UNIVERSITI TEKNOLOGI MARA

BELIEFS ABOUT MEDICINE AND MEDICATION ADHERENCE AMONG MALAY PATIENTS WITH TYPE 2 DIABETES MELLITUS IN PRIMARY HEALTH CARE

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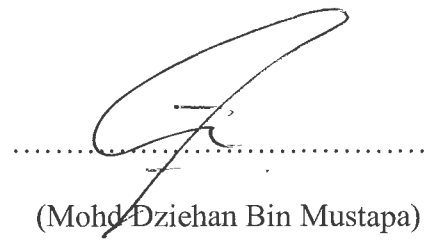
DECLARATION

I declare that the thesis is the result of my work and has not, whether in the same or a different form, been presented to this or any other university in support of an application for any degree than that for which I am now a candidate



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ABSTRACT

Prevalence of diabetes is increasing all over the world and the number is expected to rise to 300 million in the year 2025 (WHO, 2003). Malaysia is not excluded from this increasing trend; WHO estimated that 2.48 million Malaysians will be diagnosed with diabetes by the year 2030 (Zanariah et. al., 2008).

This research aims to investigate the relationship between cognitive and emotional parameters of patients' attitudes and beliefs toward prescribed medicines and medication adherence among Malay Type 2 diabetes mellitus patients in Primary Health Clinics.

The specific objectives of this study is to explore Malay Type 2 Diabetes Mellitus patients' beliefs, specifically toward prescribed oral hypoglycaemic medication (OHA); to establish level of adherence toward prescribed OHA based on HbA1c latest result (2009/2010); to describe the beliefs on the necessity of prescribed medications and concerns in taking it; to describe the beliefs about the general harm of the prescribed medications and beliefs that medicines have been overused by the prescribers in general; to analyse the relationship between beliefs about medicine (necessity and concern) with self-reported adherence score (MARS) and finally to investigate the differences in beliefs about medicine among genders, age groups, duration of being diagnosed with diabetes, educational level, and household incomes.

In this study, 345 Malay Type 2 diabetes mellitus patients agreed to participate. The results from BMQ-specific showed the mean necessity scale (19.91, SD=3.992) outweighs the concern scale (14.75, SD=4.966). For the necessity–concern differential the mean total score is 5.15 (SD 7.165). The mean for total scores of the MARS scale is 21.77 (SD 2.647). The majority of the patients (70.7%) had a necessity scale which outweighs the concern scale. A statistically significant positive correlation between specific-necessity scale and total MARS score while negative correlation between specific-concern scale and general-harm scale with total MARS score (Spearman Rho p=0.000) emerged. There were statistically significant differences for BMQ-subparts specific-necessity, specific-concern and general-overuse within age group, educational level, duration of being diagnosed with diabetes and household income. There is no significant difference among gender. The majority of the patients agreed to questions in the BMQ necessity scale, a mixed answer of agree and disagree in the concern scale, disagree in the general-harm scale and agree in the general-overuse scale.

Beliefs about prescribed medicine among patients associated with self-report medication adherence were similar with the results from Western countries. Theoretically, this preliminary study has shown a significant relationship between beliefs about medicine and medication adherence; thus both tools (BMQ and MARS) could be applied to daily clinical practice by pharmacists to further enhance their ability to ascertain the level of adherence in correlation with patients' beliefs about their medications.

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ABBREVIATIONS

Abbreviations	Full texts
BMQ	Beliefs about Medicine Questionnaire
HCP	Health Care Providers
IFG	Impaired Fasting Glycaemia
MARS	Medication Adherence Report Scale
MOH	Ministry of Health
NHMS	National Health and Morbidity Survey
NHS	National Health Service
OHA	Oral Hypoglycaemia Agent
PHCT	Primary Health Care Team (PHCT)
SD	Standard Deviation
UKPDS	United Kingdom Prospective Diabetes Study
WHO	World Health Organization

