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COMPLIANCE TO DIABETIC THERAPY;

PATIENTS ATTENDING DIABETIC CENTER OF A TERTIARY HOSPITAL AT ARAR IN SAUDI ARABIA

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ABSTRACT… Objectives: Prevalence of diabetes mellitus in Arabian Peninsula has risen to a very high level especially in Saudi Arabia (32%). Compliance of diabetic patients' towards therapy is crucial for diabetic management. According to a study conducted at Riyadh, Saudi Arabia 83.4% of uncontrolled glycemic level (HbA1c ≥7%) patients did not follow the recommended dietary plan. Another factor for high rates of un-controlled diabetes was poor compliance to medication. Present study was aimed to investigate awareness of disease and drugs, as well as compliance to medication, dietary control and exercise in diabetic patients reporting to a tertiary hospital at Arar, Saudi Arabia. **Study Design:** A cross sectional descriptive study. **Setting:** Diabetic center of Prince Abdul Aziz bin Mossaid hospital, Arar, Saudi Arabia. **Period:** November and December 2015. **Methods:** Patients' awareness of disease and drugs, as well as compliance to medication, dietary control and exercise was investigated by using a structured questionnaire. Response to various questions was analyzed using SPSS program version 16. Data was further correlated between variables via Fisher's exact and chi-squared test. **Result:** Average awareness about disease and drugs was 56.5% and 23%, respectively. Overall compliance rates to medication, dietary control and exercise were 89.3%, 31% & 28.5%, respectively. Positive association was found between awareness to disease/drugs and compliance to therapy. **Conclusion:** The results of present study and similar studies conducted elsewhere indicate that patients' awareness towards their disease and medication is directly proportional to patients' compliance. Adequate awareness programs should be arranged for better management of diabetes in the community.

Key words: Diabetes mellitus, awareness, compliance, medication, dietary control, exercise, Northern Region of Saudi Arabia.

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INTRODUCTION

Diabetes mellitus is a disorder affecting a very wide range of population of both developed and developing countries.[1] Prevalence rate of diabetes mellitus in Arabian Peninsula has risen to very high levels especially in Saudi Arabia that is about 32% according to recent studies.[2] This rise in prevalence is mainly because of economic development, rapid urbanization and changes in life-style.[3] Because of these alarming facts continuous and good medical care is required for patients with diabetes mellitus. There is a strong need for patient's proper education for their disease, medications, patients' self-management and compliance to treatment.[4]

Compliance of diabetic patient towards physicians' advice for medication use is crucial for diabetic management. By achieving good compliance and self-control, long term complications can be prevented.[5] Common factors in poor compliance are medication un-availability, medication side effects, poor self-control, social attitudes, chronic disease pattern and lack of patients' knowledge about their disease and medications.[6] According to many studies patients with chronic disease states showed 65–75% compliance rate to their prescribed therapies. Poor compliance results in more rapid disease progression, complications and increased health care financial load. Hospitalization and emergency department

usage are significantly high in diabetic patients.[7]

Only a few studies were carried out in Saudi Arabia on medication awareness and compliance rates in diabetic patients. According to a cross sectional study conducted at Sultan Bin Abdul-Aziz Humanitarian City, Riyadh, Saudi Arabia, 83.4% of uncontrolled glycemic level (HbA1c ≥7%) patients did not follow dietary plan as recommended by the dietitians. Another factor for high rates of un-controlled diabetes was reported to be poor compliance to medication use.[4]

The study was carried out about 3 years before in a well-established region of Saudi Arabia and indicated significance of compliance of patients towards physicians' dietary advices and medications. Northern Border Region of Saudi Arabia is relatively less developed and has lesser literacy rate. Therefore, the present study was carried out to investigate patients' awareness to disease and drugs, as well as their compliance towards their medication, exercise and dietary advice in patients reporting to Diabetic Center of Prince Abdul Aziz bin Mossaid hospital, Arar, which is the capital city of the Northern Border Province of Saudi Arabia.

MATERIAL AND METHODS

Subjects and study design

A cross sectional descriptive study was conducted among patients with diabetes mellitus reporting at Diabetic Center of Prince Abdul Aziz bin Mossaid hospital, Arar, Saudi Arabia during November and December 2015. The purpose of the study was explained and informed consent was obtained from the respondents. Sample size was assessed by using online sample size calculator, Fluid Surveys and Survey Monkey[8,9]; using following formula.

