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RESEARCH ARTICLE

BELIEFS AND ADHERENCE TO MEDICINES AMONG MALAYSIAN MALAY TYPE 2 DIABETICS

***[1]Mohamed Mansor Manan, [2]Salmiah Mohd Ali and [3]Mohd Dziehan Mustapa**

[1]Faculty of Pharmacy, Universiti Teknologi MARA, Puncak Alam Campus, Selangor, Malaysia
[2]Faculty of Pharmacy, Taylors University, Puchong, Selangor, Malaysia
[3]Pharmacy Service Division, Ministry of Health, Malaysia

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ABSTRACT

Introduction: This study is to explore the relationship between cognitive and emotional parameters of patients' attitudes and beliefs and adherence toward prescribed medicines among Malay T2DM patients in a Primary Health Clinics.
Method: This is a cross sectional survey conducted over a period of two months at the outpatient department in seven government primary health clinics in the district of Kuala Langat, Selangor, Malaysia. A non-probability convenience sampling method was employed and patient's recruitment based on the set inclusion criteria. Consented patients need to complete the survey form. BMQ and MARS were used to measure patients' beliefs and adherence towards their medications.
Results and Discussion: 345 registered Malay T2DM patients were selected. Most were women and only three subjects are single. At least half had primary level of education (51.6%). 72% of the subjects were housewives and pensioners. The majority (47.8%) had a monthly household income of RM999.00 or less. The average medications prescribed/ patient was five and the mean total frequency/day is 7.28. >50% had poor HbA1c control. Those with upper secondary and college graduate education were concern as to why they need to take medications other than those for DM. MARS also showed 45% forget to take their prescribed medicine and 41% miss out the dose. BMQ findings showed Malay patients' belief necessity toward prescribed medicine is similar to that reported westerners Relationship of belief and adherence showed statistically significant positive correlation between beliefs specific-necessity on oral hypoglycaemia agent (OHA) and adherence. Necessity-concern differential correlated higher adherence showed patients' beliefs necessity of prescribed OHA outweighs concern or worried about the long term use, side effects and dependence of the OHA.
Conclusion: Malaysian Malays attitudes and beliefs are not affected by race, gender, and socioeconomic status. However the patients' are concern about long term use, side effects and dependence towards the prescribed medicines that can lead to poorer adherence. Finally by improving the patient's beliefs on the necessity of prescribed OHA medicine will lead the stronger adherence.

INTRODUCTION

The ever rising trend in the prevalence of diabetes is due to an aging population, unhealthy diet, obesity and a sedentary lifestyle (WHO, 2003; Zanariah *et al.*, 2008; Lindenmeyer, 2006). Malaysia is no exception and WHO estimated that Malaysia's prevalence for people with diabetes by year 2030 is about 2.48 million (Zanariah *et al*., 2008). The above has led to the Ministry of Health Malaysia (MOH) to conduct a population base study on diabetes once in every 10 years. The 1st National Health and Morbidity Survey (NHMS I) 1986, showed the prevalence of diabetes is reported at 6.3% and the percentage increases to 8.3% in the 2nd National Health and Morbidity Survey (NHMS II) in 1996 (Zanariah *et al*., 2008).

***Corresponding author: Mohamed Mansor Manan,** Faculty of Pharmacy, Universiti Teknologi MARA, Puncak Alam Campus, Selangor, Malaysia.*

The findings also showed that the prevalence of diabetes was 11.6% in those above 18 years and can be as high as 14.9% in those above 30 years. The findings further stated that the prevalence for 18-19 year olds is 2% while the prevalence range for 50 – 64 years is between 20.8 – 26.2%. 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 and Weinman and Hankins 1999, Salmiah and Jusoff, 2009; Mateo *et al*., 2006). The appropriate use of medication is the key to self-management of chronic illnesses such as diabetes. The result of suboptimal control of diabetes is due to medication adherence and self-management. Poor result in HbA1c control was believed to be associated with non-adherence to OHA, since OHA is well known method to reduce HbA1c (Cohen *et al*., 2010).

