Original Article

MEDICATION ADHERENCE AMONG TYPE 2 DIABETES MELLITUS PATIENTS IN MANDALAY CITY, MYANMAR

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ABSTRACT

Context: The prevalence of diabetes mellitus and its related disability and premature death are high all over the world, including Myanmar. It is important to understand the perception on medication adherence among type 2 diabetes mellitus patients to design effective interventions and to ultimately improve adherence rate of diabetes mellitus patients in Myanmar. **Objective:** To study medication adherence among type 2 Diabetes Mellitus patients in Mandalay city, Myanmar. **Methods:** A cross-sectional study was done among 180 type 2 diabetes mellitus patients who were recruited by simple random sampling from the eight charity clinics in Mandalay. Face to face interviewing was done at participants' homes by using a semi-structured questionnaire. Medication adherence was measured by Medication Assessment Questionnaire. **Results:** Among the participants, 63.3% of patients had good adherence to antidiabetic therapy. Level of perception was strongly associated with level of medication adherence (p<0.001). **Conclusion:** In this study, medication adherence of type 2 diabetes mellitus patients was good. However, knowledge concerning etiology and pathophysiology of diabetes was poor. Therefore, the health education programs should emphasize not only on the risk factors and complications of the disease but also on etiology and pathophysiology and importance of drug adherence.

KEYWORDS: Knowledge, Perception, Medication Adherence, Type 2 Diabetic Patients, Charity Clinics.

INTRODUCTION

Diabetes (DM) is one of the major global health issues of the 21st century. The number of people living with this condition are increasing every year and they have to face with life-threating complications.[1]

World Health Organization (WHO) estimated that there were 171 million people with diabetes around the world in 2000 and the prevalence will increase to 366 million in 2035. Total number of diabetic patients is expected to project to double between 2000 and 2030 with a significantly greater rise in Asia.[2] Surprisingly, 78.3 million adults with diabetes live in Southeast Asia Region and it is predicted that the prevalence will increase up to 140.2 million in 2040.[1]

In Myanmar, the prevalence of diabetes is also in increasing trend. According to STEPS survey which was conducted in 2014, the adult diabetes prevalence was 10.5% which is higher than those of many Asian countries such as Sri Lanka (8.8%), Thailand (6.7%), Bhutan (6.4%), Bangladesh (5.5%) and Nepal (4.5%).[3]

Early diagnosis and proper management can minimize the problems associated with DM. The primary aim of management of DM is to delay the macro and micro-vascular complications by achieving optimal glycemic control.[4] Proper management consists of lifestyle modifications such as healthy diet and regular exercise, and regular taking of drug. For lifestyle modification and behavioral change, health literacy is an integral part of the diabetes management. Patients with proper knowledge on diabetes, its complications and importance of medication seek proper treatment and care.[5] Even though good knowledge and perception towards medication adherence could contribute to better disease management, there is a paucity of data of current knowledge and perception related to diabetes among the community in Myanmar.

Among three important dimensions for DM management including medication adherence, regular exercise and diet control, there is a crucial need nowadays to better understand and manage nonadherence, especially with the increasing numbers of effective self-administered treatments.[6] Medication nonadherence is particularly

common in type 2 DM patients.[7] It leads to decreased treatment efficacy and increased direct and indirect costs, mortality and morbidity.[8] Moreover, empirical evidence from international literature suggested that adherence rate for chronic illness regimens and lifestyle changes are lower than 50% in developing countries.[9] and diabetes patients have a poor adherence record when compared with all noncommunicable diseases (NCDs).[10]

Therefore, nonadherence to antidiabetic medication remains an unresolved issue, which can lead to several costly and life-threatening complications and patient's perception is often neglected in treatment design. Consequently, it is essential to understand patients' perception on DM, its medications and the importance of adherence to medications for glycemic control in order to promote effective and optimum diabetes care. Unfortunately, in Myanmar, only few researches have looked at the problem of DM, especially focusing on adherence to therapeutic regimens. Thus, it is important to understand the influence of patients' knowledge and perception on medication adherence and patients' perspective on medication adherence to design effective interventions and to ultimately improve adherence rate of diabetes patients in Myanmar.

The present study, therefore, is designed to address some of this paucity of data and aimed at better understanding knowledge and perception towards medication adherence among type 2 diabetes patients in Myanmar.

MATERIALS AND METHODS

A cross-sectional descriptive study was carried out among 180 type 2 diabetes mellitus patients who attended charity clinics in Mandalay city from 1st May 2019 to 31st August 2019. Patients of 18 years and above and those who were at least six months on antidiabetic therapy were included in this study.

