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Research Article

Medication Adherence among Diabetic and Hypertensive Patients in Al-Qassim region of Saudi Arabia

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ABSTRACT

Non-adherence to medication is often an unrecognized risk factor that contributes to failure of the therapeutic plan. The purpose of the study was to identify factors related to high, medium and low medication adherence among adult Saudi patients with hypertension and diabetes mellitus. This study is designed as a descriptive cross sectional survey and was conducted in three tertiary care hospitals of Al-Qassim province of Saudi Arabia. The data was collected using the 8-item Morisky Medication Adherence Scale (MMAS-8) and analyzed by SPSS. Three levels of adherence were considered based on the following scores: 0 to <6 (low); 6 to <8 (medium); 8 (high). Of the 396 patients interviewed, 52% reported low adherence to prescribed medication. Multinomial logistic regression analysis was conducted. Gender, age, literacy level, duration of illness and type of chronic disease were negatively associated with medication adherence. The study shows very high proportion of low and medium adherence on long term medication, which may be responsible for the failure of achieving therapeutic outcome. Further investigation is required to evaluate the applicability of MMAS-8 as a tool of measuring medication adherence among Saudi patients with chronic diseases. Adherence enhancing strategies should also be evaluated in separate patients group.

INTRODUCTION

Medication nonadherence is a multidimensional health care problem and is frequently the principal obstacle to successful pharmacotherapy in ambulatory patients (Vrijens et al. 2012). Poor adherence with rationally prescribed medication undermines benefits of treatment and is also associated with adverse events, increased cost, higher morbidity and mortality among the patients (Ulrich-Laufs 2010). Adherence to medication in chronic diseases such as hypertension and diabetes mellitus acts as an essential part of successful therapeutic outcome (Insel 2006). Factors contributing to nonadherence of medication include number of chronic conditions, dosing frequency or presence of side effects, personal beliefs and health literacy, patient's relationship with healthcare providers, age and cost of medication (Paraskevi 2012).

Diabetes mellitus and high blood pressure are among the leading healthcare issues that affect a growing number of people in Saudi Arabia according to the survey by the Kingdom of Saudi Arabia and the Institute for Health Metrics and Evaluation (IHME) at the University of Washington. The survey further states that the total prevalence of diabetes in Saudi

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Arabia was 14.8 % for males and 11.7% for females and hypertension was 17.7% for males and 12.5 % for females in 2013. According to the survey, conducted in 2013, 1 million of Saudi males and females are on diabetic medication and 0.6 million are on hypertensive medication (Mokdad 2016).

A medication adherence study conducted in Riyadh, Saudi Arabia found that 40% of the local patients on prescribed medication with multiple chronic diseases and high illiteracy rate had low adherence (Tourkmani 2012). Main reasons of non-adherence among Saudi patients were found to be forgetfulness, fear of side effects and lack of health education (Khan et al. 2012). The findings of the current study could provide more comprehensive information for physicians and pharmacists in Saudi Arabia with targets to investigate the ways to enhance medication adherence especially in patients with chronic diseases on long term medication to achieve therapeutic outcome.

MATERIALS AND METHODS

This study is a descriptive cross sectional interviewer assisted survey and was conducted on patients with either hypertension, diabetes or both visiting main tertiary care hospitals of Al-Qassim province of Saudi Arabia namely King Fahad specialist hospital, central hospital Buraidah and King Saud hospital between September 2013 and September 2014. The selected hospitals are main public tertiary care hospitals and cater to 80% of the diabetes and hypertensive patients in the region. These hospitals have outpatient clinics run by professionally trained family physicians. Most of the Pharm. D. internship students of Qassim University perform their internship in these hospitals.

