Original Research article

OVERVIEW OF GLYCEMIC CONTROL, KNOWLEDGE, AWARENESS AND ATTITUDE AMONG TYPE-2 DIABETES MALE PATIENT'S

Noohu Abdulla Khan*[1], V.V.Venkatachalam[2], Khaled M. Al Akhali[1] Sirajudeen S.Alavudeen[1], C.K.Dhanapal[2], Asif Ansari Shaik Mohammad[1]

1- Department of clinical Pharmacy, King Khalid University. Abha, Kingdom of Saudi Arabia
2- Department of Pharmacy, Annamalai University, Annamali Nagar, Chidambaram, India.

ABSTRACT

Background: Knowledge, awareness is the greatest weapon in the fight against diabetes mellitus. It can help the people understand the risk of diabetes, motivate them to seek proper treatment and care, and prepare them to keep the disease under control.

Objective: To assess the overview about glycemic control knowledge, attitude and awareness among the T2 DM male patients towards Diabetes.

Methods: Single center cross sectional, retrospective cum prospective study conducted at Aseer diabetic center, Abha, from July, 2012 to October 2013 to assess the glycemic control knowledge, attitude and awareness.

Results: In this current study only 15.12% of patients and had awareness about their type of DM, and 35.12% of patients had knowledge about DM. As a the therapeutic outcome the patients had an average HbA1c value of 9.17($\pm$1.68) % and BMI of 28.52($\pm$5.00) kg/m^2.

Conclusion: Present study outcomes indicate that the improvement in diabetic patient's knowledge, awareness and attitude about the disease can do productive changes in the gylcemic control.

*Author for correspondence: Noohu Abdulla Khan Lecturer,Department of Clinical Pharmacy, College of Pharmacy,King Khalid University, Abha, Kingdom of Saudi Arabia, P.O Box:1882 Post Code:61441 K.S.A. E.: shanoohu@yahoo.co.in

INTRODUCTION:

Diabetes mellitus is a common chronic metabolic disorder affecting 20.8 million Americans[1]. Whereas patients with type 2 diabetes mellitus experience insulin resistance and/or diminished insulin secretion. Regardless of the pathogenesis, uncontrolled diabetes is associated with chronic hyperglycemia, leading to the development of long-term microvascular, macrovascular, and neuropathic complications [2]. According to the American Diabetes Association, the target for long-term glycemic control in patients with diabetes is Glycated hemoglobin (HbA1c) value of less than 7%[3].

The benefit of improved glycemic control in microvascular complications and neuropathy was demonstrated conclusively in the Diabetes Control and Complications Trial (DCCT) [4] for patients with type 1 diabetes, and by the United Kingdom Prospective Diabetes Study (UKPDS) [5-7] for patients with type 2 diabetes. In near past research, investigating the effect of education to improve knowledge of diabetes selfmanagement on glycemic control has shown mixed results. On the other hand, studies that assessed diabetes-related knowledge at a point in time (without an educational intervention) have shown a positive correlation with blood glucose control[2].Type-2 diabetes Mellitus(T2 DM) is considered as most commonest and worst non- communicable chronic diseases in human history. [8] It is also now considered as a social and economical issue in the developed countries and developing countries.[9]

Diabetes in Kingdom of Saudi Arabia

In the past four decades, the lifestyle of the people of the Kingdom of Saudi Arabia (KSA) has undergone tremendous changes, primarily leading to decreased physical activity and unhealthy eating habit [10-13]. Family histories of diabetes and obesity will increases the risk of diabetes. Diabetes is also found to be more common among certain ethnic groups. Pre-diabetes is a condition characterized by abnormal blood glucose levels that are below the 'cut-off' point for diabetes [14].

Unhealthy dietary patterns and lack of physical exercise are the most important factors responsible for the increasing incidence of diabetes worldwide.[15] There is an increase in the prevalence of T2 DM in the KSA which might be due to dramatic changes in lifestyle, and a high prevalence of consanguineous marriages.[16] A national survey in 2004 estimated that 23.7% of Saudi adults (age 30-70 years) suffered from T2DM, and another 14.1% had impaired fasting glucose.[11]The World Health Organization estimates that non-communicable diseases will soon become the principal global cause of morbidity and mortality in KSA.[17]

Knowledge, awareness is the greatest weapon in the fight against diabetes mellitus. can help the people understand the risk of diabetes, motivate them to seek proper treatment and care, and prepare them to keep the disease undercontrol.[18] There is an improper guidance about the disease due to lack of awareness program to increase the responsibility of the society regarding diabetes.[19] and proper knowledge regarding various aspects of health education program can improve the knowledge of patients and change their attitude.[20] This study was conducted to assess the overview about glycemic control knowledge, attitude and awareness among the T2 DM male patients towards Diabetes.