The questionnaires contained 4 sections. Section 1 was the questions for socio-demographic characteristics including age, gender, education status, occupation and monthly family income. Section 2 was the questions for knowledge about type 2 diabetes mellitus patients. Knowledge towards DM and its adherence was measured by DM knowledge questionnaires which included 24 items. Section 3 was the perception section. The responses were measured by using five points Likert scale (i.e. Strongly agree, Agree, Uncertain, Disagree and Strongly disagree). This section consisted of 9 items to assess the perception of type to diabetes mellitus patients. For the medication adherence, the valid and reliable 4-items Medication Assessment Questionnaire (MGL MAQ), was used for determining adherence to antidiabetic medication. This measuring scale has a sensitivity of 81% and specificity of 44%.[11] These 4 items reflect the specific medication-taking behaviors of diabetes mellitus patients.

The reliability of the questionnaires was measured by conducting pre-test among 30 subjects before actual data collection. The Cronbach Alpha for the testing questionnaires was set to be at least 0.7. The questions that affected the reliability were removed after pilot testing. For the reliability, Cronbach Alpha of: knowledge session was 0.73, perception section was 0.72, and adherence session was 0.84.

Data Processing and Data Analysis
Quantitative data was collected by using semi-structured questionnaires. Data entry was done by using Epi data version 3.1 software. Data management and analysis was done by using statistical software, Stata version 13. Descriptive statistics was done to summarize the study population characteristics. Continuous variables such as age and monthly per capita income were presented using mean and standard deviation. Categorical variables such as gender and level of education were presented as frequency and percentage. Association between factors influencing antidiabetic drug adherence and adherence to antidiabetic medication was tested by using Chi square test. If assumptions for Chi square test did not meet, Fisher's exact test was used. Statistical significance was considered if p value was ≤ 0.05.

Ethical Considerations
The study received approval from the board of studies of the University of Medicine, Mandalay, Myanmar for permission to proceed (276(MHOS)/UMM/2019).

RESULTS

A total of 180 type 2 diabetes mellitus patients were involved in this study. Majority of the participants (87.8%) were more than 45years and over two-third of the patients in this study were females (85.6%). Most of the participants (46.1%) were primary school level, whereas only 5% were graduate. Most of the patients in this study were homemakers (37.2%), followed by self-employees (36.1%), and unemployed persons (18.4%). Most of them were currently married persons (61.1%) and majority of the participants were in low income (56.7%).

More than half of the participants (60%) had DM for less than 5 years. Majority of the participants (85%) said that they received all the required drug from the charity clinics (Table 1).

Table 1: Demographic and clinical characteristics of the study participants (n=180).

Demographic and clinical characteristics	Frequency	Percentage
Gender		
Male	26	14.4
Female	154	85.6
Age (year)		
18-45	22	12.2
>45	158	87.8
Education		
Illiterate	14	7.8
Read & write	29	16.1
Primary school	83	46.1
Middle school	36	20.0
High school	9	5.0
Graduate/postgraduate	9	5.0
Types of occupation		
Government employee	2	1.1
Non-government employee	4	2.2
Self-employed	65	36.1
Homemaker	67	37.2
Retired	9	5.0
Unemployed	33	18.4
Marital status		
Never married	16	8.9
Ever married	164	91.1
Monthly per capita income in family (Kyats)		
Low (≤ 90000)	102	56.7
High (> 90000)	78	43.3
Duration of diabetes mellitus		
< 5 years	108	60.0
≥ 5 years	72	40.0
Duration of antidiabetic treatment		
< 5 years	112	62.2
≥ 5 years	68	37.8
Supplying all the required antidiabetic drugs		
Yes	153	85.0
No	27	15.0

Most of the participants (82.8%) had good level of knowledge on diabetes mellitus and antidiabetic therapy. Among the various domains of diabetes knowledge questionnaire, the least correctly answered questions which score <50% were source of insulin production (1.6%), failure of the kidney to keep sugar out of the urine as a cause of diabetes (8.3%), eating excess sugar to be cause of diabetes (10.5%), the types of diabetes (12.2%), ineffective insulin secretion as a cause of diabetes (15.0%), hypoglycemia symptoms (31.6%) and importance of the way of food preparation (44.4%).

Over half of the participants (52.2%) had positive perception on diabetes mellitus and antidiabetic therapy and 63.3% of the participants had good medication adherence.

Regarding association between socio-demographic characteristics and level of knowledge, it was found that education status, duration of diabetes, mellitus and duration of antidiabetic drug therapy were statistically significantly associated with level of knowledge with p values of 0.032, <0.001 and <0.001 respectively.