The study population consists of registered adult hypertensive and/or diabetic Saudi patients in the outpatient clinics of the hospitals that have been prescribed diabetic and/or hypertensive medication for more than 6 months and not known to have cognitive impairment or psychiatric illness. Patients meeting the above inclusion criteria were approached and consent was taken to participate in the study. Pharm. D. internship students from Qassim University (supporting staff) conducted the interview and explained the study program to each patient. The interview was conducted during patient's follow-up and medication refills during the clinic hours (8 am to 2 pm weekdays) at outpatient clinic and out-patient pharmacy. Patients were selected using random time intervals on each day of the study period and to avoid any duplication we started first six months at out-patient pharmacy where patient came to refill their diabetic and hypertensive medications then at out-patient clinics outside the physician's office for remaining six months. Data were collected every end of the week. About 500 patients were approached to take part in the study, in which 425 patients consented to participate. They were interviewed to collect the demographic data and medical history. It took an average of 5 minutes to complete an interview. Literate patients (having secondary or higher education) were given the English version of the questionnaire, whereas illiterate patients or those with lower level of literacy, were interviewed by the supporting staff (all native Arabic speakers) using the same questionnaire and their answers were recorded. Supporting staff were advised and given training to avoid any prejudice and potential social desirability bias (Alhewiti 2014). Patients with inability to understand spoken words, such as those with visual or hearing impairment, were excluded from the study.

The supporting staff who have conducted all the interviews attended a standardized workshop on study protocol and questionnaire administration before the start of the study and took part in the focus group discussion to determine the reliability and suitability of the questionnaire. Permission was taken from Professor Donald E. Morisky to use MMAS-8 Scale. The research protocol was evaluated and permission was granted from the ethical committee of the College of Pharmacy, Qassim University.

Medication Adherence Measure

The questionnaire was divided into three sections. The first section contains demographic characteristic of patients like age, gender, education level, and type and duration of diagnosed chronic disease. The second section included patient adherence towards medication and was measured using eight item Morisky Medication Adherence Scale (MMAS-8). The

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first seven items in the MMAS-8 have dichotomous responses (yes/no) and they are formulated in a way to avoid acquiescence bias, whereas the eighth item has a 5 point likert scale response (Morisky et al. 2008). Three levels of adherence were considered based on the following scores: 0 to <6 (low); 6 to <8 (medium); 8 (high). MMAS-8 is designed to reverse the code response in a positive direction for item number 5 and standardize the code for item 8 (0-4), resulting in a scale from low adherence to high adherence. Item 8 is divided by 4 when calculating a summated score. This procedure standardizes the 5-point likert scale. The total scale has a range of 0 to 8.0. The eight-item compliance scale had an alpha reliability of 0.83 (n= 1367) among patients diagnosed with essential hypertension attending an outpatient clinic of a large teaching hospital (Krousel-Wood et al. 2009; Morisky and DiMatteo 2011).

Statistical Analyses

Based on previous medication adherence studies performed in Saudi Arabia (Tourkmani 2012; Khan et al. 2012; Alhewiti 2014), and after using NCSS-PASS (Power Analyses and Sample Size) 11 V11.0.7 program with desired 95% confidence interval of ±5, the estimated sample size was 425.

The PASW (Predictive Analytic Software) V18 (SPSS) was used for all data analysis. Chi-square tests and Student's t-tests were used for categorical and continuous variables, respectively. Association between adherence and continuous variables were evaluated using multinomial logistic regression model for adjustment. All the data entered into the software were double checked for their accuracy of the survey responses. All p values ≤0.05 were regarded as statistically significant.

RESULTS AND DISCUSSION

A total of 425 patients were screened during the study period. Of them, 396 patients were included and surveyed in the final analysis and remaining 29 patients were excluded from the study due to incomplete questionnaires. We have used 75% completion criterion for establishing eligibility. The median value of all non-missing items would be substituted for the missing item for individuals meeting the eligibility criterion i.e. if 1 or 2 items are missing, the median values of the other 7 or 8 items were substituted for the missing item.

Among 396 patient, 53.5% (n=212) were females and 46.5% (n=184) were males. Socio-demographic characteristics of the patients are shown in Table 1. Almost two third of patients (67.4%) were more than 45 years old. Of the statistics, majority of the patients (32.8%) have completed secondary education, while 30% were illiterate.