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% while Mateo *et al*. (2006) later found the adherence to be 50%. Poor adherence led to poor glycaemia control (Guillausseau, 2003) and associated with a higher cost of medical care (Balkrishnan *et al*., 2003; Salmiah and Jusoff, 2009). If appropriate drug therapies had been provided, the observed trend showed the medication had resulted in poor health gain and a waste of resources (Horne, Weinman and Hankins 1999). The reason for the lack of disease control through medication is again due to medication non-adherence (Cohen *et al*., 2010). These issues are important for health care staff where these factors influence beliefs about medicine, health and illness held by individual patients (Hjelm *et al*., 2004). Examining why patients stop taking their medicines or become non-adherent and their perception about their illness is thus critical (Mardby, Akerlind and Jorgensen, 2007). Therefore, beliefs about medicine had been reported to be one of the most important factors that affects adherence (Horne, Weinman and Hankins 1999; Mardby, Akerlind and Jorgensen, 2007). To explore the above factors, the Beliefs about Medication Questionnaire (BMQ) can be utilized to evaluate an individual or patients' beliefs about necessity and concerns with regard to medications (Horne, Weinman and Hankins 1999) and later correlate with self-reported adherence (Menckeberg, *et al*., 2008).

The majority of patients believed that their prescribed medication was necessary for maintaining health but about one third had strong concerns about the potential long term or adverse effects of taking it. The concern about prescribed medicines were often associated with lower adherence (Horne and Weinman, 1999; Mardby, Akerlind and Jorgensen, 2007). Specifically for the diabetic patients, the concerned about their treatment were more likely to be non-adherent toward their antidiabetics and antihypertensive medication (James and John, 2009). Furthermore, there are studies that showed differences in beliefs about medicines might be due to country of birth, education and the use of medicines (Mardby, Akerlind and Jorgensen, 2007) and across socio-demographic subgroups (James and John, 2009). Health care providers need to be aware that patients' concerns, views and medicines may change over time because this is a continuous process (Barnett and 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 to treatment (Midlov, 2009). Most Malaysian patients depend on the government funded healthcare and only pay RM1 (USD 0.30) per visit for treatment, consultation, laboratory test and medication. Thus, these facilities are the first point for treatment for most Malaysian and their attitudes and beliefs toward prescribed medicines and medication adherence needs to be evaluated.

Pharmacist in Malaysia plays an important at the Medicine Therapy Adherence Clinic (MTAC) for diabetes mellitus where they provide feedback on how patients use their medications and whether there is important patients' belief, could affect adherence (Chen and Britten, 2000). However, their functions need to address key psychosocial factors in non-adherent patients, rather than assume that they fail to grasp the medical necessity of treatment (James and John, 2009). This study is thus undertaken to explore and understand the relationship between cognitive and emotional parameters of patients' attitudes and beliefs toward prescribed medicines and medication adherence among Malay T2DM patients in a Primary Health Clinics. Thus the study hopes to provide the Malaysian Malay population perceptions on the importance of adherence toward prescribed medicines.

MATERIALS AND METHODS

This is a cross sectional survey conducted over a period of two months (February – March 2010) at the outpatient department in seven government primary health clinics in the district of Kuala Langat, Selangor, Malaysia. A non-probability convenience sampling method was employed and patients were recruited during normal clinic hours. Patients' background data and past medication history were screened before recruitment. Patients were identified prior seeing the doctor and were asked to take part in the study. Consented patients need to complete the consent and survey form. The set inclusion criteria were adult Malay T2DM, age above 18 years old, able to speak and understand Malay or English languages and on OHA for at least two months. Patients receiving insulin as treatment were excluded since insulin treatment may require patient to adjust their own dose according to their meal intake. BMQ was used to measure patients' beliefs about their medicines. The questionnaire in BMQ-specific was further divided into another two subparts with five-questions each. Part 1 of the BMQ questionnaire measures patients' beliefs about the *necessity* (BMQ specific necessity) of the prescribed medication for maintaining and controlling their chronic illness. Part 2 comprises of *Concerns or worries* (BMQ specific-concern) about the potential adverse effect as a result of taking the medication. The questionnaire in BMQ-general is also been divided into another two subpart. Part I consists of five questions concerning general harm and part II is on general overuse (Mardby, Akerlind and Jorgensen, 2007; Horne and Weinman, 1999). Patients indicate their degree of agreement with each question in subparts; belief about medicines on a five-point Likert scale, where 1 = strongly disagree, 2 = disagree, 3 =uncertain, 4 = agree and 5 = strongly agree. Thus, total scores for the BMQ *specific-necessity* and BMQ *specific-concerns* scales range from 5 to 25.

