ASSOCIATION BETWEEN MEDICATION ADHERENCE AND PATIENTS FACTORS WITH TYPE 2 DIABETES MELLITUS IN MAJMAAH CITY, KINGDOM OF SAUDI ARABIA

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ABSTRACT

Objective: To explore the medication adherence in type 2 diabetes mellitus in Majmaah, Kingdom of Saudi Arabia and to find possible role of socio-demographic factors in determining adherence to medication among patients with type 2 diabetes mellitus.

Study Design: Cross-sectional analytical study.

Place and Duration of Study: The data was collected from patients with type 2 diabetes mellitus in public places such as shopping areas and restaurants in Majmaah, from Feb 2018 to May 2018.

Methodology: A total of 137 patients with type 2 diabetes mellitus who fulfilled the inclusion criteria were recruited in the study. Adherence to medication was assessed by using the four item Modified Morisky mediction adherence scale (MMAS).

Results: The frequency of high adherence was only 10 (7.3%). Moderate adherence was 62 (45.3%), and low adherence was 65 (47.4%). There was no statically significant correlation between patients' age, gender, educational level, the employment status, duration of disease since diagnosis and adherence rate. Majority of the patients 40 (60.6%) responded that complexity of treatment and forget fullness 54 (56.8.3%) are the main factors contributing to low adherence. Fewer visits to the clinic is also a reason for low adherence to treatment either patients foget to take an appointment, or they intentionally miss due to the long clinic waiting time 50 (58.1%) and 51 (60.7%) respectively.

Conclusion: Adherence to diabetes medication was found to be low. No statically significant association with scodemographic factors and level of adherence were noted. The factors contributing to low adherence were complexity of treatment, forgetfulness and failure to keeping the appointment due to long clinic waiting time.

Keywords: Medication adherence, Modified morisky mediction adherence scale, Socio-demographic factors, Type-2 diabetes (T2DM).

INTRODUCTION

Diabetes mellitus is a condition where the therapeutic focus is to avoid complications by obligatory control of blood glucose level. Persistent adherence to prescribed medication is required to achieve the normal blood glucose levels[1]. Adherence rates to treatment for diabetes is generally a challenge to health care providers and reported low[2]. Medication adherence characterizes as compliance with care provider plan to timing, dosage, and frequency, lifestyle modification according to the recommendation and time-to-time adjustment to therapeutic plan. The absence of adherence with treatment as recommended particularly with Diabetes may prompt expanded utilization of numerous health care services, for example, more doctor visits, more laboratory usage, extra medications, and more seriously increase emergency room utilization and inpatient care[3].

Low adherence is one of the major contributing factors leading to poor glycemic control. Diabetes Complications can cause over time damage to eyes, kidneys, and nerves, and can increase the risk of death from heart disease and stroke, and these symptoms cause the death of 50% of diabetic patients. This may result in treatment failure, further complications leading

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to the worst outcome and psychosocial issues to patients as well as the burden on the healthcare system[4,5].

Numerous variables are related with low adherence to medication in patients with type-2 diabetes mellitus (T2DM), which can be named patient related, treatment-related or healthcare system related[6]. Patient-centered related include socio-demographic (age, sex, and educational status), and Economic elements like very high costs of drug and financial limitations. Treatment-related components like the complexity of prescription routine particularly in patients who take multiple drugs, also drug induce adverse reaction most commonly hypoglycemia in patients, the frequency of dosing and polypharmacy and long duration of diabetes since diagnosis. Healthcare system factors like accessibility and availability to patients services, and too low adherence to appointment keeping by the patients due to multiple reasons[6,7].

The incidence of poor medication adherence in patients with type 2 diabetes mellitus is high in Saudi Arabia. There is a need to highlight the factors with low adherence so we can address the core issues while planning the therapeutics goal. The rationale of this study was to find out the medication adherence among patients with type 2 diabetes mellitus and to determine the socio-demographic factors which can influence medication adherence in Patients with T2DM in Majmaah, Kingdom of Saudi Arabia.