Sample Size Calculation

Sample Size = (Distribution of 50%) / ((Margin of Error% / Confidence Level Score) Squared)

Finite Population Correction

True Sample = (Sample Size X Population) / (Sample Size + Population – 1)

Data collection

Patients' data was recorded through a semi structured questionnaire, consisting of; i) Demographic information: patients' age, gender, and educational status, etc; ii) Patients' awareness towards their disease and medication; iii). Patient's compliance to therapy, exercise and dietary advice.

Presentation and analysis of data

Collected data was presented in tables and graphs and analyzed for descriptive statistics using SPSS version 16. Association between variables was carried out by Fisher extract test and chi-squared test.

RESULTS

Out of total 130 diabetic patients contacted, 84 consented to participate in the study, thus the response rate was 65%.

Table-I indicates demographic characteristics of diabetic patients. Highest percentage of our patients (41.7%) was in between 41-50 years of age. 64.3% of our patients were male and 35.5% were female. Most of our patients (88.1) were Saudis. A significant number of our patients was illiterate (34.5%) and majority of them were residing in urban areas (78.6%). Most of them were type-2 diabetics (90.5%).

Table-II indicates patients' awareness about their disease. 61.9% of Patient knew about major symptoms of diabetes (like polyuria, polydipsia polyphagia and generalized fatigue). 67.9% knew about symptoms of hyperglycemia (e.g. polyuria and polydipsia) and 40.4% had the knowledge of symptoms of hypoglycemia (e.g. palpitation, sweating and headache). 56% of our patient knew about major complications of diabetes mellitus (e.g. angina, myocardial infarction and stroke). 25% of patients reveled that they often and 42.9% of our patients revealed they sometimes got symptoms of hyperglycemia. Whereas, only 14.1% of patients revealed that they often and 26.3% of patients revealed that they sometimes noticed the symptoms of hypoglycemia. Male patients were found to know more about major

symptoms of diabetes as compared to female patients (Fisher's exact test, P-value 0.048). Relatively more proportion of foreigners knew about major complication of diabetes (Fisher's exact test, P-value 0.037).

Question	N (%)
Age	
o less than 40	10 (11.9)
o 41-50	35 (41.7)
o 51-60	27 (32.1)
o More than 60	12 (14.3)
Gender	
o Male	54 (64.3)
o Female	30 (35.7)
Nationality	
o Saudi	74 (88.1)
o Non-Saudi	10 (11.9)
Religion	
o Muslim	84 (100)
o Non-Muslim	
Type of Diabetes	
o Type-1	8 (9.5)
o Type-2	76 (90.5)
Education level	
o Illiterate	29 (34.5)
o Primary school graduate	15 (17.9)
o High school graduate	27 (32.1)
o College graduate	8 (9.5)
o Bachelor degree holder	4 (4.08)
o Master degree holder	
o Doctorate degree holder	1 (1.1)
o Religious degree holder	
Address	
o Rural	18 (21.4)
o Urban	66 (78.6)

Table-I. Demographic characteristics

Type-1 diabetic patients more often noticed the symptoms of hyperglycemia as well as hypoglycemia as compared to type-2 diabetics (Chi squared test, P-value 0.001 and 0.018, respectively). There was a positive association of educational level and recognition of symptoms of hyperglycemia and hypoglycemia (Chi squared test, P-value 0.001 and 0.032, respectively).

Question	N (%)
Do you know about major symptoms of your disease?	
o Yes	52 (61.9)
o No	32 (38)
Do you recognize that now your blood sugar is going high (hyperglycemia)?	
o Yes	57 (67.9)
o No	27 (32.1)
How often you got symptoms of hyperglycemia?	Among 67.9 %
o Always	21 (25)
o Sometime	36 (42.9)
Do you recognize that now your blood sugar is going low (hypoglycemia)	
o Yes	34 (40.4)
o No	50 (59.6)
How often you got symptoms of hypoglycemia?	Among 40 %
o Always	12 (14.1)
o Sometime	22 (26.3)
Do you know about major complications of diabetes?	
o Yes	47 (56)
o No	37 (44)
Overall awareness of disease (Positive response)	56.55%

Table-II. Patients' disease awareness

Table-III indicates patient's awareness of their medication. A significant number of patients (36.9%) knew about the names of drugs for their problem and only 9.5% of patients could tell/ noticed the major side effects of their drugs. Relatively, male patients knew more about major side effects of their drugs (Fisher's exact test, P-value 0.048).