Result of total scores can be interpreted either by as a continuous scale where higher scores reflect a stronger belief in the concept described by the subpart or by dichotomizing the scales middle point (Mardby, Akerlind and Jorgensen, 2007; Horne and Weinman, 1999). Medication Adherence Reporting System (MARS) was also used as a questionnaire to measure self-reported adherence (Horne and Weinman, 1999). It consists of five statements regarding self-reported adherence: forgetfulness, altering the dosage, stopping taking medication, missing a dose, and taking less than instructed. The statements have response categories on a five-point Likert scale where 1 = always, 2 = often, 3 = sometimes 4 = rarely and 5 = never. Scores range from 5 to 25, with higher scores indicating greater reported adherence. The internal validity test was conducted

among T2DM patients and Cronbach's alpha value of 0.78 was obtained. SPSS version 17.0 for Windows was used for all statistical data analyses. Test of normality was undertaken in determining either parametric or non-parametric which statistical evaluation is appropriate. Relationship between scales will use Spearman Rho correlation test for non-parametric data analysis. *p* value of less than 0.05 is accepted as statistically significant for all inferential test analysis.

RESULTS

A total of 345 registered Malay T2DM patients met the inclusion criteria. Only 60% agreed to participate and most were women. Only three subjects declared themselves as still single while others are married. The number of patients classified according to age was similar. Almost half of the patients had at least a primary level of education (51.6%). 72% of the subjects that participated were housewives (females) and pensioners (males). As for household income, the majority (47.8%) of the subjects declared they earn around RM999.00 or below per month (Table1). Table 1 also showed that 95% of patients consumed their medication alone without any assistance of spouse, children or other individuals daily. 66% had at least two underlying diseases such as hypertension and hyperlipidaemia.

Table 1. Background characteristics of Malay T2DM patients

	Malay patients, n (%)
Age	
< 49 years old	111 (32.2)
50 – 59 years old	122 (35.4)
> 60 years old	112 (32.5)
Gender	
Male	139 (40.3)
Female	206 (59.7)
Marital status	
Single	3 (0.9)
Married	342 (99.1)
Educational Level	
No primary education / primary school	178 (51.6)
Secondary school	138 (40.0)
University / College graduate	29 (8.4)
Employment status	
Full time employment	87 (25.2)
Part time employment	9 (2.6)
Housewife / Pensioner	249 (72.2)
Household income / month	
< RM 999.00	165 (47.8)
RM 1000.00 – 2999.00	137 (39.7)
> RM 3000.00	43 (12.5)
Assist in medicine taking at home	
Need assistant (spouse/children) in medicine taking at home	15 (4.3)
Take medication alone without any help from others	330 (95.7)
Duration diagnosed with DM	
< 4 years	193 (55.9)
5 – 9 years	84 (24.3)
> 10 years	68 (19.7)
Underlying disease	
Single underlying disease	97 (28.1)
Two underlying diseases	229 (66.4)
Three underlying diseases	5 (1.4)
No underlying disease	14 (4.1)
HbA1c result	
< 6.5 % (control)	74 (21.4)
> 6.5 % (uncontrolled)	203 (58.8)
Test not done	68 (19.7)

Their latest results of HbA1c showed only 21.4% achieved the targeted HbA1c level below 6.5%. 58.8% had their HbA1c more than 6.5% and about 20% had not had any test done for HbA1c since January 2009 until March 2010. Table 2 highlighted the results from BMQ-specific presented according to the mean (SD). The findings showed the patients had a stronger agreement with the mean necessity scale (19.91, SD 3.99) than the mean concern scale (14.75, SD 4.97). For the necessity–concern differential the mean total score was 5.15 (SD 7.16) where the scale ranges from -20 to 20 score. Table 2 further highlighted the mean score for BMQ general harm of 12.44, SD 3.60 which is an indication it is slightly below the middle point of total score. The mean total score for BMQ-general overuse, 11.04, SD 1.841 is greater than the middle point of the scale. These results showed that patients agree with the statement that the physicians are over-prescribing their medication.

Table 2. Descriptive analysis for BMQ

	N	Min	Max	Mean	Std. Dev
Total BMQ-Specific-Necessity	345	10	25	19.91	3.992
Total BMQ-Specific-Concern	345	5	25	14.75	4.966
Total BMQ-General-Harm	345	5	21	12.44	3.598
Total BMQ-General-Overuse	345	6	15	11.04	1.841
Total-MARS	345	7	25	21.77	2.647
Necessity concern differential	345	-12	20	5.15	7.165
% HbA1c (09/10)	278	4.7	16.5	8.586	2.3168
Random Blood Sugar Level	115	4.0	25.0	9.905	3.8778
Fasting Blood Sugar Level	229	3.3	16.4	8.152	2.5161
Number of items per prescription	345	1	11	4.68	1.547
Complexity Regimen	345	2	15	7.28	2.393

Table 2 also highlights the mean for total score (SD) of the MARS scale of 21.77(2.647) is at a higher side of the range (from 5 to 25). This indicates greater self report of adherence among the subjects. However, the mean HbA1C level is above the targeted value (below 6.5% HbA1c) and the same result was seen for both random and fasting blood sugar level. It is estimated that five items on average were prescribed and the sum of frequency the medication prescribed was around seven times per day for all the medication.

