

ORIGINAL ARTICLE

ASSOCIATION OF BELIEF ABOUT MEDICATION ON DRUG ADHERENCE FOR THE TREATMENT OF TYPE 2 DIABETES MELLITUS, HYPERLIPIDAEMIA AND HYPERTENSION IN THE COMMUNITY OF TWO SELANGOR DISTRICTS

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ABSTRACT

Poor drug adherence is a global problem, especially with the treatment of chronic conditions. Non-adherence to long-term medication is a complex phenomenon of multifactorial causation that include beliefs about medication. This study aimed to assess the association of beliefs about medications on patients' drug adherence to the treatment of chronic conditions. This was a cross-sectional study that involved 470 respondents and carried out in two semi-rural areas in Selangor, Malaysia. Respondents had one or more of the following chronic conditions: type 2 diabetes mellitus, hypertension and hyperlipidaemia and had been prescribed with long-term treatments for a minimum of three months. The validated questionnaires used were Belief about Medication Questionnaire (BMQ) and Adherence to Refill and Medication Scale (ARMS). From the correlation analysis, belief about medication necessity had positively correlated with drug adherence ($r=0.249$, $p<0.001$). Meanwhile, belief about medication concern ($r=0.235$, $p<0.001$) and harm ($r=0.214$, $p<0.001$) were associated with reduction in drug adherence. However, no significant correlation was found between belief about medication overuse and drug adherence ($p>0.005$). In summary, patients' beliefs about medication have a weak association with drug adherence among patients with type 2 diabetes mellitus, hyperlipidaemia and hypertension in this community.

Keywords: beliefs about medication; drug adherence; chronic conditions; Malaysia.

INTRODUCTION

Cardiovascular diseases (CVDs) are the leading cause of death globally. At the end of 2016, 17.9 million people had died from CVDs, representing 31% of total death worldwide¹. This amounted to twice the number of deaths attributed to cancers². The well-established risk factors for CVDs include type 2 diabetes mellitus (T2DM), hypertension (HTN), hyperlipidaemia (HLD) as well as smoking³. The successful management of CVDs in Malaysia poses a huge challenge for the Ministry of Health. Between 2006 and 2009, the rate of in-hospital CVDs mortality had increased from 15.7% to 25.4%⁴. The prevalence of CVDs risk factors such as T2DM, HTN and HLD had also climbed to 14.9%, 42.6% and 24% of the Malaysian population respectively in over ten years duration until 2019⁴. Due to the chronic nature of CVDs, long-term pharmacotherapy has grown into a fundamental component in the management of the patients.

The World Health Organization (WHO) defines adherence to long-term chronic therapy as "the

extent to which a person's attitude and action taking medication diligently, following a diet, and making lifestyle changes corresponds with agreed recommendations from a healthcare provider"⁵. Adherence is imperative to achieve the effect of the medication and in improving the patient's prognosis⁶. It had been suggested that adherence to proven, evidence-based pharmacological interventions is key to successful management of chronic conditions⁵. On the other hand, low adherence to medication eventually leads to poor clinical outcomes, increased healthcare costs and a higher rate of hospitalisation due to increased morbidity⁷. It has been estimated that around 20-50% of patients with chronic medical conditions are said to be non-adherent and do not take their medication as prescribed^{8,9}. In Malaysia, the adherence level to long-term antihypertensive treatment in primary health clinics was low at 53.4%, and this had negatively affected the blood pressure control¹⁰.

Medication non-adherence is of multifactorial aetiology. The factors contributing to non-adherence can be classified into five main domains, namely, patient-related, disease-related, treatment-related, socioeconomic factors, as well as healthcare system-related factors¹¹. Under patient-related factors, non-adherence is contributed by lack of motivation, depressions, drug or alcohol abuse and belief systems^{9,11}. Besides, a patient's psychological factor, which questions the necessity of, concern about, expectations and perceived benefits of long-term prescribed drugs can significantly influence a patient's adherence level^{11,12}.