CHAPTER 1

Introduction

The prevalence of diabetes is increasing all over the world with approximately 150 million people affected and this number is expected to rise to 300 million in the year 2025 (WHO, 2003; Shaw, Sicree & Zimmet, 2009). The rising trend in the prevalence of diabetes is due to an aging population, unhealthy diet, obesity and a sedentary lifestyle (WHO, 2003; Lindenmeyer, 2006; Zanariah et al., 2008). In the United Kingdom (U.K), obesity among all age groups is one of the factors that lead to young people being diagnosed with type 2 diabetes (Helen & Robert, 2009) Malaysia is not excluded from the world increasing trend of people diagnosed with diabetes since WHO reported that Malaysia is estimated to have a prevalence of 2.48 million people with diabetes by year 2030 (Zanariah et al., 2008).

Inadequate control of diabetes can lead to various complications, such as micro- and macro-vascular diseases, retinopathy, nephropathy, cardio and cerebro-vascular disease, neuropathy, peripheral vascular disease, and it also affects the central and peripheral nervous systems (Helen & Robert, 2006). Furthermore, diabetes is usually diagnosed late, which leads to a high cost of treating the disease as a result of complications (Anuar, 2000). In the U.K, almost 10% of the National Health Service (NHS) budget is spent to treat diabetes complications (Helen & Robert, 2006).

To determine the prevalence of diabetes (known and newly diagnosed) and impaired fasting glycaemia (IFG), The Ministry of Health Malaysia (MOH) has taken the effort to conduct a population base study (survey) once in every 10 years among

the Malaysian population. Based on findings from the First National Health and Morbidity Survey (NHMS I) conducted in 1986, the prevalence of diabetes is 6.3% of the total population and the percentage increase is 8.3% as reported in the Second National Health and Morbidity Survey (NHMS II) in 1996 by Zanariah et al., (2008).

The expected rising trend of diabetes prevalence among Malaysians was seen in the Third National Health and Morbidity Survey (NHMS III) conducted in 2006. Based on the findings, it was reported that the prevalence of diabetes (known and newly diagnosed) was 11.6% in those above 18 and as high as 14.9% in those above 30 (Zanariah et al., 2008). According to Zanariah et al., (2008) similar results were seen in age group analysis where it was 2% among the 18-19 year olds and rise to an alarming prevalence ranging between 20.8 – 26.2% among the 50 – 64 year olds.

Comparing findings from NHMS II and NHMS III showed the prevalence of diabetes increasing at an average rate of 8.0% per year which resulted in an increase by 80% seen over just a decade (8.3% in NHMS II *vs.* 14.9% in NHMS III) in adults above 30 years (Zanariah et al., 2008). The Minister of the Ministry of Health Malaysia, Dato' Sri Liow Tiong Lai in his speech recently (MOH, 2009), also addressed the alarming situation of increasing prevalence and it is estimated that about a third (or 36%) of the diabetic population were undiagnosed.

To deal with this situation, the Ministry of Health (MOH) has started on a new strategy to reduce the prevalence of diabetes through education, counselling and getting more involvement from healthcare providers (Salmiah & Jusoff, 2009). Good communication between patients and healthcare providers has proven to bring a positive impact in patient care including satisfaction and self-care behaviours. Healthcare providers with good communication skills have greater achievement with

their clinical practice when patients are satisfied and the positive impact will lead to better patient outcomes (Fitzgerald, 2008).

Physicians have a big influence on patients' medication regimens (Piette et al., 2006). Therefore in achieving positive patient health outcomes, mutual understanding and effective communication between the patient and healthcare provider are important (Clark et al., 1997). For example, a patient's perception of diabetes differs from the provider's perception. Fitzgerald (2008), in his study, mentioned that the concept of diabetes discussed during appointments with healthcare providers might be perceived differently by the patients. Thus the perception differences are complex and healthcare providers must avoid making assumptions about patients' understanding of diabetes, instruction and advice given. This is where good communication skills and mutual understanding play an important aspect in achieving positive patient outcome.