Table 3. BMQ necessity-concern differential

Necessity-Concern differential	N	Percentage
Necessity > Concern	244	70.7
Concern > Necessity	70	20.3
Necessity = Concern	31	9.0
Total	345	100

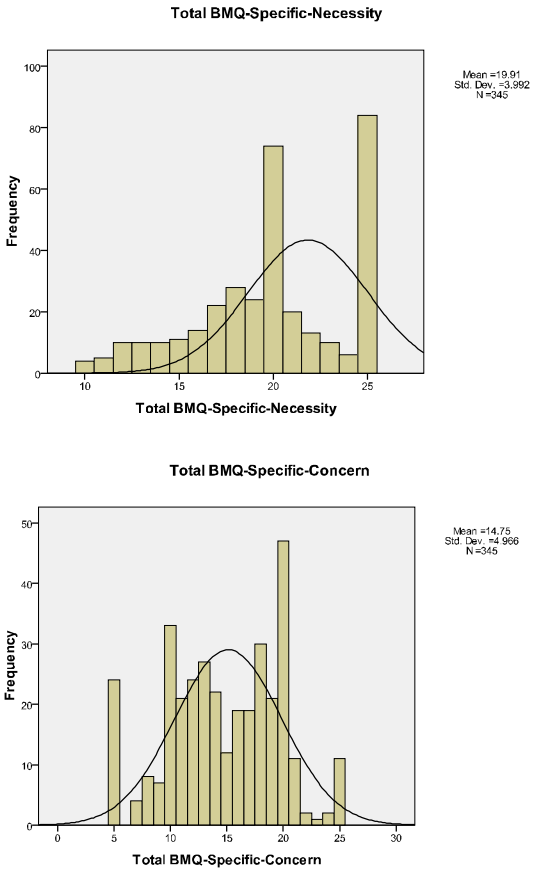
The majority of the patients (70.7%) had strong beliefs in the *necessity* of OHA for maintaining good control of diabetes (scores BMQ specific-necessity greater than score BMQ specific-concern). However, over twenty percent (20.3%) of the patients reported strong *concerns* of the OHA (scores BMQ specific-concern greater than score BMQ specific-necessity). This group of patients were worried about the adverse effect of the OHA prescribed to them and the need to consume the medication daily. The small number of the patients (9%), have equal scores for BMQ specific-*necessity* and specific-*concern* scores (Table 3) suggests that they have an equal agreement on both concept of the subpart where they share the same score.

Table 4. Percentage score of BMQ less or more than the middle point of the scale

Score	% BMQ Sp-Necessity (n)	% BMQ Sp-Concern (n)	% BMQ Gen-Harm (n)	% BMQ Gen-Over (n)
<middle point	5.5(19)	35.1(121)	47.0(162)	3.2(11)
>middle point	94.5(326)	64.9(224)	53.0(183)	96.8(334)
Total	100%(345)	100%(345)	100%(345)	100%(345)

Table 4 provided the distribution of beliefs across all the BMQ subparts on the percentage number of patients who have scores above and below the middle point of each subpart of BMQ. Figure 1 shows the distribution of scores for all the BMQ subparts and MARS score in general. The results showed almost all the subparts of BMQ have a total score which is greater than the middle point of the scale. The greater the number of total score from the middle point of the scale, the higher the agreement to the conceptual proposed for each subpart. For example, the result of BMQ general harm total score, scores above and below middle point were almost the same, indicating that the patients or subjects do not have a strong agreement that the medication prescribed in general can cause them harmful effects (Table 4).

Correlations between BMQ total score and MARS total score revealed fairly consistent and statistically significant relationships between beliefs and reported adherence (Table 5).