Moreover, there was a statistically significant association of age and monthly per capita income per month with level of perception with p values of 0.003 and 0.043 respectively. However, it was found that there were no statistically significant associations between socio-demographic characteristics and antidiabetic drug adherence. There was statistically significant association between level of perception and antidiabetic drug adherence (p=<0.0001). See Table 2.

Table 2: Association of socio-economic factors, level of knowledge and level of perception with antidiabetic drug adherence.

Socio-economic factors		Antidiabetic drug adherence		Chi square	P value
		Good N (%)	Poor N (%)		
Age group	18-45	12(54.5)	10(45.5)	0.83	0.361
	>45	102(64.5)	56(35.5)		
Sex	Male	15(57.7)	11(42.3)	0.42	0.519
	Female	99(64.3)	55(35.7)		
Education	Illiterate/ Read & write	28(65.1)	5(34.9)	0.87	0.646
	Primary/middle school	73(61.3)	46(38.7)		
	High school and above	13(72.2)	5(27.8)		
Occupation	Employee	47(66.2)	24(33.8)	0.41	0.520
	Dependent	67(61.5)	42(38.5)		
Marital status	Never married	12(75.0)	4(25.0)	1.03	0.310
	Ever married	102(62.20)	62(37.80)		
Monthly per capita income in family (Kyats)	Low (≤ 90,000)	65(63.7)	37(36.3)	0.02	0.901
	High (>90,000)	49(62.8)	29(37.2)		
Duration of DM (year)	<5	63(58.3)	45(41.7)	2.91	0.088
	≥5	51(70.8)	21(29.2)		
Duration antidiabetic drug therapy (year)	<5	67(59.8)	45(40.2)	1.57	0.210
	≥5	47(69.1)	21(30.9)		
Supplying all the required drugs	Yes	99(64.7)	54(35.3)	0.83	0.363
	No	15(55.6)	12(44.4)		
Level of knowledge	Good	98(65.8)	51(34.2)	2.22	0.137
	Poor	16(51.6)	15(48.4)		
Level of perception	Positive	71(75.5)	23(24.5)	**12.67**	**<0.001**
	Negative	43(50.0)	43(50.0)		

DISCUSSIONS

Prevalence of adherence in previous studies varied by location. Regarding the results in this study, the prevalence of antidiabetic drug adherence in type 2 diabetes patients was 63.3% which was measured by previously validated Medication Assessment Questionnaire (MAQ). A study done in Nader Kazemi Clinic in Shiraz by using Medication Adherence Report Scale (MARS) reported the majority of participants (87%) adhered to their medication.[12] A study done in Palestine had shown that 58% of the patients had good medication adherence,[13] and a study done in Ghana found that 38.5% of the patients were adhered to antidiabetic therapy. It is also possible that the adherence behavior changes based upon the different population and cultural settings.

In this study, 63% of the participants had good adherence on antidiabetic drug therapy, which is similar to the result of a previous study, representing 65.9%.[14] However, the findings of both studies were lower than that of another study in which 82.4% of subjects were adherent to the intake of their prescribed antidiabetic medication.[15] This discrepancy might be explained partially due to the different characteristics of the target populations. The latter study was at the Diabetes and the Endocrinology OPDs of a major tertiary care government hospital in Central Delhi, whereas the majority of populations in the two former studies were from charity clinics and private hospitals.

It was stated that compliance with medication was observed in 56.7%,[16] and patients with good medication adherence was 61%.[17] A study done in Kenya mentioned that the prevalence of medication adherence low for 28.3 %, medium for 26.2% and high for 45.5% of study participants.[18] Other studies which used different measurement tool (MMAS-4) also indicated different results with the current study.

Regarding knowledge on diabetes mellitus and antidiabetic therapy, most of the participants (82.8%) had good level of knowledge on diabetes mellitus and antidiabetic therapy. Only 17.2% of the participants had poor level of knowledge. This finding is similar to the study done in Sri Lanka, in which the majority (77%) had good knowledge on diabetes mellitus.[19] Likewise, the majority of the participants (91.3%) had good knowledge on diabetes mellitus.[20] On the other hand, in the study done in Myanmar, only 41.2% of type 2 diabetes mellitus patients had good knowledge about diabetes mellitus.[14] These discrepancies might be due to difference in population characteristics and differences in cutoff points in defining knowledge levels. Previous study done in Myanmar categorized the knowledge level into good and poor level by taking mean score as a cutoff value.[14] But the current study and the study done in Singapore categorized knowledge levels as good when the participants got the scores >50% and categorized as poor when the participants got the score less than or equal to 50%. The reason why the level of knowledge in

this study is high may be due to development of social and media networks in Myanmar.