METHODOLOGY

The cross sectional analytical study was conducted in the city of Majmaah, Kingdom of Saudia Arabia between February 2018 to May 2018. The ethical review committee of Majmaah University approved the study (MUREC-Jan03/ COM-2018/1). Known cases of type-2 diabetes were recruited from the public places such as shopping areas and restaurants in Majmaah. Informed consent was obtained at the time of data collection. Study participants were selected using consecutive sampling technique and all patients with type 2 diabetes mellitus of Saudi origin who were avialable and residing in Majmaah city. A sample of 188 was required considering a prevalence of adherence of 36% among these patients, with a precision of 7% at 0.05 level of significance. However, a final sample of 137 was achieved due to refusals from the eligible participants[7].

The data was collected by a pre-tested, primarily a close-ended modified four item version of Morisky medication adherence scale[8]. This qustionaire has good Internal Consistency and Reliability (ICR) with a Cronbach Alpha value of 0.67[9]. The questionnaire was translated in Arabic language. These four questions were answered by either yes or no, with corresponding 1 or 0 value. Then the adherence to medication was classified as high (0), moderate (1-2) or low (>2). The questionnaire contained socio-demographic characteristics. The factors that areaffecting medication adherence including social and economic factors, therapy-related factors and patient-related factors were recorded by simply answering yes or no to questions. Also, causes for low adherence to appointment keeping were explored.

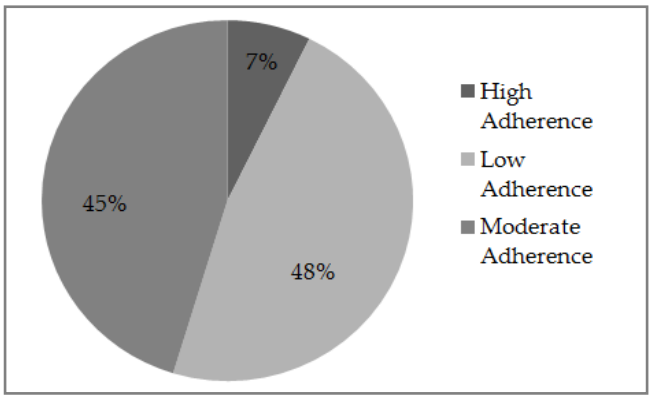

Figure: Magnitude of antidiabetic medication adherence.

The data was entered and analyzed using IBM SPSS Statistics for Windows, Version 25.0. Descriptive statistics are presented in the form of frequencies, percentages, and graphs. Pearson Chi-square test was used to study association between qualitative variables. Chi-square test was also applied to observe differences in two

categories. The *p*-value of ≤0.05 was considered as statistically significant.

RESULTS

A total of 137 patients responded. The female patients were slightly more in number than men 72 (52.6%) vs 65 (47.4%). Most of the patient's age was between 35-69 years 70 (51.1%). Most of the patient with a duration of DM since diagnosis was <5 years 62 (45.3%). Most of the participant's educational statuses were highly educated 74 (54.0%). Many study participants were 67 (48.9%) employed. Majority of patients had a family history of diabetes 84 (61.3%). The prevalence of high adherence was 10 (7%), moderate adherence was 62 (45%), and low adherence was 65 (48%). Results are presented in figure.

Table-I: Distribution of adherence to medications among patients of diabetes mellitus on the basis of socio-demographic characteristics (n=137).

Variables	High Adherence (n=10) %	Moderate Adherence (n=62) %	Low Adherence (n=65) %	*p*-value*
Age				
18-35	2 (20)	30 (48.4)	30 (46.2)	0.35
35-69	7 (70)	32 (50)	31 (49.2)	
>70	1 (10)	1 (1.6)	3 (4.6)	
Gender				
Male	5 (50)	31 (50)	29 (44.6)	0.82
Female	5 (50)	31 (50)	36 (55.4)	
Educational Status				
Primary	2 (20.2)	5 (8.1)	7 (10.8)	0.59
Secondary	2 (20)	20 (32.3)	16 (24.6)	
High Education	4 (40)	33 (53.2)	37 (56.9)	
Illiterate	2 (20)	4 (6.5)	5 (07.7)	
Employment Status				
Employed	5 (50)	26 (41.9)	36 (55.4)	0.41
Unemployed	3 (30)	18 (29)	13 (20.0)	
Disabled	1 (10)	03 (4.5)	7 (10.8)	
Retired	1 (10)	15 (24.2)	9 (13.8)	
Duration of Disease				
≤5 years	3 (30)	27 (43.5)	32 (49.2)	0.706
6-10 years	2 (20)	15 (24.2)	15 (23.1)	
>10 years	5 (50)	20 (32.3)	18 (27.7)	

*Chi-square test (*p*-value of ≤0.05 was considered statistically significant).