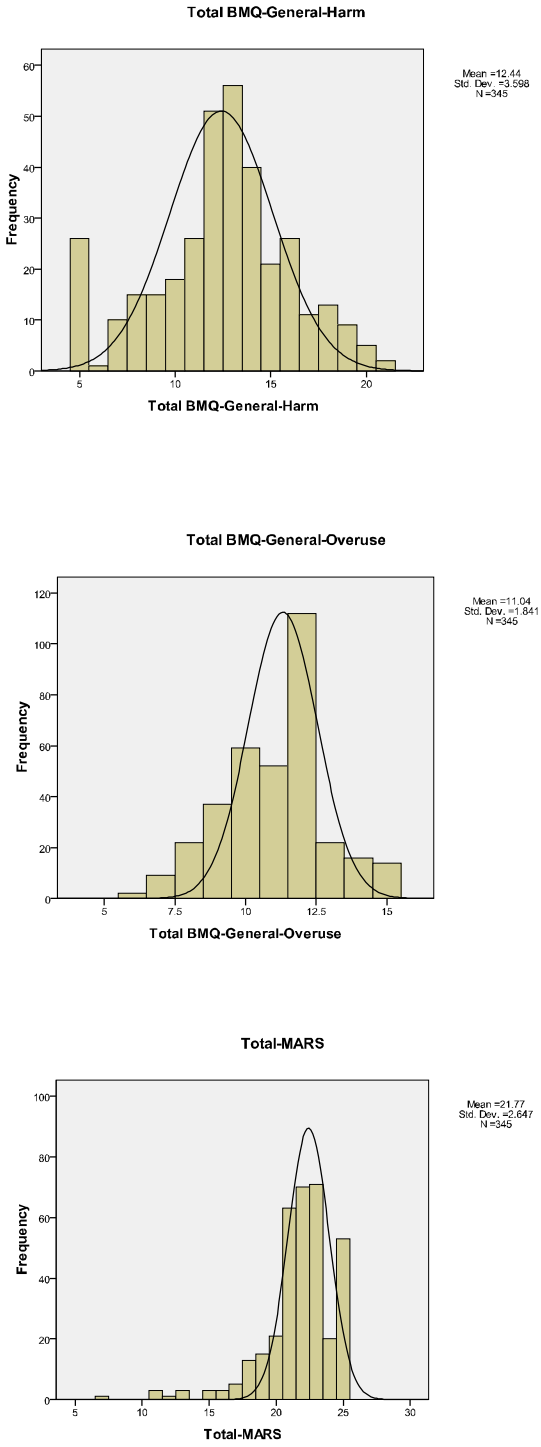


Figure 1. Frequency distribution of scores for the all BMQ subparts and MARS score

The results showed that there is statistically significant positive correlation (Spearman rho p=0.000 < 0.01) between BMQ specific-necessity subpart and MARS total score, where the higher *necessity* scores correlate with higher reported adherence rates (MARS total score). The result also showed statistically significant negative correlation (Spearman rho

p=0.000 < 0.01) between BMQ specific-concern subparts and MARS total score, where the higher *concerns scores* correlate with lower reported adherence. Positive correlations and statistically significant findings was observed between the *necessity–concerns differential* and reported adherence (Spearman rho p=0.000 < 0.01). These results indicate that the more positive value (range from -20 to 20) in differential between necessity-concern scores, the higher reported adherence recorded based on total MARS scores. Statistically significant negative correlations were found between the BMQ *general harm* and report adherence (Spearman rho p=0.000 < 0.01). This finding indicates the more the patient thought that the prescribed medicine in general can cause harmful effect, the less number of self report adherence was recorded (Table 5).

Table 5. Spearman's rho correlation between medication beliefs (BMQ total score) and reported adherence to medication (MARS total score)

BMQ subpart (n=345)	Spearman's rho	Significant 2tailled
BMQ-specific necessity	0.19	0.000 (p<0.01)
BMQ-specific concern	-0.35	0.000 (p<0.01)
Necessity-concern differential	0.35	0.000 (p<0.01)
BMQ-general harm	-0.30	0.000 (p<0.01)

Table 6 examines into the differences of patients' beliefs about medication (BMQ subparts total score) within an age group, educational level, duration of being diagnosed with diabetes mellitus, household income and gender. Utilizing the Kruskal-Wallis, findings showed statistically significant differences of total for BMQ specific necessity across the educational level and duration of being diagnosed with diabetes (p=<0.001). The highest beliefs that the prescribed OHA is necessary to maintain good control of diabetes (total score of BMQ specific necessity) was seen within groups of those receiving education at primary level or less while the college and graduate patients scored less beliefs in the necessity sub-scale.