METHODOLOGY

Patients were informed about purpose of the study, confidentiality of the data and anonymity. Only those patients who agreed were interviewed.

This is a cross sectional retrospective cum prospective study of patients which included all adult type 2 DM patients who were registered in the Aseer diabetic center(ADC), Abha, Aseer Region, Kingdom of Saudi Arabia. This study was conducted from July, 2012 to October 2013. A total number of 343 Type-2 DM patient's records were randomly selected from the patient medical records section. A Total number of 213 male patients of age group from 18 years to 80 years were included in the study. Medical record of the patients who fulfilled the criteria was reviewed and the data was entered in the specifically designed data collection form to evaluate the therapeutic management and its outcomes. Each quarter was designated as visit. The day patients registered in the ADC was assigned as visit 1 and rest of the visits (once in three months) were labeled as visits 2, 3 and 4 respectively. Data obtained from the patient records included: age, duration of DM, BMI (Body Mass Index), glycayted haemoglobin (HbA1c), Fasting blood sugar (FBS).Following measurement were used to classify patients as normal weight (18.5 to 24.9 kg/m²), overweight (25–29.9 kg/m²) and obesity into (30 to ≥40 kg/m²). Current guidelines for glycemic control recommend HbA1c values < 7% as a treatment goal for most DM patients.[18] Glycemic control was grouped into four categories: good (HbA1c < 6-6.9%), acceptable (HbA1c 7%–7.9%), poor (HbA1c >8%–9.9 %) or extremely inadequate (HbA1c ≥ 10 %). Patient attitude and adherence data was retrieved from the medical records and discussing with the treating Diabetologist from the center. Gestational Diabetes Mellitus (GDM), Type-1 diabetes mellitus and patients less than 18 years and more than 80 years were excluded from the study. Among the 343 patients 213 patients were males. Only the 213 male patient's data was analyzed for this study. Also a Questionnaire was developed to know the attitude and awareness among the type-2 Diabetes male patients. Self monitoring blood glucose (SMBG), diet, physical exercise, compliance to drug therapy was considered as most important parameters. The questions were asked to the patients when they came to the clinic during their follow-up visit. The answers were recorded and statistically analyzed with

Microsoft Excel 2007. Descriptive statistics of Mean, standard deviation (SD) and frequencies were performed using sample one way ANOVA was used to analyze the continuous data; $p \leq 0.05$ was considered statistically significant.

RESULTS:

T2 DM is currently becomes a global issue in health care system. In most of the countries this has been developed due to urbanization and westernized food habits and reduced physical activity.DM requires long time dietary management, regular exercise and proper medication. The patient's attitude and awareness about T2DM was analyzed. Total number of patients enrolled in this study was 343. Among the 343 patients 213 patients were males. Their demographic and social data were represented in the Table no: 1

Among the male T2 DM patients (Table-1) of this study the mean age group was found to be 60.73($\pm$10.50) yrs, with duration of diabetes of 16.54($\pm$7.75)yrs. The patients had an average HbA1c value of 9.17($\pm$1.68) % and with BMI of 28.52($\pm$5.00) kg/m^2. Among them 42.44 % of patients were had literacy of primary school level, 18.54% of patients had literacy of high school level,9.26% of the patients had literacy of college level and 29.76% of patients were illiterate. All the male patients were married. More than half of the patients (68.30%) were living in urban areas and 31.70% of patients were from rural areas.