The socio-demographic factor were analyzed to see any association between them and adherence to diabetes medications. For all the studied factors, no statistically significant differences were observed in adherence to diabetes medications among patients of diabetes with different socio-demographic characteristics (table-I).

Overall, the factors that are affecting medication adherence has been categorized into social and economic factors, therapy-related factors and patient-related factors. This study found that frequency of adherence was significantly poor among those reporting lack of financial resources as a factor affects their treatment. Complexity of the medication regimen and frequency of dozing were the main therapy related factors affecting adherence (p≤0.05) Adherence to medication was statistically poor among patients who identifies inadequate knowledge regarding therapy forgetfulness, being busy and stop treatment when feeling better as the factors affecting medication intake as compared to those who didn't (table-II).

Overall, the factors that were causing low adherence to appointment keeping were categorized into forgetfulness, travel a lot, long clinic wait time, nature/busy schedule of work, The study identifies statistically significant difference in adherence among patients who reported forgetfulness and long waiting time at

clinics as a cause for poor medication adherence due to failure for appointment keeping as compared to those who didn't. (table-III).

Table-II: Factors affecting medication adherence among patients of diabetes mellitus (n=137).

Variables	Adherence to Medication*		*p*-value
	No (n=65)	Yes (n=72)	
Social And Economic Factors			
Costs of medication too expensive			
Yes	36 (59%)	25 (41.0%)	0.15
No	29 (38.2%	47 (61.8%)	
Lack of financial resources			
Yes	35 (57.4%)	26 (42.6%)	0.03**
No	30 (39%)	46 (60.5%)	
Therapy-Related Factors			
Complexity of the medication regimen			
Yes	40 (60.6%)	26 (39.4%)	0.003**
No	25 (32.2%)	46 (64.8%)	
Too much medications			
Yes	41 (54.7%)	34 (45.3%)	0.06
No	24 (38.7%)	38 (61.3%)	
Frequency of dosing			
Yes	45 (58.4%)	32 (41.6%)	<0.001**
No	20 (33.3%)	40 (66.7%)	
Side effects of medications			
Yes	39 (54.2%)	33 (45.8%)	0.09
No	26 (40%)	39 (60%)	
Long duration of the treatment period			
Yes	53 (51%)	51 (49%)	0.14
No	12 (36.4%)	21 (63.6%)	
Patient-Related Factors			
Lack of knowledge about the disease			
Yes	35 (53.8%)	30 (46.2%)	0.15
No	30 (41.7%)	42 (58.3%)	
Inadequate knowledge regarding therapy			
Yes	41 (56.2%)	32 (43.8%)	0.03**
No	24 (37.5%)	40 (62.5%)	
Forgetfulness			
Yes	54 (56.8%)	41 (43.2%)	0.001**
No	11 (26.2%)	31 (73.8%)	
Decision to omit treatment			
Yes	30 (65.2%)	16 (34.2%)	0.003**
No	35 (38.5%)	56 (61.5%)	
Being busy/ busy schedule of Work			
Yes	41 (64.1%)	23 (35.9%)	<0.001**
No	24 (32.9%)	49 (67.1%)	
Forgetting to refill drugs			
Yes	48 (62.3%)	29(37.7%)	<0.001**
No	17 (28.3%)	43 (71.7%)	
When feeling better			
Yes	45 (59.2%)	31 (40.8%)	0.002**
No	20 (32.8%)	41 (67.2%)	
When feeling worse/bad			
Yes	28 (50%)	28 (50%)	0.61
No	37 (45.7%)	44 (54.3%)	
Others (Difficulty swallowing, Hypoglycemia, etc.)			
Yes	31 (52.5%)	28 (47.8%)	0.29
No	34 (43.6%)	44 (56.4%)	

*High/moderate adherence is considered as adherence while low adherence is considered as poor or no adherence to medications. **Chi-square test (*p*-value of <0.05 was considered statistically significant).

