participants who perform routine spiritual activities such as spiritual meditation, or any religious ritual practice with the aim of enhancing their spirituality in order to cope with the symptoms of coronary heart disease well. Whereas, not practicing spiritual practices was contrary to routine spiritual activities, and participants did not practice any related spiritual activities. This is based on local studies showing that a person with higher spiritual practice, is more adherent to prescribed medications (Hatah et al., 2015). The category was divided into two:

i) Not performing spiritual practice: Coded as 0; with 0 as the references and

ii) Performing spiritual practices: Coded as 1

1.13 The significance of the study

Reviews by Ho et al. (2009), suggest that medication adherence is an important part of cardiovascular outcome research and quality improvement in clinical practice. For instance, 16 years of follow-up results of a randomised controlled trial of medication-

based treatment among hypertensive patients associated with long-term benefits on cardiovascular outcomes such as fewer cardiovascular death more than 10 years after the trial closure (Gupta et al., 2018). However, there are very few exploratory studies on medication adherence amongst people with CHD in Malaysia (Ang & Chan, 2016; Ganasegeran & Rashid, 2017; Kassab et al., 2013a; Kassab et al., 2015; Lee et al., 2013). Consequently, the Malaysian-based associative factors with medication adherence among CHD patients remain unexplored (Lee et al., 2013).

Apart from that, all the exploratory models were also not validated locally in Malaysia, a multi-ethnic developing country, particularly on the CHD patients. In addition, Koh et al. (2011) indicated that the major adverse cardiovascular events vary between ethnic groups, where Indians have a higher rate compared to Malay and Chinese. On another hand, reviews by Jin et al. (2008), suggest that risk factors based on an individual's socio-cultural background are important to be identified during the pre-treatment stage prior to developing or offering any intervention programme. Hence, an exploratory model is deemed necessary to improve patient care in Malaysia from the multi-ethnic perspective.

This study utilised data from the National Heart Institute (NHI), and University Kebangsaan Malaysia Medical Centre (UKMMC). The NHI is the primary cardiac hospital that received cases from all states in Malaysia including Sabah and Sarawak, whereas UKMMC received referrals mainly from Klang Valley. The varieties of participants recruited in this study may represent Malaysian with CHD experience related to clinical information and reflect the contemporary practice in the centre. The final exploratory factors identified in the qualitative findings are validated

in the form of a questionnaire, and next were used to develop the models via logistic regression. Finally, the best-performed model was chosen to translate the algorithm into an association model. Thus, the exploratory findings from this study will provide a preliminary model for a reference towards the development of locally tailored secondary prevention. The findings from this study will be of great interest to health practitioners and researchers especially those involved in healthcare decision-making and patient treatment management specifically in medication adherence (Kini & Ho, 2018).

1.14 Summary

Several research that was conducted on CHD patients in Malaysia has suggested the level of patient adherence to medications is still suboptimal. Due to this challenge, the underlying psychosocial factors that contribute to better medication adherence are still uncertain and further research is required (Lee et al., 2013). To fulfill the first objectives of this study, reviews suggest effective psychosocial-based treatment for cardiac rehabilitation, which only can be determined through qualitative exploration need to be performed in the first phase (Jolly et al., 2007; Rouleau et al., 2018). Next, the second objective of the study is where the new questionnaire was developed based on the factors identified in the initial qualitative study, and further validated in Chapter 4, Section 4.3, Page 216.

Finally, by using the newly developed questionnaire on the psychosocial factors of medication use among CHD patients; at the third objective the association

between these factors with medication adherence was determined (Chapter 4, Section 4.4.3, Page 235). The overview of this study's research objective is illustrated in Figure 1.5, Page 43.

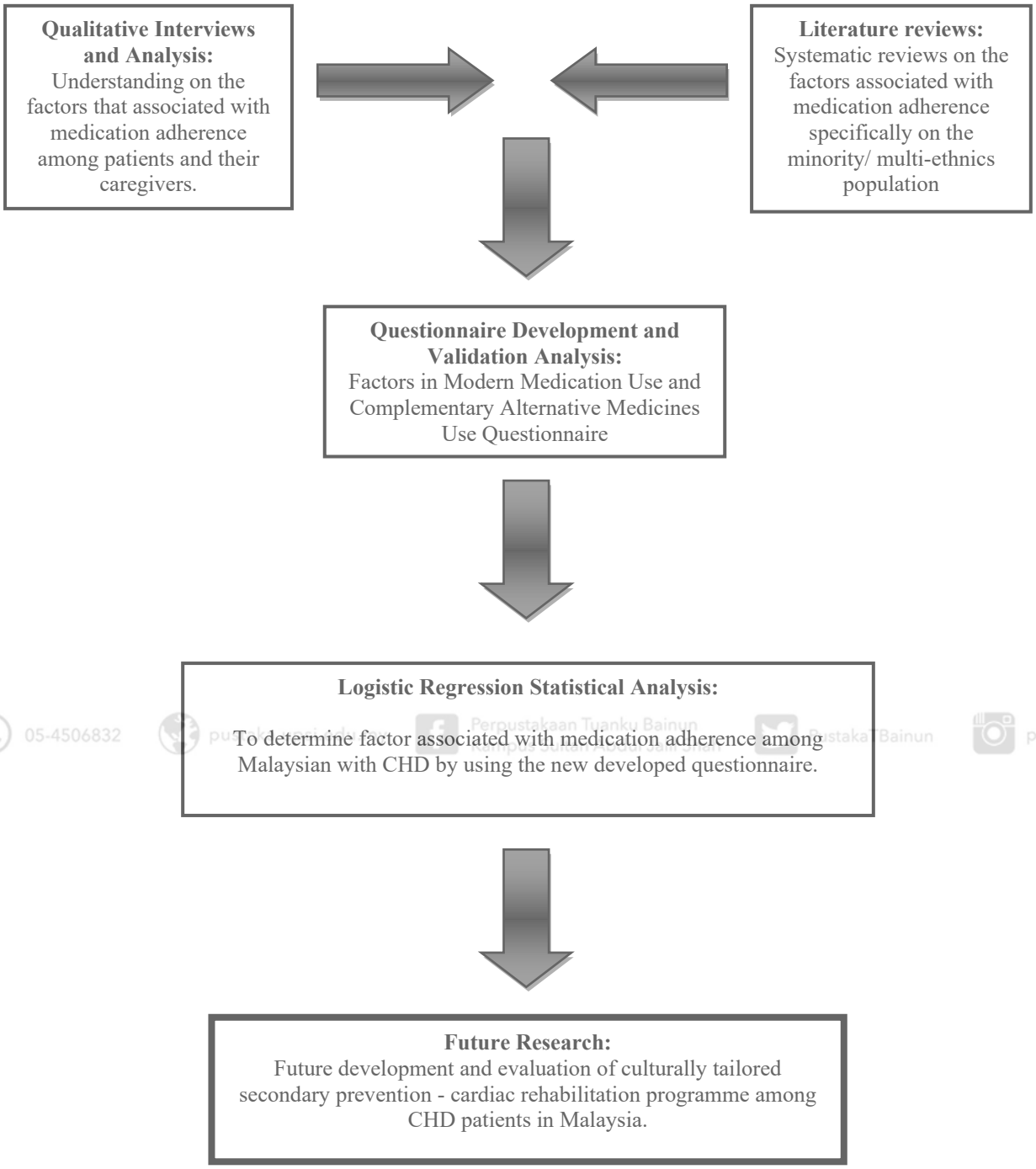

Figure 1.5. Overviews of research aims and objective of the study