Table 6. Difference of all BMQ subparts total score within group variable

Group	Asymptotic Significant (2 tailed)			
	BMQ-specific necessity	BMQ specific concern	BMQ general harm	BMQ general overuse
Age group (n=345)				
Below 50 years old	0.329 [a]		0.771 [a]	0.019 [a]
51 – 60 years old		0.000 [a]		
Above 61 years old				
Educational level (n=345)				
No formal education/Primary school	0.000 [a]	0.000 [a]	0.169 [a]	0.120 [a]
Lower secondary school				
Upper secondary school				
College graduate				
Duration of diagnosed DM (n=345)				
Below 5 years				
6 – 10 years	0.000 [a]	0.155 [a]	0.124 [a]	0.167 [a]
Above 11 years				
Household income per month (n=345)				
Below RM 999.00				
RM 1000.00 – 2999.00	0.153 [a]	0.166 [a]	0.954 [a]	0.021 [a]
Above RM 3000.00				
Gender (n=345)				
Male				
Female	0.652 [b]	0.118 [b]	0.610 [b]	0.395 [b]

a: Kruskal-Wallis test
b: Mann-Whitney U test

The highest belief is in the necessity of prescribed OHA was seen on patients who had been diagnosed to have diabetes for more than 11 years, while the newly diagnosed patients, seemed to score less beliefs in the necessity sub-scale. There is no significant difference in belief necessity among patients across other variable groups (age, household income and gender).

In the BMQ specific concern scale, statistically significant difference of total score across patient age and educational level is observed (p=0.000; <0.001). The results showed statistically significant highest score on beliefs concern for patients in the age group of below 50 years old. This indicates they are worried of the side effects due the prolonged use of OHA while those above 61 years old scored the lowest belief concern. In contrast the result of beliefs in necessity across educational level, patients with upper secondary education and college graduates scored the highest belief concern (which indicate their worries), while patients who received primary school or lower scored less in belief concern. There is no significant difference in belief concern among patients across other variable groups (duration of diagnosed diabetes mellitus, household income and gender). Interestingly, from the statistical analysis test for BMQ general-harm scale, there is no statistically difference of total score across patients' age, educational level, duration of being diagnosed with diabetes mellitus, household income and gender (Table 6). Finally, BMQ general-overuse scale showed a statistically significant difference of total score across patient age (p=0.019; <0.05) and household income (p=0.021; <0.05). From the results, those in the age group of between 51 to 60 years old showed the highest score on BMQ general-overuse which indicates the belief of patients within this group that the physicians are overprescibing the medication to them, while the older group of patients (above 61 years old) score the lowest. The highest score on BMQ general-overuse is also seen within the group of patients who have a household income of less than RM999.00 per month, while patients whose household income is more than RM3000.00 per month seem to score less in the BMQ general overuse scale. There is no significant difference in belief concern among patients across other variable groups (educational level, duration of diagnosed diabetes mellitus, and gender). The response of patients regarding dose and frequency for each medication compare with actual prescribed in medical record is summarized in Table 7. A total of 1614 item were prescribed for the 345 subjects and an average of 5 items (mean 4.65, table: 2) per patient. 87.05% of patients' responded to medication prescribed were correct for both dosing and frequency. 12.95% of the response were however either wrong in dose or frequency or both.

Table 7. Subject response of medication taking compare with actual dose and frequency prescribed

Response	Number of Item	Percentage
Only dose correct	104	6.44
Only frequency correct	68	4.21
Both answer; dose and frequency wrong	37	2.29
Both answer; dose and frequency correct	1405	87.05
Total	1614	100

Mean and standard deviation SD of responses to each BMQ specific and general questionnaire are presented in Table 8. Assuming all answered questions were equally important, the median of BMQ specific and general questionnaire was also identified for each patient. From the result on the distribution of answered questions in BMQ specific-necessity, many patients agreed with all the questions and agreed with the concept suggested for the scales. Patients also agreed with statements that they need OHA in specific to control their blood sugar level and better control their diabetes conditions. As for BMQ specific-concern, a mix response of agree and non-agreement is observed. For example, most patients express their agreement with the statement "I sometimes worry about long-term effects of my medicines' and "I sometimes worry about becoming too dependent on my medicines". Both statements indicate patient concern with the long term effect and the need to be too dependent on the medication prescribe but they disagree with statement that the medication disrupt their life and worried of taking it.