Table-III: Causes for low adherence to appointment keeping (n=137).

Variables	Adherence		*p*-value
	No (n=65)	Yes (n=72)	
Forgetfulness			
Yes	50 (58.1%)	36 (41.9%)	0.001**
No	15 (29.4%)	36 (70.6%)	
Travel a lot			
Yes	16 (50%)	16 (50%)	0.74
No	49 (46.7%)	56 (53.3%)	
Long clinic wait time			
Yes	51 (60.7%)	33 (39.3%)	<0.001**
No	14 (26.4%)	39 (73%)	
Nature/busy schedule of work			
Yes	36 (59%)	25 (41 %)	0.015**
No	29 (38.2%)	47 (61.8%)	

*High/moderate adherence is considered as adherence while low adherence is considered as poor or no adherence to medications. **Chi-square test (*p*-value of <0.05 was considered statistically significant).

DISCUSSION

This study highlighted poor medication adherence among patients of diabetes mellitusin Majmaah city. Medication adherence in Middle Eastern countries constituted a problem in the management of chronic disease and reported suboptimal[7]. The results of this study showed that high adherence rate to diabetes medication is only 7%, while moderate to low adherence rate is 45% to 48% respectively. Our results almost did match with the recently publish local studies in Saudi Arabia where reported high adherence rate was near 10% while poor adherence rate around 55%[5,10]. In contrast, other nearby regional countries had shown the high adherence rate such as 84% in Ajman, UAE[11], 74% in Kuwait[12], 45% in Sudan[13], 26.1% in Egypt[14].

We did not find any statistically significant association between patient's age, gender, educational level, employment status and duration of disease since diagnosis with the level of adherence to medications ($p>0.05$). This finding was similar to the findings from studies conducted by Al-Majeed and Gelwa where they find no statistically significant difference in medications adherence to sociodemographic variables ($p>0.05$)[12,15]. Still there are studies reporting that higher age (53.6 years) found to have significant ($p<0.05$) high level of adherence to medications

than patients with lower age (43 years), also they found a statistically significant difference (p<0.05) between level of education, employment status, and medications adherence[16]. This may be because of the difference in the methodologies and settings, self-beliefs about the requirement of medicines, and concerns about the adverse effect of anti-diabetics medicines in different cultures and societies, that needs further investigation.

Cost of medication is the main factors related to low adherence to medication in diabetes[17]. Present study showed no significant association with this factor. This is a reflection of the local healthcare system, which provides comprehensive health care facilities. Majority of the patient response that the frequency and complexity of medication as a factor contributing to low adherence. This low adherence rate may be voluntary, unintended or may be patients having treatment for chronic illnesses. Studies conducted by Sajith and Iuga also report similar trends of low adherence to medications among T2DM patients[18].

Forgetfulness, decision to omit and feeling good while taking treatment is a statistically significant reason for low adherence in our study as in other local and regional studies. Appraisal and implementing the screening tool to classify high-risk patients with diabetes at increased risk of low adherence because of such issues is an area of interest in the management of diabetes[19].

Another major contributing factor for maintaining medication adherence is irregular visit and missed follow-up to the caring facility. Forgetfulness is a known factor in literature for decreased adherence rate. Our study finds that busy schedule for work is statically significant reason for the inability to keeping the appointment. Travelling is also a reasons for forget fulness in some patients because of their nature of job[20].

Factors related to health care provider are another reason for low adherence. Access difficulty e.g. long waiting time or busy clinics and lack of trust in the health care system are one of the factors for decrease adherence rate in a regional study; our study has a similar finding[21]. Medications adherence is the main component for disease complication prevention and acquiring management goal. Low medication adherence results in expanded expenses of diabetes outpatient care, increase emergency services usage, increase hospital admission, and cause over burden health care system[22]. There is an emerging need to address medication adherence to improve health care in diabetes.

CONCLUSION

Adherence to diabetes medications was found low among patients of diabetes mellitus living in the city of Majmah, KSA. The study found no significant differences in the adherence to medication of diabetes among patients of diabetes on the basis of differences in socio-demographic characteristics. Complexity of the treatment, forgetfulness and long waiting times at clinics were identified as the main reasons for poor adherence to medication among patients of diabetes.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

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