Though treatment adherence is affected by social, cultural, financial as well as healthcare system factors, it is patients' involvement with prescribed medicines that are most central to support adherence¹³. To date, there is a paucity of treatment adherence research conducted in Malaysia focusing on patient beliefs, especially in rural and semi-urban areas. Most of the research published in government primary health clinics and focused on the healthcare system and socioeconomic factors instead^{10,14}. Therefore, this study aimed to address this research gap by evaluating the association of patient belief about medication on treatment non-adherence for three main chronic conditions, namely, type 2 diabetes mellitus, hypertension and hyperlipidaemia.

METHODS

Study population

The sample size was calculated based on the The sample size was calculated based on the frequency of non-adherence in the population ($p=0.5$) and the confidence level of 95%, to give a minimum sample size of 384. The inclusion criteria for the respondents were individuals 30 years old and above (as chronic diseases are more commonly observed in this group) with a confirmed diagnosis (self-reported) of one or more of the following chronic conditions: type 2 diabetes mellitus (T2DM), hypertension (HTN), hyperlipidaemia (HLD), and currently being prescribed condition-relevant treatment(s) for a minimum period of three months. Respondents who did not meet the criteria, refused to participate, or who were unable to give consent were excluded from the study. Ethical permission was obtained from Perdana University Institutional Review Board (PUIRB HR0171).

Study design and data collection

This was a quantitative cross-sectional study which was conducted over the six weeks between 23rd January 2018 and 17th March 2018. Data collection

involved convenience sampling and community-based survey by administering questionnaires to individuals in public places such as restaurants, supermarkets, bus stops, mosques as well as by house-to-house visits in Kuala Selangor and Sabak Bernam, Selangor areas. Potential respondents were approached after they had performed the prayer at mosque or finished eating in the restaurants for example. Students also went to residential areas and conveniently approached a few people living there. The potential respondents were explained about the purpose of this study and screened for the eligibility by asking the age and if they had any of the chronic diseases of study. After the inform consent was obtained, each respondent was given the self-assessment questionnaire, which took around 10 minutes to be completed. In some cases, caretakers were asked to help respondents who were unable to fill out the questionnaire by themselves.

Study instrument

The self-administered questionnaire comprised 40 questions and was made available in Malay, English and Chinese languages. The questionnaire was divided into three parts where the first part consisted of sociodemographic factors (age, gender, race, marital status, education level) and medical questions (presence of chronic medical conditions, duration of diagnosed conditions, duration of medications taken), the second part explored the patients' beliefs and perceptions about their medications using the Belief about Medication Questionnaire (BMQ)¹² and the final part focused on treatment non-adherence using the Adherence to Refills and Medication Scale (ARMS)¹⁵. Both the BMQ and ARMS are validated questionnaires, previously widely used in a range of populations and have been deemed suitable among participants with low literacy¹⁵.

The BMQ comprises of two sections: the BMQ-Specific section which assesses beliefs of specific-necessity (five items) and specific-concern (five items), and the BMQ-General section which assesses beliefs of general-harm (four items) and general-overuse (four items) to give a total of 18 items. Each item was evaluated continuously using a five-point Likert scale, from 1 to 5; 1=strongly disagree, 2 = disagree, 3 = uncertain, 4 = agree and 5 = strongly agree. Whereas, the ARMS contains 14 items that were answered in a four-point Likert scale, from 1 to 4; none of the time = 1 to all of the time = 4. For ARMS, the higher the value, the higher the non-adherence. The ARMS was slightly modified to aid the understanding of the questions in the local context following written permission from the questionnaire author. This only involved the word "refill" which was rarely used in the Malaysian

setting and had been replaced with the word "renewed" or "collected".

The questionnaire set was also translated into Malay and Chinese by forward and backward translations. The forward translation was conducted by having two persons who speak either Malay or Chinese to translate the original English version to Malay or Chinese languages respectively. The backward translation involved another two persons who speak either Malay or Chinese and proficient in English to translate the questionnaire back to English. A group of panels had compared and validated the two English versions. A partial validation was conducted for both the BMQ and ARMS as they were validated questionnaires. Factor analysis was done to evaluate the construct validity of data, by looking at one of the parameters of construct validity, which is the Kaiser-Meyer-Olkin measure (KMO). BMQ and ARMS variables had KMO values of 0.828 and 0.782 respectively (above 0.7), that indicated accepted validity. Similarly, communalities were above 0.4, and total variance explained met the requirement as the value was greater than 60%. In order to evaluate reliability, Cronbach's alpha analysis was used. The BMQ and ARMS variables showed Cronbach's alpha values of 0.756 and 0.682 respectively (above 0.6) and therefore categorised as reliable.