Table -1: Demographic and Social data

Variables	Mean($\pm$SD)
Total number of patients	**n= 213**
Participants in survey	**205(96.24)**
Age(years)	60.73 $\pm$10.50
Duration of diabetes(years)	16.54 $\pm$7.75
HbA1c (%)	9.17 $\pm$1.68
BMI(kg/m^2)	28.52 $\pm$5.00
Literacy	**n(%)**
Illiterate	61 (29.76)
Primary school	87(42.44)
High school	38(18.54)
College	19(9.26)
Marital Status	**n(%)**
Married	205(100)
Unmarried	0
Civilization	**n=205 (%)**
Rural	65(31.70)
Urban	140(68.30)

Patient attitude and awareness about the disease is important for any chronic disease. As T2 DM is now a global issue, the attitude awareness and knowledge among the T2DM study population was analyzed. The data is represented in Table-2 For this study 213 patients were selected, among them 205 patients accepted to participate and answered the questionnaire. Self monitoring blood glucose

(SMBG) is an important attitude, which will have psychological impact in therapeutic management in DM. Among the selected male patients, only 39.52 % patients were performing SMBG; which is an alarming sign for therapeutic management, 8.78% of males does SMBG partially. Total of 34.63% of patients follows the diet and 60.48% of patients were not following the diet.

Physical exercise is an important attitude in the glycemic control. Total of 68.79% of patients were doing exercise, which is one of the major contributing factor for remarkable increase in the BMI in these patients. Almost more than 50% of the patients (50.25%) were compliance to therapy. Total of 15.60% of patients were refused to take insulin irrespective of the physician's advice and they were kept on oral hypoglycaemic agents. This data was obtained from the physician's notes from the patient's file.

Table 2-Patient Attitude (n=213)

Attitude	Responders n = 205		
	Yes	**No**	**Partially**
SMBG	81(39.52%)	106(51.70%)	18 (8.78%)
Diet	71(34.63%)	124(60.48%)	10 (4.89%)
Physical exercise (30 min Walking) daily	141 (68.79%)	64(31.21%)	0
Compliance with the therapy	103 (50.25%)	102(49.75%)	0
Patient refused physician advice in treatment*	32 (15.60%)		

*Data from medical record.

The measurable therapeutic outcome parameters (Table-3) such as HbA1c < 7%, FBS ≤130mg/dl were considered as control for therapeutic outcome or considered as targeted goal for therapeutic outcome. In the table Mean (SD) values are given for each parameter during each visit during the study period,visit is considered as the visit on registration with the ADC. The values in the visit-1 are considered as control and the other visits are compared with visit-1 for the statistical analysis, and p value <0.05 was considered as significant.

The important therapeutic outcome in T2DM is reduction in HbA1c and FBS. The HbA1c values was found to be 9.52±2.06%, 9.05±1.86 %,9.15±1.87 %,8.99±1.70% in visit1, visit-2, visit-3 and visit-4 respectively, whereas FBS was found to be 179.75±60.81 mg/dl, 155.6±50.18 mg/dl ,166.67±58.15 mg/dl, 168.8±56.24 mg/dl in each visit. However the targeted glycemic goal HbA1c ≤7% and FBS ≤130mg/dl was not achieved in this study group but there is a statistically significant reduction in the HbA1c and FBS in the visit-4.HbA1c shows the p value statistically significant with the visit-1 and visit-4(p≤0.0039) and also FBS p value statistically significant with the visit-1 and visit-4(p≤0.0071), the result shows a positive sign in achieving glycemic control in this study group.

Table-3: Glycemic control among the study population

Parameter	Visit-1 Mean(SD)	Visit-2 Mean(SD)	Visit-3 Mean(SD)	Visit-4 Mean(SD)	*p* value*
HbA1c %	9.52±2.06	9.05±1.86	9.15±1.87	8.99±1.70	0.0039*
FBS mg/dL	179.75±60.81	155.6±50.18	166.67±58.15	168.8±56.24	0.0071*

p ≤ 0.05 was considered statistically significant

Patient's awareness and knowledge about the disease is expected to makes remarkable difference in the glycemic control. Awareness and knowledge was analyzed through a questionnaire. The response rate and percentage of awareness and knowledge is represented in the Table-4. Total numbers of participants were 205 which is 96.24%. In this study population about 15.12% of patients and had awareness about their type of DM, and 35.12% of patients had knowledge about DM. About (90.73%) patients know about their medicines. Almost 80% of the patients replied that health care providers gave

information about the medications. Total of 68.79% patients were doing the exercise. Among the participants, 54.63% had housemaid, which reflects their economic and social status.