There was positive association of education level with the knowledge of major side effects of drugs (Chi squared test, P-value 0.001).

Question	N (%)
Do you know for which disease / disorder are you taking your drugs? o Yes o No	 31 (36.9) 53 (63.1)
Do you know about major side effects of your drugs? o Yes o No	 8 (9.5) 76 (90.5)
Have you ever noticed any side effects of your drugs? o Yes o No	 8 (9.5) 76 (90.5)
Average medication awareness (Positive response)	23.2%

Table-III. Patients' medication awareness

Table-IV indicates patients' compliance towards medication. 89.3 % of the patients took their drugs at proper timing and majority of them (65.5%) benefitted by relating intake of their medication to meal times. A good number of patients (97.6 %) took their drug doses as prescribed by their doctors, while 11.9 % of patients willingly discontinued their drugs. 39.3% of patient gave history of missing one dose of the drug, whereas 19% missed intake of their drug for the whole day. Only 11.9% patients reported to miss their drug intake once in a month, while the majority of them rarely missed their drug intake. There was a positive association between awareness of symptoms of hyperglycemia with the drug compliance (Chi squared test, P-value 0.033). No significant differences were found in respect of age, gender, nationality, education level and locality for the drug compliance.

Figure-1 shows patients' response to physicians' dietary advice. 44 % of patients never followed physicians' dietary advice. Relatively younger aged persons followed physicians' dietary advices more than older patients (Chi squared test, P-value 0.047). Type-1 diabetic patients relatively followed physicians' dietary advices more in comparison to Type-2 diabetic patients (Chi squared test, P-value 0.004). There was a positive association between awareness of symptoms of hypoglycemia with the compliance of physicians' dietary advices (Chi squared test, P-value 0.008).

Question	N (%)
Do you take your drugs at proper time as advised by doctor? o Yes o No	 75 (89.3) 9 (10.7)
How you remember to take your daily drug at proper time? o Through meal timing o Through Prayers timing o Others	 55 (65.5) 12 (14.3) 17 (20.2)
Do you take your drug doses as prescribed by doctor? o Yes o No	 82 (97.6) 2 (2.4)
Have you ever discontinued your drugs at your own will? o Yes o No	 10 (11.9) 74 (88.1)
Do you some time missed your drug intake? o Yes o No	 33 (39.3) 51 (60.7)
How long you missed your drug use? o For half day o For full day o For two days o For many days	 8 (9.5) 16 (19) 3 (3.6) 6 (7.1)
How frequently you missed your drug intake in last month? o One time o Two times o Three times o Four times o More than four times	 10 (11.9) 5 (6) 4 (4.8) 3 (3.6) 1 (1.2)

Table-IV. Patients' medication compliance

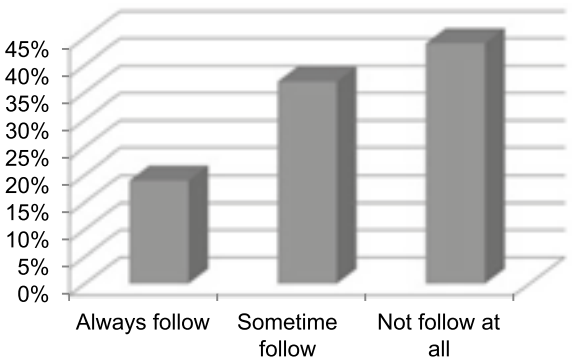


Figure-1. Figure-2 Bar graph showing patients' response to physicians' dietary advices

Figure-2 shows patients' response to physicians' daily exercise advice. 47% of patients never followed physicians' exercise advice. Type-1 diabetic patients followed physicians' exercise advices more than Type-2 diabetic patients (Chi squared test, P-value 0.025). Patients residing in urban areas followed physicians' advices for daily exercise more in comparison to patients residing in rural areas (Chi squared test, P-value 0.041). There was positive association between awareness of symptoms and complication of diabetes with the compliance of physicians' daily exercise advices (Chi squared test, P-value 0.004 & P-value 0.001).