Management of diabetes at Primary Health Clinic in the Kuala Langat district

Public Health (MOH) has organized yearly audits on management and performance of diabetes care at primary health clinics in Malaysia. Based on the underperforming results of the Kuala Langat Diabetes Clinical Audit 2009, Kuala Langat was chosen as the location of the study. Kuala Langat is one of nine districts in the state of Selangor Darul Ehsan. All seven Primary Health Clinics in the district are managed by the Kuala Langat District Health Office under the Selangor State Health Department. Kuala Langat has a total population of 239 700 people (Kuala Langat District Office) and 5239 (prevalence=2.18%) active diabetes patients (Diabetes registry) who are registered with the primary health clinics in Kuala Langat.

Based on the Diabetes Clinical Audit 2009, done for the 2008 diabetic record, some interesting facts regarding the management and performance of diabetic care at Kuala Langat were noted. 755 diabetic records from seven primary health clinics were audited for diabetes management in 2008. Several variables such as sociodemographic, age and duration of diagnosed diabetes, clinical target parameter such as HbA1c, blood pressure, and microalbumin, assessment on complications of the disease and laboratory clinical test results were collected and analysed descriptively.

From the Diabetes Clinical Audit 2009, the patients' compositions according to ethnicity were Malays; 56.8%, Indians; 26.9%, Chinese; 15.8% and other races; 0.5%. Most of the patients' from this survey were between 45 to 64 years old (64.5%). About a third of them were diagnosed to have diabetes when they were between the ages of 45 to 54 years old (33.25%). The majority of the patients in this survey had diabetes for less than 5 years (47.15%). The Minister of The Ministry of Health Malaysia, Dato' Sri Liow Tiong Lai in his speech, was concerned with the increasing number of Malaysians with diabetes that has resulted in disabilities and premature deaths among the nation's economically-productive population (age 45-55) and the loss of productivity for the nation.

In terms of clinical outcomes for diabetic care in the Kuala Langat district, it was found that only 8.48% of the diabetes records achieved the targeted HbA1c below 6.5% (mean=8.68%) and only 65.43% of HbA1c tests were done. Other diagnostic findings reported 18.9% of cases to have positive microalbumin (test done = 40.3%), 10.6% showed abnormal results of fundus camera (test done = 29.7%) and 30.7% diagnosed with complications of nephropathy (Diabetes Clinical Audit, 2009).

Thus, from the clinical outcome results above, lack in performance was shown in diabetes care at the Primary Health Clinic in the Kuala Langat District, even though health care professionals have prescribed adequate medicine for the treatment of diabetes. 98.9% of the patients were prescribed with antihyperglycaemia agents either as monotheraphy oral hypoglycaemic agent (OHA) or combination therapy of OHAs or in combination of OHAs with Insulin (Diabetes Clinical Audit, 2009). Similar treatments have been mentioned in several studies, which stressed that although intensive and appropriate treatment regimens were prescribed, it would not improve the clinical outcomes if the prescribed medications were not taken or there was nonadherence to treatment by patients (Farmer, Kinmonth, & Sutton, 2005; Mardby, Akerlind & Jorgensen, 2007).

Problem statement

Chronically ill patients depend on prescription medications to enhance their well-being (Piette et al., 2006). Results from the United Kingdom Prospective Diabetes Study (UKPDS) reported that intensive treatment with medications is one of the most important aspects to achieve glycaemia control in patients with diabetes (Horne, Weinman & Hankins, 1999; Mateo et al., 2006; Salmiah & Jusoff, 2009). The appropriate use of medication is the key to self-management of most chronic illnesses. The result of suboptimal control of diabetes is due to challenges to medication adherence and self-management. Poor result in HbA1c control was believed to be

associated with non-adherence to oral hypoglycaemic (OHA) drugs, since OHA drugs are well known to reduce HbA1c (Cohen et al., 2010).