Statistical analysis

The data was analysed with descriptive and inferential statistics using Statistical Package for the Social Sciences (SPSS) version 21. Correlation analysis was performed to determine the association between the independent variable (belief about medication) and the dependent variable (drug adherence). $P < 0.05$ was considered statistically significant

RESULTS

Sociodemographic and medical profiles

A total of 470 respondents who fulfilled the inclusion criteria were recruited into the study. The demographic characteristics and clinical data of the respondents are illustrated in Table 1. More than half of the respondents (51.5%) aged 60 years and above. There were more male (58.5%) than female (41.5%) respondents. The majority of the respondents were Malays (77.4%), followed by Indians (11.7%), Chinese (10.2%) and others (0.6%). This accords with the demographic data obtained in Kuala Selangor and Sabak Bernam in which Malays are the dominant ethnic group. Most of the respondents had either primary or secondary school education (72.9%) while a smaller percentage (17.7%) had had a college or university education. A

total of 53.2% of the respondents had more than one diagnosed condition. HTN was the most common disease among the three. A total of 20.6% of the respondents have all three conditions which are T2DM, HTN and HLD.

Belief about medication (BMQ) and Adherence to Refills and Medication Scale (ARMS)

The results on BMQ and ARMS were shown in Table 2. For BMQ, a score of five indicates the highest score of beliefs about medications. The means for beliefs of medication necessity, concern, overuse and harm were 3.447 ± 0.707 , 3.114 ± 0.724 , 3.353 ± 0.666 and 2.545 ± 0.651 respectively. The mean from the total 14 items in the ARMS questionnaire was 1.575 ± 0.347 out of four. A lower score indicates a higher level of drug adherence.

Association between belief about medication and non-adherence

Correlation analysis was used to find the association between belief about medications and non-adherence (Table 3A and 3B). The beliefs about medication had a weak correlation with drug non-adherence. Belief about medication necessity was negatively correlated with non-adherence with $r = -0.249$ ($p < 0.05$) (Table 3A). This finding showed the possibility of a stronger belief in the necessity of taking medication to lead to a higher drug adherence. Whereas, belief about medication concern were weakly correlated with non-adherence ($p < 0.05$) with $r = 0.235$ (Table 3A). This indicates that it was possible that the respondents to be non-adherent to their medications if they had higher concerns regarding their medications. Similarly, higher beliefs about their medication harms were also weakly correlated with drug non-adherence ($r = 0.214$, $p < 0.05$) (Table 3B). On the other hand, the belief regarding medication overuse was not associated with non-adherence ($r = 0.084$, $p > 0.05$) (Table 3B).

DISCUSSION

The present study showed a weak correlation between beliefs about medication necessity, concern and harm with medication non-adherence, based on the correlation coefficient of 0.212-0.240. A study that used structural equation model analysis had also showed adherence to medications for chronic illnesses was negatively impacted by higher negative beliefs toward medications¹⁶.

A negative correlation between BMQ specific-necessity and ARMS showed that a strong belief of medication necessity led to a better adherence to medications. This result was consistent with a previous study which had reported that patients

Table 1: Sociodemographic characteristics

Sociodemographic	Frequency	Percentage (%)
Age group		
30-44 years old	47	10.0
45-59 years old	181	38.5
60-74 years old	208	44.3
>75 years old	34	7.2
Gender		
Male	275	58.5
Female	195	41.5
Race		
Malay	364	77.4
Chinese	48	10.2
Indian	55	11.7
Others	3	0.6
Marital status		
Single	13	2.8
Married	439	93.4
Divorced/widowed	18	3.8
Education level		
No formal education	44	9.4
Primary school	113	24.0
Secondary school	230	48.9
University/college	83	17.7
Medical conditions		
T2DM	56	11.9
HTN	110	23.4
HLD	54	11.5
T2DM + HTN	59	12.6
T2DM + HLD	22	4.7
HTN + HLD	72	15.3
T2DM + HTN + HLD	97	20.6