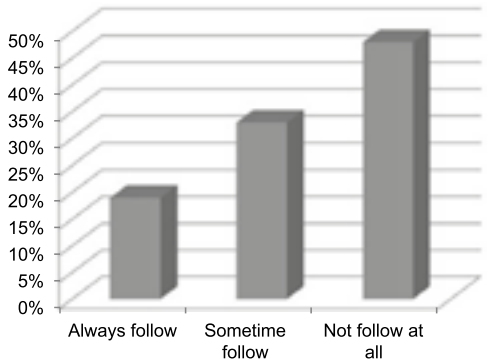


Figure-2. Bar graph showing patients' response to physicians daily exercise advices

DISCUSSION

According to the present study an overall 56.5% of diabetic patients were aware of their disease (Table-II). In another study, conducted in Al-khobar Saudi Arabia in 2005, a similar percentage of patients (50%) were found to be aware of diabetes.[10] The present study indicates that male diabetes patients had more awareness of diabetes as compared to females. Similar results have been reported in a study conducted in India in 2015.[11] Our study indicated that increasing education level was associated with better recognition of symptoms of hyperglycemia and hypoglycemia. Above mentioned study conducted in India also mentioned that higher proportion of study populations with college graduation had good awareness to their disease.

In the current study, patients average medication awareness was only 23.2% (Table-III). Above mention study conducted in Al-khobar Saudi Arabia also revealed similar results regarding patients' medication awareness.

Awareness about symptoms and complications of diabetes is very crucial for long-term management of diabetes. Several studies conducted worldwide consistently revealed that awareness of the disease among diabetic patients were low. Different educational programs running throughout the world are not achieving the desired goal of increasing awareness among diabetic patients towards their disease and medications.[12] 11.9 % of patients in our study willingly discontinued their drugs mainly due to un-awareness of fact that anti-diabetes drugs do not cure disease but only control diabetes and faced health problems on discontinuation.

In our study an overall compliance rates to medication, dietary control and exercise were 89.3%, 31% & 28.5%, respectively (Table-IV, Figure-1 & Figure-2), indicating that compliance towards medication was much better. Good percentage of the patients took their medicines at proper timing as prescribed by physicians (Table-IV). A similar compliance rate (90%) of diabetic patients towards their medications has been reported in a study conducted in UAE in 2013.[13] According to our study medication compliance rate increases with the increase in level of patients' disease awareness (Chi squared test, P-value 0.033) and the above mentioned UAE study also shows positive association between level of patients' disease awareness and patients' compliance to medication.

The present study reveals that 31% and 28.5% diabetic patients follow physician's dietary and daily exercise advices respectively. In a study conducted in Nepal in 2013 only 12% patients followed physicians' dietary advice and about 50% followed physicians' daily exercise advices.[14] In another study conducted in Egypt in 2010 only 2.2% patients followed dietary advice and nearly 0% followed daily exercise advices.[15]

According to results of the present study, middle

aged patients follow physicians' dietary advices more than older patients. Moreover, patients with Type-1 diabetes (which is usually common in younger aged group) followed physician's dietary advice more than Type-2 diabetics. Patients residing in urban areas followed physicians' daily exercise advices more than those from rural areas. In addition to that our study also showed positive association between awareness to disease and compliance to physicians' daily exercise advice.

CONCLUSION

The results of present study and similar studies conducted elsewhere indicate that patients' awareness towards their disease and medication is directly proportional to patients' compliance to medication, exercise and dietary control, which in turn are crucial for the management of diabetes and prevention of its long term complications. These finding strongly suggest that awareness programs towards disease and medication for diabetic patients should be adequately arranged for better management of diabetes in the community.

Conflict of Interest:

This research was carried out for academic promotion and student's research training

REFENERCES

1. Abahussain NA, El-Zubier AG. **Diabetes knowledge among self-reported diabetic female teachers: Al-khobar, Saudi Arabia.** J Family Community Med. 2005 Jan; 12(1):43-8.

2. Alharbi NS, Almutari R, Jones S, Al-Daghri N, Khunti K, de Lusignan S. **Trends in the prevalence of type 2 diabetes mellitus and obesity in the Arabian Gulf States: Systematic review and meta-analysis.** Diabetes Res Clin Pract. 2014 Nov; 106(2):e30-3. doi: 10.1016/j.diabres.2014.08.019. Epub 2014 Sep 6.