For over half a century studies have been conducted to look into adherence to medical advice, prescribed medications and medical treatments and it is estimated that over 30% of prescribed medication is not taken as directed (Grunfeld et al., 2005). Published systematic reviews of studies regarding adherence to diabetes medication regimens by Cramer (2004) and Jingdong et al. (2005) found that adherence to oral hypoglycaemic drugs ranged from 36% to 93%. In another study by Mateo et al.. (2006) it was found that 50% of the patients were non-adherent to oral hypoglycaemic drugs. This poor adherence led to poor glycaemia control in nonadherent diabetes patients (Guillausseau 2003) and was also associated with a higher cost of medical care (Balkrishnan et al., 2003; Salmiah & Jusoff, 2009). If appropriate drug therapies had been provided, then this trend showed a poor result of health gain and a waste of resources (Horne, Weinman & Hankins, 1999). Identifying lack of adherence towards OHA drugs could help to improve adherence and subsequent control of diabetes (Cohen et al., 2010).

Health care staff needs to address this issue and be aware of the factors influencing beliefs about medicine, health and illness held by individual patients (Hjelm et al., 2004). Furthermore, it is crucial to find out why patients stop taking their medicines or become nonadherent. This may be due to the patients' perception about their illness. For example, if a patient thinks that his/her illness is not chronic the patient might think that he/she only needs to take his/her medicines when he/she experiences the symptoms (Mardby, Akerlind & Jorgensen, 2007). Therefore, beliefs about medicine are one of the most important factors reported affecting adherence

rather than clinical and sociodemographic factors (Horne, Weinman & Hankins 1999; Mardby, Akerlind & Jorgensen, 2007).

Beliefs about Medication Questionnaire (BMQ) has been developed specifically to explore individual or patients' beliefs about necessity and concerns with regard to medications. This questionnaire has been shown and proven to be predictive of adherence to medication among chronically ill patients (Horne, Weinman & Hankins, 1999) and has been shown to correlate with self-reported adherence (Menckeberg et al., 2008). This questionnaire can be used to measure beliefs about medicines in general and specific beliefs about the patient's own medicines for specific diseases (Horne, Weinman & Hankins, 1999). In BMQ specific, there are two subparts: Part I, regarding the *Specific-Necessity* which represents the perceived role of medication in maintaining present and future health status from getting worse and Part II, the *Specific-Concerns* subpart which comprises aspects of both an emotional and a cognitive representation (Horne, Weinman & Hankins, 1999). Beliefs about the necessity of medication to be consumed also have been shown to be an important factor in adherence across patient groups (Grunfeld, 2005).

In order to enhance adherence by method of intervention, reasons for non-adherence (intentional or non-intentional) should be determined (Grunfeld et al., 2005). There are several theoretical models taken from health psychology that can be applied to the adherence study. One of the examples is the social cognition model (such as the health belief model) which shares the idea of individuals develop beliefs that influence the interpretation of information and that which guide behaviour (Grunfeld et al., 2005). However, these models have limitations where there is a tendency to generalise adherence as the result of a rational decision. One should know

that perceptions, or representations, of an illness are also known to play a key role or can influence individual adherence to prescribed medication (Horne, Weinman & Hankins, 1999). In recent development, many studies now focus on patients' belief about medication in relation to adherence attitude among patients. An individual or patients has complex beliefs about medications and for a large number of patients, failure to consume medications as prescribed may be the result of misguided beliefs about medication (Grunfeld et al., 2005).

Patients' anxiety about the harmful and unwanted effects of a specific prescribed medication is also known as concern beliefs in medicines. These types of beliefs in medicines are important because they impact individual behaviours toward medications; for example, adherence and the self-report of adverse drug events (Horne, Weinman & Hankins, 1999). Several studies have shown that people have beliefs about medicines in general and beliefs about prescribed medicine for specific illnesses (Horne, Weinman & Hankins, 1999). Individual or patient's beliefs about the specific prescribed medicine can be grouped under two categories. These are "necessity beliefs" which refer to their beliefs about the necessity of the prescribed medicine for maintaining health now and in the future, and "concern beliefs" which refer to concerns feeling about the potential adverse effects of taking it or becoming too dependent on that particular medicine and possibility of long term adverse effect in future (Horne, Weinman & Hankins, 1999). Thus, concern beliefs in medicine reflect patient's perceptions and experiences of specific medications.