Overall 51.5% of the patients were found to have low adherence to prescribed medications (Table 1). When using multivariate logistic regression test, it was found that there was a negative association of age, gender, literacy level, duration and type of chronic disease with the adherence score (using MMAS-8). Chi-square was 8.610 with p value >0.05. The most common chronic disease among the patients was diabetes mellitus (42.2%) and most of them were found to have low adherence (53.9%) to prescribed medication.

Patients with low adherence showed significantly higher level of forgetfulness in taking their medication (47.2%) followed by carelessness (40.7%). Participants with low and medium adherence had shown significant concern about their medication, in which 27.8% had stronger belief that medication is overused, harmful and addictive in nature. Participants reported adherence behaviour is shown in Table 2.

The results of this study indicate major concern of nonadherence to medication among adult Saudi patients of diabetes mellitus and hypertension in Al-Qassim region of Saudi Arabia.

Prevalence of diabetes mellitus is estimated at approximately 24 percent in Saudi Adults which is three times higher than the global prevalence of diabetes mellitus (8.3%). Approximately 30 percent of Saudi adults are suffering from hypertension (Mokdad 2016). In the current study, we utilized MMAS-8 scale to assess poor medication adherence among diabetic and hypertensive patients of Al-Qassim province of Saudi Arabia, after studying previous studies done in Saudi Arabia which reported high number of low adherence. Two

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Studies conducted in Riyadh, Saudi Arabia found nonadherence to medication to be 56.9% and 40% (Alhewiti 2014; Tourkmani 2012). Overall prevalence of therapeutic nonadherence among diabetic patients in Al-Hasa district of Saudi Arabia was 67.9% (Khan, et al. 2012). In contrast to medication adherence rate of 51.5% in the current study, similar studies performed in neighbouring Gulf countries, such as UAE and Qatar showed nonadherence rates of 14% and 41.8% respectively (Arifulla et al. 2014; Jimmy et al. 2014). The high nonadherence rate to prescribed medication contributes to failure of therapeutic outcome, resulting in higher incidence of cardiovascular, cerebral and renal diseases (Insel 2006), therefore the current study highlights the need for investigating adherence enhancing strategies to improve therapeutic outcome among the Saudi adult population with chronic diseases.

Although statistics of the study showed that age, gender, literacy level, type and duration of illness is independent of medication nonadherence, slightly higher adherence was observed in older patients (>55 years) compared to the young (age 26-35 years) (Table 1). Illiterate patients were found to have higher adherence level as compared to highly educated patients, and this could be because patients with lower literacy levels were helped more by the interviewer in filling the questionnaire; another possible reason is that they may be less aware of the actual and potential side effects of medication than those with higher level of literacy (Alhewiti 2014).

Table 1: Characteristics of study participants and their adherence levels.

Characteristics	Number of Patients (%)			
	Total	**Low**	**Medium**	**High**
Total	*n = 396 (100)*	*n* = 204 (51.5)	*n* = 129 (32.6)	*n* = 63 (15.9)
Gender *N* (%), p >0.05				
Male	184 (46.5)	96 (52.2)	56 (30.4)	32 (17.4)
Female	212 (53.5)	108 (50.9)	73 (34.4)	31 (14.6)
Age (in years) *N* (%), p<0.05				
18-25	22 (5.6)	12 (54.5)	6 (27.3)	4 (18.2)
26-35	30 (7.6)	21 (70.0)	7 (23.3)	1 (3.3)
36-45	77 (19.4)	35 (45.5)	30 (39.0)	12 (15.6)
46-55	140 (35.4)	76 (54.3)	46 (32.9)	18 (12.9)
> 55	127 (32)	60 (47.2)	40 (31.5)	27 (21.3)
Literacy level *N* (%), p<0.05				
Illiterate	117 (29.5)	52 (44.4)	43 (36.8)	22 (18.8)
Primary education	57 (14.5)	30 (52.6)	20 (35.1)	7 (12.3)
Secondary education	130 (32.8)	73 (56.2)	37 (28.5)	20 (15.3)
Higher education	92 (23.2)	49 (53.3)	29 (31.5)	14 (15.2)
Duration of disease *N* (%), p>0.05				
< 1 year	30 (7.6)	18 (60.0)	5 (16.7)	7 (23.3)
1-3 years	85 (21.5)	51 (60.0)	22 (25.9)	12 (14.1)
4-10 years	132 (33.3)	61 (46.2)	53 (40.2)	18 (13.6)
11-20 years	111 (28.0)	55 (49.5)	38 (34.2)	18 (16.2)
> 20 years	38 (9.6)	19 (50.0)	11 (28.9)	8 (21.1)
Type of chronic disease *N* (%), p>0.05				
Diabetes Mellitus (DM)	167 (42.2)	90 (53.9)	50 (39.9)	27 (16.2)
Hypertension (HT)	97 (24.5)	46 (47.4)	32 (33.0)	19 (19.6)
DM + HT	129 (32.6)	66 (51.2)	46 (35.7)	17 (13.2)