3. Jackson IL, Adibe MO, Okonta MJ, Ukwe CV. **Knowledge of self-care among type 2 diabetes patients in two states of Nigeria.** Pharmacy Practice 2014 Jul-Sep; 12(3):404.

4. Al-Hayek AA1, Robert AA, Alzaid AA, Nusair HM, Zbaidi NS, Al-Eithan MH, Sam AE. **Association between diabetes self-care, medication adherence, anxiety, depression, and glycemic control in type 2 diabetes.** Saudi Med J. 2012 Jun; 33(6):681-3.

5. Khattab MS1, Aboifotouh MA, Khan MY, Humaidi MA, al-Kaldi YM. **Compliance and control of diabetes in a family practice setting, Saudi Arabia.** East Mediterr Health J. 1999 Jul; 5(4):755-65.

6. Faria HT, Santos MA, Arrelias CC, Rodrigues FF, Gonela JT, Teixeira CR, Zanetti ML. **Adherence to diabetes mellitus treatments in family health strategy units.** Rev Esc Enferm USP. 2014 Apr; 48(2):257-63.

7. Roberts AW, Crisp GD, Esserman DA, Roth MT, Weinberger M, Farley JF. **Patterns of medication adherence and health care utilization among patients with chronic disease who were enrolled in a pharmacy assistance program.** N C Med J. 2014 Sep-Oct; 75(5):310-8.

8. http://**fluidsurveys.com**/university/calculating-right-survey-sample-size/

9. https://**www.surveymonkey.com**/mp/sample-size/

10. Abahussain NA, El-Zubier AG. **Diabetes knowledge among self-reported diabetic female teachers: Al-khobar, Saudi Arabia.** Journal of Family & Community Medicine. 2005; 12(1): 43-48.

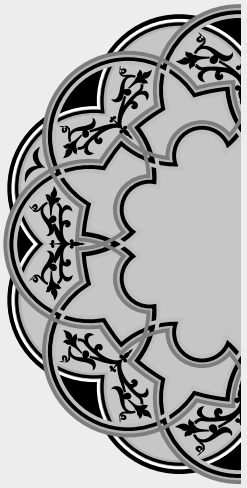
11. Girish M. Chavan, Vivek B. Waghachavare, Alka D. Gore, 1 Vishwajeet M. Chavan, Randhir V. **Dhobale, and Girish B. Dhumale. Knowledge about diabetes and relationship between compliance to the management among the diabetic patients from Rural Area of Sangli District, Maharashtra, India.** J Family Med Prim Care. 2015 Jul-Sep; 4(3): 439–443.doi: 10.4103/2249-4863.161349.

12. Foma MA, Saidu Y1, Omoleke SA, Jafali J. **Awareness of diabetes mellitus among diabetic patients in the Gambia: a strong case for health education and promotion.** BMC Public Health. 2013 Dec 5; 13:1124. doi: 10.1186/1471-2458-13-1124.

13. Al-Maskari F1, El-Sadig M, Al-Kaabi JM, Afandi B, Nagelkerke N, Yeatts KB. **Knowledge, attitude and practices of diabetic patients in the United Arab Emirates.** PLoS One. 2013; 8(1):e52857. doi: 10.1371/journal.pone.0052857. Epub 2013 Jan 14.

14. Parajuli J1, Saleh F, Thapa N, Ali L. **Factors associated with nonadherence to diet and physical activity among Nepalese type 2 diabetes patients; a cross sectional study.** BMC Res Notes. 2014 Oct 24; 7:758. doi: 10.1186/1756-0500-7-758.

15. Ibrahim NK, Attia SG, Sallam SA, Fetohy EM, El-Sewi F. **Physicians' therapeutic practice and compliance of diabetic patients attending rural primary health care units in Alexandria.** J Family Community Med. 2010 Sep; 17(3):121-8. doi: 10.4103/1319-1683.74325.



"Who seeks a faultless friend remains friendless."

Turkish Proverb

AUTHORSHIP AND CONTRIBUTION DECLARATION

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4	Ahmed Badah Alanazi	Data collection	
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