Although the majority of patients believed that their prescribed medication was necessary for maintaining health, it was estimated that a third had strong concerns about the potential long term or adverse effects of taking it. Stronger concerns about prescribed medicine were often associated with lower adherence (Horne, Weinman &

Hankins, 1999; Mardby, Akerlind & Jorgensen, 2007). It is reported that diabetic patients who were concerned about their treatment were more likely to be nonadherent toward their antidiabetics and antihypertensive medication (James & John, 2009). Furthermore, differences in beliefs about medicines might exist among people with different backgrounds such as country of birth, education and the use of medicines (Mardby, Akerlind & Jorgensen, 2007). The nature, intensity, and impact of medication beliefs may also be different across sociodemographic subgroups (James and John, 2009).

Many people have negative views about medicines. Most of them think that medicines are generally harmful substances that are overused by doctors. This negative perception toward medication is often associated with the understanding that the dangerous aspects of medication are linked to their chemical/unnatural origins compared to the complementary treatments which they think are more "natural" and therefore safer (Horne, 1999).

Therefore, healthcare providers need to be aware of the importance of general beliefs about medicines which influence adherence toward prescribed medicines (Mardby, Akerlind & Jorgensen, 2007). Not only patient's beliefs about treatment can influence treatment preferences, adherence, and outcomes (Horne, 1999), there is evidence that individuals make decisions based on their understanding of their conditions and treatments provided, their perceptions of their need for medicines, and concerns about their prescribed medicines. All these factors can influence adherences to medicines (Barnett & Oboh, 2009). This is a continuous process because patients' concerns, perceptions and the need for medications will change over time (Barnett & Oboh, 2009). Therefore, informed patients are more likely to play an active role in their disease care, able to make wiser decisions, come to a mutual understanding with

their physicians, and subsequently adhere more to treatment as described above (Midlov, 2009).

As part of the Primary Health Care Team, pharmacists could provide feedback on how patients use their medications and whether there are important patients' beliefs, which could affect adherence (Chen & Britten, 2000). It seems to be more important to address key psychosocial factors in nonadherent patients, rather than assume that they fail to grasp the medical necessity of treatment (James & John, 2009).

Patients with a lower education level perceived medicines as more harmful and less beneficial than those with a higher level of education (Mardby, Akerlind & Jorgensen, 2007). Patients' perceptions that medication is harmful was also related to psychosocial factors and dissatisfaction with medication information received (James & John, 2009). In this situation, if health care providers deliver more education and knowledge about medicines, it would result in the improvement in general beliefs about medicines and, over time improve adherence (Mardby, Akerlind & Jorgensen, 2007). Isacson and Bingefors (2002) also mentioned that good knowledge of medicines has been associated with positive attitudes towards medication and thus improve adherence.

This study hopes to explore and understand the relationship between cognitive and emotional parameters of patients' attitudes and beliefs toward prescribed medicines and medication adherence among Malay Type 2 diabetes mellitus patients in Primary Health Clinics. The specific objective of this study is to explore Malay Type 2 diabetes mellitus patients specifically:

1. their beliefs toward prescribed oral hypoglycaemic medication (OHA);

2. to establish level of adherence toward prescribed OHA based on HbA1c latest result (2009/2010);
3. to describe the distribution of beliefs about the necessity of prescribed medications and concerns about taking it;
4. to describe the distribution of beliefs about the general harm of the prescribed medications and beliefs that medicines have been overused by the prescribers in general;
5. to analyse the relationship between beliefs about medicine (necessity and concern) with self-reported adherence score (MARS); and finally
6. to find out any differences in beliefs about medicine among the different genders, age groups, duration of being diagnosed with diabetes, educational level, and household incomes.