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Table 2: Patient's self-reported adherence behaviour as measured by MMAS-8*

Questions	Number of Patients (%)	
	'Yes'	'No'
Do you ever forget to take your medications?	187 (47.2)	209 (52.8)
Are you careless at times about taking your medications?	161 (40.7)	235 (59.3)
Do you stop taking your medications when you feel better?	101 (25.5)	295 (74.5)
Do you stop taking your medications if they make you feel worse?	110 (27.8)	286 (72.2)
Did you forget to take your medications yesterday?	96 (24.2)	300 (75.8)
Over the past 2 weeks, were there any days you did not take your medications?	91 (23.0)	305 (77)
When you travel or leave the house, do you sometimes forget to take your medications?	149 (37.6)	247 (62.4)
How often do you have difficulty to remember taking all your medications?		
i. Never/rarely	128 (32.3)	
ii. Once in a while	127 (32.1)	
iii. Sometimes	110 (27.8)	
iv. Often	25 (6.3)	
v. Always	6 (1.5)	

*Morisky et al (2008), Morisky and DiMatteo (2011), Krousel-Wood et al (2009)

In this study, it was also found that the patients who are taking diabetes or hypertensive medications for the last 3 years or less were significantly less adherent to their prescribed medication than those who were on these medications for longer than 3 years (Table 1). One of the key factors of adherence behaviour not covered in this study is polypharmacy, which is an important risk factor for medication interactions and adverse events and which could contribute towards lower and higher adherence levels of medication. Morisky Scale had demonstrated the ability to predict poor medication adherence, however one of its limitation is the lack of the threshold score or individual question that yielded high sensitivity and positive predictive values which necessitates the addition of more questions to improve the scale consistency and predictability (Tourkmani 2012).

One of the main limitations of the current study is that patients, who are nonadherents to prescribed medication, may have been less likely to participate with the possibility of diluting the actual rates. We acknowledge that more questions about name of medication, dosage regimen, comorbidity and presence of complications could be added in the questionnaire, however these questions were omitted to avoid the lengthy questionnaire which could make the patient uncomfortable during interview. Another limitation of the study is exclusion of other races and ethnic populations in Saudi Arabia. Further studies are needed to better understand potential racial and ethnic disparities in adherence and ways to ameliorate them. Interviewer bias cannot be ruled out in our study but it is believed to have minimal impact on study validity (Alhewiti 2014).

Further studies are needed to explore actual causes and potential factors associated with low level of medication adherence and patient's belief towards medication in Saudi Arabia.

CONCLUSIONS

This study reported very high proportion of medication non-adherence among diabetic and hypertensive patients in Al-Qassim province of Saudi Arabia, which might result in patients not achieving desired therapeutic outcome. Further investigation is required to evaluate the applicability of MMAS-8 as a tool of measuring medication adherence among Saudi patients with chronic diseases. Moreover, adherence enhancing strategies should be evaluated in separate patients groups.

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