Table 8. Mean Median and standard deviation of response to each BMQ specific and general questionnaire

BMQ questionnaire	Mean	Median	SD
BMQ specific-necessity			
My health, at present, depends on my prescribe medicines	4.09	Agree	0.948
My life would be impossible without my medicines	3.92	Agree	1.068
Without my medicines I would be very ill	3.84	Agree	1.110
My health in the future will depends on my medicines	3.91	Agree	0.969
My medicines protect me from becoming worse	4.14	Agree	0.824
BMQ specific concern			
Having to take medicines worries me	2.75	Disagree	1.461
I sometimes worry about long-term effects of my medicines	3.44	Agree	1.329
My medicines are a mystery to me	2.83	Uncertain	1.277
My medicines disrupt my life	2.31	Disagree	1.211
I sometimes worry about becoming too dependent on my medicines	3.41	Agree	1.370
BMQ general-harm			
People who take medicines should stop their treatment for a while every now and again	2.70	Disagree	1.307
Most medicines are addictive	2.24	Disagree	1.061
Natural remedies are safer than medicines	2.80	Uncertain	0.985
Medicines do more harm than good	2.18	Disagree	0.917
All medicines are poisons	2.51	Disagree	1.103
BMQ general-overuse			
Doctors use too many medicines	3.37	Agree	1.162
Doctors place too much trust on medicines	4.10	Agree	0.700
If doctors had more time with patients they would prescribe fewer medicines.	3.57	Agree	0.928

Likert-scale: 1=strongly disagree, 2=disagree, 3=uncertain, 4=agree and 5=strongly agree

Most of answered questions in BMQ general-harm disagree that all medication prescribed are harmful, thus they disagree with statement of "People who take medicines should stop their treatment for a while every now and again", "Most medicines are addictive", "Medicines do more harm than good" and "All medicines are poisons" Finally, Malay patients mostly agree that physicians are over-prescibing the medication base on distribution or answered question in BMQ general overuse (Table 8). This clearly showed their worries of the medications are excessive and probably not-appropriate.

DISCUSSION

Many of the patients in this study are above 60 years old and most received only primary care education or lower and is similar to that reported by Zanariah *et al* 2008. The findings showed more than half of the Malay patients with T2DM had poor HbA1c control and is associated with non-adherence to OHA and is well known method to reduce HbA1c (Cohen *et al*., 2010). Adherence is essential and Mateo *et al*., (2006) had earlier found that adherence to metformin led to improvement on HbA1c result. This current result is similar to earlier research (WHO, 2003; Mateo *et al*., 2006; Cramer, 2004 and Jingdong *et al.*, 2005; Jeanette *et al.*, 2009). The risk of overestimating this finding is probably low since a person stating his/her non-adherence is usually telling the truth. This association is deliberated by Horne and Weinman (1999) where it is reported that approximately 20% of self-report adherences tend to underestimate the true level of nonadherence toward the prescribed medicine. Our findings of 45% of the patients forget to take their prescribed medicine and 41% of the patients miss out the dose of their medicine demonstrates the higher the score of MARS can indicate the stronger reported adherence. However, the 38% of the patients with a MARS scale below mean score (mean MARS =21.77) may suggest less strongly reported adherence. This study examined patients' perception about their illness and their experience while taking the medication. These factors are important to health care since it can influence beliefs about medicine, health and illness held by individual patients (Hjelm *et al*., 2004) and is similarly reported by Horne (1999). However there are studies measuring non adherence to OHA and/or its cost and the implications towards health in general, rather than to study why patients adhere with OHA or do not consume their prescribed OHA (Lawton, *et al.*, 2008).

The average number of five medications prescribed per patient and frequency of medication consumed per day is about seven times per day (mean total frequency per day =7.28) is an indicator of the complexities of regiment for the treatment of diabetes mellitus and its underlying diseases. Mateo *et al*., (2006) reported that complexity of regimen or polypharmacy as one of the crucial factor which influence non adherence, while one pill per day administration was associated with greater adherence toward prescribed medicine (Eisen *et al.*, 1990). The importance of the frequency of medications was highlighted by Miller (1997) who studied on reasons why patients forgot to take their OHAs and showed that poorer reported adherence were linked to increase in total frequency of OHA and other medication consumed per day while polypharmacy is associated with lower adherence. Forgetfulness and perceptions that medications are no longer necessary are also common reasons for non adherence, especially amongst asymptomatic patients (Miller, 1997). Beliefs toward medication were known to be one of the factors which affect patient adherence toward prescribed medicine. Horne, Weinman and Hanskin (1999) found that medication beliefs were stronger predictors of reported adherence than clinical and sociodemographic factors. (Horne *et al*., 2004) mentioned that Asian people have different expectations, beliefs, and satisfaction levels for their medications than Westerners but proved likewise by the current study. Balkrishnan 1998 similarly found that race, gender, and socioeconomic status have not been consistently associated