Table-4: Knowledge, Awareness and social status among Type-2Diabetes patients (n=213)

Total number of male patients	213(100%)	
Total number of Participants	205(96.24%)	
Questions	**Patient's Response**	
	Yes	**No**
Do you know what type of Diabetes you have?	31(15.12%)	174(84.88%)
Do you know what Diabetes is and how it occurs?	72(35.12%)	133 64.88%)
Do you know what type of medications you are using?	186(90.73%)	19 (9.27%)
Do you know what to do when you become hypoglycemia?	195(95.12%)	10 (4.88%)
Do you know How to inject insulin?	165 (80.49%)	40 (19.51%)
Whether your Doctor /Nurse informed you about your medication?	174(84.88%)	31 (15.12%)
Do you eat vegetables and fruits Daily?	101 (49.27%)	104 (50.73%)
You are doing your physical exercise (30 min Walking) daily?	141 (68.79%)	64(31.21%)
Do you have housemaid at home?	112(54.63%)	93 (45.37%)
Do you take your medications in proper time as prescribed?	186 (90.73%)	19 (9.27%)
If you are not taking oral medicines properly on time, what is the reason?		
Forget fullness	15(78.94%)	
No hope on treatment	4(21.06)	

From the participants 80.49% of patients know how to inject insulin, 95.12% of them had awareness about hypoglycaemia, which is a positive sign in DM management. Proper intake of medication is the important consideration in patient compliance to therapy, 90.73 % of the patients are taking their medications in proper time. Forgetfulness was the major reason for missing the dose, 78.94% patient had this problem and 21.06% of patients had no hope on treatment, which is important indicator for compliance in therapy and uncontrolled diabetes.

DISCUSSION:

The disease management or therapeutic plan of T2DM not only requires the pharmacological, nutritional management but also to improve the knowledge and the awareness about the disease. Patient compliance to the therapeutic management is important factor which is directly involved in the glycemic control. Attitude of the patients have great impact in the glycemic control.

In this current study the various parameters of national T2DM prevalence rate in Kingdom was reflected, such as age and glycemic control (HbA1c <7%).AlNozha. *etal* [11] represented in their study that the average age in T2 DM in the Kingdom was found to be 30-70yrs., men with T2DM are higher in number when compared to women with T2DM this current study is in line with other earlier reports. After a successful initial response to oral therapy, patients fail to maintain target HbA1c levels <7% at a

rate of 5 to 10 % per year, a report in United Kingdom by UKPDS [5, 21, 22] which is consistent with this current study.

This current study had given an overview about the knowledge attitude and awareness about T2DM among the DM patients but still deep probing for the knowledge, attitude and awareness about DM has to be done in future. In present study most of the male (51.70%) were not having SMBG attitude, this is high in comparison to study conducted by Zaheera Saadia [23] ,*etal* which was 32% among the Saudi patients in Qassim region. In the current study more than 60% of patients were not following the diet, which is not consistent with other studies [24,25] done in Saudi Arabia which is an alarming sign, which has to be focused in future by the health sector in this region. Patient refusing physician's advice was a novel criteria identified in the current study, as an attitude parameter, which was not reported in earlier studies conducted in kingdom. Among these patients, 15.60% patients were not following the physician's advice during therapeutic management. This attitude can be changed only through patient education programs.

Patients participated in the present study have inadequate knowledge about the disease and the percentage was high when compared to other similar studies conducted in Malaysia [26] and Nepal [27]. From current study it is prevailed that the physical inactivity persist among the patients, which is consistent with other study in the Kingdom of Saudi Arabia done before by Al Raeffa S [28] and co researchers and another study conducted by Nadia and Amani.[29] Williams CL and his colleagues mentioned in their study that the prevalence of physical inactivity is extremely high among diabetes pateints, especially in women, and may be considered among the highest in the world[30].

Among the study population, the literacy rate was found to be low compared to earlier study conducted by Nadia and Amani.[29]In present study the obesity is an important indicator, which is consistent with other studies conducted in Saudi Arabia [24, 25] and in Pakistan[19]. Most of the patients had excellent knowledge about the precautions to be taken during hypoglycemia symptoms, which is consistent with the study done by M.P Khapre and his friends in India [31].

There is a great need for continuous health education to diabetics and caregivers to improve their knowledge and awareness of different aspects of DM. This can be done by all members of the private health care team through a structured program using different health education strategies such as focus on group discussions. Current study had given an overview about the knowledge attitude and awareness about T2DM among the DM patients.

CONCLUSION:

Present study outcomes indicate that the improvement in diabetic patient's knowledge, awareness and attitude about the disease can do productive changes in the gylcemic control. Still deep probing has to be done in future to know the contributing factors and solutions for such issues.

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