Although overall knowledge score was good, participants could not answer certain questions. The questions with the lowest scores were related to the etiology of DM, since patients believed that it was due to a high consumption of sugar or sweet foods. It was also found that knowledge about pathophysiology of diabetes mellitus was poor. Moreover, symptoms of hypoglycemia were unknown and this could put the patient's life at risk. This finding was similar with the previous study done in Mexico.[21]

Significant number of patients knew that wounds heal slowly in diabetics and as a result, they were aware of precautions while cutting nails and dealing with cuts and abrasions. Patients were aware of diabetic complications like neuropathy, nephropathy and delayed wound healing. Therefore, they can identify preventive approach to minimize these complications. The above results were similar with the study done in 2015 in which participants could describe complications and its preventive measures.[21] However, this finding was different from the study done in 2016 in which most of the respondents knew well about the complications of diabetes but few were aware of the etiology, pathophysiology, risks and preventive approach to reduce these complications.

Over half of the participants (52.2%) had positive perception towards diabetes mellitus and antidiabetic therapy and nearly half of the participants had negative perception. A previous study in Myanmar stated that 56.3% of the participants had positive perception on susceptibility, 63.9% had positive perception on severity of the disease and its related complications, 80.8% had perceived positively on the benefits of taking medicines and 53.5% patients had positive perception on barriers to take medicine and follow-up regularly.[14] It was stated that more than half of participants (62.69%) presented attitude level above the cutoff point for poor attitude level.[22]

In contrast, a different result was found in a study done in Galle district in Sri Lanka, in which majority (88%) had poor attitude towards DM.[19] This dissimilarity may be due to difference in population characteristics. This is because majority of the participants in the latter study were recruited from tertiary hospital while the present study recruited the participants from the charity clinics.

There is no significant association between socio-demographic characteristics and antidiabetic drug adherence as seen in this study. This finding was consistent with previous studies. It was stated that no significant association was reported between all demographic variables and treatment adherence.[23] In a study done in Kenya, there is no significant association between medication adherence and socio-demographic characteristics.[18] However, both of studies done in

Myanmar.[14] and in Malaysia.[24] had shown that household income is a significant predictor of medication adherence.[14] This diversity may be due to differing in drug support for the participants.

Regarding availability of all the required drugs, there is no association between drug availability and medication adherence in the present study. But participants who received some of the antidiabetic drugs were 2.0 times less likely to adhere to antidiabetic therapy compared to those who got all of their medications in a study done at Mutare Provincial Hospital, Manicaland Province, Zimbabwe.[4]

In the present study, education status, duration of diabetes mellitus and duration of antidiabetic drug therapy were statistically significantly associated with level of knowledge on diabetes mellitus and antidiabetic drug. This finding was similar to a study done in Sri Lanka in which level of education was significantly and positively associated with knowledge level.[19] In the present study, association between education status and diabetes knowledge is reasonable because patients with higher educational level also in a higher socio-economic status and might have more opportunity to obtain knowledge from the press, books and internet. In addition, they might have fewer barriers in communicating with healthcare providers.

According to this study, age and per capita income were strongly associated with level of perception which is similar to the previous study in which attitude level had significant correlations with income, occupation, age and gender.[22] On the other hand, attitude had no significant association with level of education, gender, and socio-economic status were also not associated with attitudes.[19]

In the present study, there is no significant association between level of knowledge and antidiabetic drug adherence. This finding is similar to a previous study in Myanmar, in which diabetes knowledge was not a significant predictor of medication adherence.[25] However, Ahmad et al. (2013) and Sweileh et al. (2014) stated that knowledge is important factor in understanding diversity in medication compliance among diabetic patients.

Regarding level of perception, it is strongly associated with good medication adherence. This finding is similar to many studies. Wai Yan Maung Maung, Tiraphat & Puckpinyo (2017) stated that perceived susceptibility, perceived severity, perceived benefits and perceived barriers are strongly associated with medication adherence. Ashur et al. (2015) pointed out that diabetes illness perception of type 2 DM patients plays a important role in determining medication adherence and could be considered in the development of drugs adherence promotion plans.

CONCLUSION

Majority of the participants in the current study had good level of knowledge. Moreover, they were well aware of diabetes related complications and its preventive measures, but they lag in knowledge about etiology and pathophysiology of diabetes. Over half of the participants had positive attitude good adherence to antidiabetic therapy.

Health education by means of mass media, campaigns and health talks should be done emphasizing not only on the risk factors and complications of the disease but also on knowledge regarding etiology and pathophysiology of DM and the importance of medication adherence and long-term management. Moreover, further qualitative research should be done to explore perspective of diabetic patients and service providers to get a holistic view on problem of antidiabetic drug adherence.

Competing interests
The authors declare that they have no competing interest.

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