with levels of adherence. However, statistically significant negative correlation for both specific concern and general harm among Malay diabetes patients adherence showed the more the patients' are concern about long term use, side effects and dependence toward prescribed medicine OHA, the higher the patients' beliefs that the prescribe medicine bring more harm than benefits which then led to lower adherence. This result study is similar to Home *et al*. 1999, as well several other studies (Mardby, Akerlind and Jorgensen, 2007). Furthermore this study also showed that the higher score of necessity-concern differential correlated with more reported adherence recorded on MARS scale (Spearman rho, 0.35, p=0.000 < 0.01). This indicates that Malay diabetes patients' beliefs necessity of prescribed OHA outweighs concern or worried about the long term use, side effects and dependence of the OHA. Even though this study results showed 70.2% of patients on necessity-concern differential shows that patient beliefs on necessity outweighs concern, there are still twenty-percent of subjects have concern belief out-weighs necessity that need further attention. These findings are again similar to that reported by Horne and Weinman (1999). Horne (1999) also stated that most people have a slightly negative perception of medicines, perceiving them to be generally harmful substances that are often overused by physicians. These negative perceptions of medication are often associated with the beliefs that the dangerous aspects of medicines are due to their chemical/unnatural origins and therefore complementary or traditional treatments are perceived to be more "natural" and safer. This study however showed that the majority of Malay diabetes patient perceived that natural remedies are safer than medicines just "uncertain" because most replied of never ever try or experienced using complementary or traditional treatment before for treatment of diabetes.

Most of the patients in this study agreed with statement that doctors are over prescribing the medicine and place too much trust on the medicines. An article published on "compliance to concordance" by Judy, 2007 reflect significantly with this finding. This is because Judy 2007 suggested medicines partnership between physicians and patients as an initiative that "focused at enabling patients to get the best out of prescribe medicines, by involving them as partners in decisions making about suggested treatment and supporting them in medicine taking" (Judy, 2007). Another interesting finding is the majority of patients agree with the statement "if doctors had more time with patients they would prescribe fewer medicines". This again showed the patients' beliefs that doctors should spend more time during consultation time and discussed regarding suggested pharmaceutical treatment using medication with them. This also showed that medicines partnership is important to enhance patient's belief. Osterberg and Blaschke (2005) similarly suggested this recommendation as one of the method to improve adherence toward the prescribed medicine. A study by Mardby, Akerlind and Jorgensen (2009) between pharmacy clients of lower education and higher level reported those with lower education levels believed medicines as more harmful and less beneficial. This study contradicted these findings where patients with lower education had more beliefs with necessity toward prescribed medicine than those with higher education. The effect of age and education level can be explained by the Transtheoretical Model of Change suggested by Prochaska and DiClemente (1983) which described explicitly the intervention of time in the adoption of behaviour. Their model states that there are four main stages of Model of Change; pre-contemplation, contemplation, preparation, maintenance stage. For DM patients to change they need to go through all four stages and these are lengthy processes. This model might answer as to why diabetic patients with other underlying diseases for more than 11 years seemed to score higher or were more agreement on the necessity of the prescribed medicine for maintaining their current health status and disease control. As for the younger patients below age 50 or below, they might be at the pre-contemplation and contemplation stage only where these can influence their beliefs and decision making process to take action which then modifies their behaviour.

Based on the above theory, patients age more than 61 years and contributed to highest prevalence of diabetes rarely asked questions about their treatment. They are at most times trust the need and necessity for those prescribed medicine for maintaining their health status. Patients' age below 50 years old mostly has at least upper secondary and college or graduate education. These patients are more concern about beliefs on the medication they take. These patients are also newly diagnosed with DM for about 5 years and many developed complication and other underlying disease and more concern about beliefs and curious as to why they need to take medications other than those for DM. Household income is also a factor the affects patients beliefs. Patients age from 51 to 60 years and earning a household income less the RM999.00 (USD 300) strongly agree that the physicians are overprescribing the medicines. This trend is similar to that of James and John, 2009. Finally, the effect of cost is not an issue in Malaysia. This is because in most developed countries, patients need to buy their medication while Malaysian patients g*et al*most free medication. Cost is thus not an issue but the lack of communication to achieve concordance state between patients and health care providers led to dissatisfactions among them.

Conclusion

Although complexities of medication can be a hindrance to adherence, improving the patient's beliefs on the necessity of prescribed OHA medicine will lead the stronger adherence. Malaysian Malays attitudes and beliefs are not affected by race, gender, and socioeconomic status. However the patients' are concern about excessive and inappropriate medications, long term use, side effects and dependence towards the prescribed medicines that can lead to poorer adherence.

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