Table 2: Belief about Medication (BMQ) and Adherence to Refills and Medication Scale (ARMS)

Variables	Mean±SD
BMQ	
• Necessary	3.447±0.707
• Concern	3.114±0.724
• Overuse	3.353±0.666
• Harm	2.545±0.651
ARM	1.575±0.347

Table 3A: Correlation between BMQ (Necessity and Concern) and ARMS

Belief about Medication Questionnaire (BMQ)	r	p
Necessity	-0.249	0.001
My life would be impossible without my medicines	-0.164	0.001
Without my medicines, I would be very sick	-0.177	0.001
My health, at present, depends on my medicines	-0.215	0.001
My medicines protect me from becoming worse	-0.213	0.001
My health in the future will depend on my medicine	-0.239	0.001
Concern	0.235	0.001
I sometimes worry about the long-term effects of my medicine	0.129	0.001
Having to take medicines worries me	0.182	0.001
I sometimes worry about becoming too dependent on my medicines	0.169	0.001
My medicines disrupt my life	0.260	0.001
My medicines are a mystery to me	0.141	0.001

Table 3B: Correlation between BMQ (Overuse and Harm) and ARMS

Belief about Medication Questionnaire (BMQ)	r	p
Overuse	0.084	0.069
If doctors had more time with patients, they would prescribe fewer medicines	0.063	0.171
Doctors use too many medicines	0.104	0.024
Doctors place too much trust in medicines	-0.022	0.639
Natural remedies are safer than medicines	0.067	0.144
Harm	0.214	0.001
Medicines do more harm than good	0.172	0.001
People who take medicine should stop their treatment for a while every now and again	0.093	0.044
Most medicines are addictive	0.224	0.001
All medicines are poisons	0.151	0.001

who believe in the benefits of medications have increased adherence to antihypertensive agents¹³. On the other hand, that study had also found that patients who have lower belief in the necessity of taking medication were 19.9 times more non-adherent to treatment regime¹³. Another study had stated that non-adherence to stroke medication was due to the lack of belief in the necessity of taking the drug¹⁷. This finding highlights the need for better patient education in providing a clear rationale why the medications are necessary.

A positive relationship was found between specific-concerns and ARMS or drug non-adherence. This indicates that the respondents were less likely to adhere to their medication regimes when they believe that the medications have side effects that raise concerns. This outcome is in agreement with a study which reported that low adherence to medication to

the highly active antiretroviral therapy (HAART) are due to concerns about adverse effects¹⁸. This finding was further supported by two meta-analyses for many types of long-term conditions regardless of the country in which the research was conducted^{19,20}. This finding highlights the need to communicate about medication risks and benefits and to involve patient in the decision-making process to enhance patients'

optimal adherence to drugs²¹. Besides that, it is important to adopt a non-judgmental manner towards patients' perspective about disease and treatment²².

Additionally, there was a significant correlation between general beliefs regarding medication harm and drug non-adherence. A previous study had reported that respondents' inclination to follow medication regimens are influenced by multiple factors which included risk of harmful side effects²³. This study had enhanced our understanding of the beliefs and perceptions of the people in the semi-rural area in Malaysia about their medicines. Generally, the respondents believed in the benefits of medicines and perceived that medicine are necessary for their health. At the same, they were also concerned about the adverse effects of the drugs and thought that doctors relied too much on medicines.

Some limitations of this study include the possibility of social acceptability or perception bias since the respondents wanted to portray the positive self-descriptions in front of medical students, resulting in lower scores of the ARMS. In order to minimise this bias, the respondents were reassured that the participants would be anonymised and all the data collected would be kept confidential. Besides, selection bias could also be introduced as the questionnaires were

distributed to people in certain public places such as restaurants, supermarkets, bus stops and mosques without proper randomisation. The results of this study also need to be interpreted with caution since they could be biased as the bivariate correlation was conducted without controlling possible confounders.

CONCLUSION

This study revealed a low association of beliefs of medicines with the level of non-adherence. The findings suggest that patients' beliefs about medication, including medication concern, necessity and harm could have a limited influence on patients' adherence to their medication. More studies are needed to confirm these results in order to improve drug adherence for the treatment of type 2 diabetes mellitus, hyperlipidaemia and hypertension among the Malaysian population.

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