Thus, the study hopes to provide recommendations to enhance adherence toward prescribed medicines based on better understanding of patients' cognitive and emotional parts which influence patients' attitudes and beliefs about medicine and therefore lead to achieve a state of concordance between patients and healthcare providers.

CHAPTER 2

Literature Review

In this chapter, the literatures related to beliefs in medications, medication adherence and toward concordance model are discussed. The review begins with the topic regarding adherence to prescribed medicine as an explanation to the definition of adherence, prevalence of non-adherence recorded in previous studies and the importance of adherence to prescribed medicine, especially in the management of chronic illnesses such as diabetes mellitus. The next topic is on the description of beliefs in medicine as a general idea and its correlations toward health and illness behaviours.

After focusing on the description of belief in medicine, the topic next to be discussed will be on its relationship to adherence status, followed with a description of the factors related to beliefs in medicine such as socio-demographic factors, clinical factors involved and individual behavioural factors. In this chapter also, previous studies that focused on measurement of beliefs in medicine are summarized and discussed.

The next important topic related to the purpose of this study is to help in the understanding of patients' beliefs toward medicine and to use them to achieve a concordance model of communication between patients and healthcare provider. Under this topic, important points such as knowledge of patients' decision making, good communication skills and concept of concordance model between patients and healthcare providers are looked into. Before ending this chapter, it is best also to

describe the role of pharmacists in improving medication adherence through emphasis on patients' beliefs in medicine.

To conduct this literature review, search terms such as beliefs in medicines, concern beliefs in medicines and medication beliefs were used. Many previous studies were found and such studies have been conducted since 1996 in western countries but there is a lack of studies done among the Malay population in our own country that focuses on Type 2 diabetes mellitus patients. Despite the huge availability of beliefs about medicines and health beliefs studies, only those related to this research are included.

Adherence to prescribed medicine

There was a swap from the word "compliance" to "adherence". As already known compliance suggests that the patient is passively following the doctor's orders and the discussion and decision on the treatment plan is not based on a therapeutic alliance or contract established between the patient and the physician (Midlov, 2009). The World Health Organization (WHO) defined adherence as voluntary involvement of the patient in the management of his or her disease by following a mutually agreed course of treatment and sharing responsibility between the patient and health care providers (WHO, 2003). Other definitions of adherence include the extent to which patients take medications as prescribed by their health care providers (Osterberg & Blaschke, 2005) and the extent to which a patient's actions match the agreed recommendations between physician and patient (Barnett & Oboh, 2009).

One drug related problem is nonadherence which may result in negative outcomes for the patient. Nonadherence can be intentional or non-intentional and related to knowledge, attitudes, and also practical difficulties including memory and administration issues (Midlov, 2009). Unintentional nonadherence happens when the patient wants to follow the agreed treatment but is prevented from doing so by barriers that are beyond their control; example, the inability to open a medicine bottle, read a label or understand dosing instructions. Intentional non-adherence occurs when the patient decides not to follow the treatment recommendations, may be because of their beliefs about their need for treatment (Barnett & Oboh, 2009). Nonadherence to medication is a major issue in improving treatment outcome (Farmer, Kinmonth & Sutton, 2005) but the most important thing is that there will be no improvement in patient health or condition if prescribed medications are not taken regularly (Farmer, Kinmonth & Sutton, 2005).

It is estimated that only 50% of patients with chronic diseases are following agreed recommendations for medicine treatment (WHO, 2003; Midlov, 2009; Horne, Weinman & Hankins, 1999). Mardby, Akerlind, and Jorgensen (2007) also highlighted the same scenario in their study among pharmacy clients where half of them can be considered as nonadherent to prescribed medicine.

However, even with the huge development in pharmacotherapy and decades of intervention trials to improve diabetes management, adherence to diabetes medication regimens still remains suboptimal (James & John, 2009). This situation may represent a greater risk especially in older people resulting in poor disease control which may be compounded with multiple morbidity and polypharmacy in future (Midlov, 2009). Among diabetes patients only 75% of the patients reported to adhere to the oral