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Research Article

### A STUDY TO ASSESS PERCEIVED KNOWLEDGE AND AWARENESS OF TYPE-2 DIABETES MELLITUS, AWARENESS OF COMPLICATIONS, COMPLIANCE TO MEDICATIONS AND CONTROL OF TYPE-2 DIABETES MELLITUS AMONG DIABETIC POPULATION IN TABUK CITY, KINGDOME SAUDI ARABIA

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**Abstract:**

**Introduction:**

*Diabetes Mellitus (DM) is considered to be one of the main 4 groups of Non-communicable diseases which are the biggest cause of death worldwide, more than 36 million die annually from NCDs (63% of global deaths) where Diabetes account for 1.5 million NCD deaths annually. While its complications can lead to cardiovascular disease, cerebrovascular disease, retinal disease, renal disease and lower limb amputation. As a consequence, causes a shorter life expectancy in diabetic patients; researches confirmed that diabetics have a shorter life expectancy than non-diabetic individuals and this extravagant mortality is predominantly due to diabetic complications. Limited data is available regarding the awareness and knowledge about these complications in our population.*

**Methods:**

*We conducted this descriptive cross-sectional study among Tabuk city population, Saudi Arabia. All Saudi participants who diagnosed with type-2 Diabetes Mellitus and were included in this study. The total sample obtained was 385. A Pre-Formed self-administered questionnaire about duration of diabetes mellitus, compliance to treatment, Knowledge about complications of diabetes mellitus, filled by participants.*

**Results:**

*Participants classified to five categories according to age. Male and female groups contributed to (41%) and (59%) respectively. Nearly half of participants have the disease for more than five years (51%), and nearly two thirds were compliant to their medications (64.9%). Four fifths of participants (80%) have positive family history of diabetes mellitus. (23.2%) of participants have only one family member with diabetes mellitus, (12%) have two members, (17.1%) have five members or more with diabetes mellitus.*

**Conclusion:**

*Self-knowledge and recognition of early signs and symptoms of DM complications, and the control of blood sugar levels are essential in prevention of and slowing the progression of diabetic complication. And to achieve these results, effective patient education and improvement patients' diabetic control, educational strategies will be needed as it will help diabetic patients to improve their blood glucose levels and to prevent further deterioration which improve life quality and increase life expectancy for those patients.*

**Keywords:** *diabetes mellitus, awareness, complications.*

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**INTRODUCTION:**

Diabetes Mellitus (DM) is considered to be one of the main 4 groups of Non-communicable diseases which are the biggest cause of death worldwide, More than 36 million die annually from NCDs (63% of global deaths) where Diabetes account for 1.5 million NCD deaths annually. While its complications can lead to cardiovascular disease, cerebrovascular disease, retinal disease, renal disease and lower limb amputation. Limited data is available regarding the awareness and knowledge about these complications in our population [1]. According to International Diabetes Federation (IDF), Saudi Arabia had 3.4 million cases of diabetes in 2015 (Prevalence of diabetes in adults aged 20-79 years is 17.6%). And estimated that 415 million people have diabetes in the world while more than 35.4 million people (9.1% of adults aged 20-79), are in the Middle East and North Africa (MENA) Region; anticipated by the year 2040 this will rise to 72.1 million. Over 40.6% of these are undiagnosed. Health expenditure on diabetes in the region accounts for just 2.5% of global spending on the disease. This is expected to almost double by 2040 but will likely not be enough to adequately treat all people with the disease. Regarding Mortality Diabetes was responsible for 342,000 deaths (51.3%) in 2015 which occurred in people under the age of 60 taking into account early deaths. In 2015, Saudi Arabia had 23,420 deaths in adults due to diabetes [2]. According to World Health Organization (WHO) in 2012, an estimated 1.5 million deaths were a direct outcome to diabetes and another 2.2 million deaths were attributively related to high blood glucose in a global population [3]. As a consequence, causes a shorter life expectancy in diabetic patients; researches confirmed that diabetics have a shorter life expectancy than non-diabetic individuals and this extravagant mortality is predominantly due to cardiovascular cause which considered one of the interminable diabetic complications [4]. And another study confirmed the virtually higher risk of death, minimal survival, and lower life expectancy of diabetic adults in comparison

to non-diabetic adults [5]. DM is considered a lifelong problem; but with the proper management the quality of patient's life can be improved noticeably. Thus individual training is an integral part for self-management of diabetes. In the end optimum management requires patient participation and cooperation to be aware of the nature of the disease and therefore decide the consequence of the disease, dimensions of treatment and its complications [6, 7]. This study performed to evaluate awareness and recognition of the signs and symptoms regarding diabetic complications among Makkah population, and to calculate the frequency of diabetic complications occurrence.

**METHODS:**

We conducted this descriptive cross-sectional study among Tabuk population, Saudi Arabia. The study was conducted during the period from June to October 2019. All Saudi patients who diagnosed with type-2 DM in Tabuk city were included in this study. The participants were selected randomly. The total sample obtained was 385. All the participants were approached to obtain the desired sample size. A pre-formed self-administered questionnaire filled by participants. A letter that explains the objectives of the study and asks for participants' consent was sent with the questionnaire. The questionnaire requires information about duration of diabetes mellitus, compliance to treatment, Knowledge about complications of diabetes mellitus.

The questionnaire responses were analyzed using the Statistical Package for the Social Science (SPSS Inc. Chicago, IL, USA) version 23. Categorical variables were described by frequencies and percentages. Descriptive analysis involving Chi-square test was used to test significance of association between categorical variables. The level of significance was set at  $P < 0.05$ .

The research was approved by the local Research Committee of the Faculty of Medicine, University of Tabuk.

### RESULTS:

Table 1 shows general characteristics of the participants. Participants classified to five categories according to age: from 20 to 30 years old, from 31 to 40 years old, 41 to 50 years old, 51 to 60 years old, and above 60 years old. Male and female groups contributed to (41%) and (59%) respectively. The majority of participants were university graduates (40%), about (36.1%) were secondary education, and (323.9%) were bellow secondary education.

Table 2 shows Diabetes Mellitus characteristics of participants. Nearly half of participants have the disease for more than five years (51%), and (18.1%) have it for one year. The duration of DM of remaining participants ranged from two to four years. Regarding the compliance to medications, nearly two thirds were compliant to their medications (64.9%), (24.2%) reported themselves as some compliant to their medications, and (10.9%) were incompliant to their medications. Four fifths of participants (80%) have positive family history of diabetes mellitus. Regarding the number of family members with diabetes mellitus, (23.2%) have only one member with diabetes mellitus, (12%) with two members, (17.1%) with five members or more with diabetes mellitus.

Table 3 shows perceived knowledge and source of information about long term DM complications. The

majority of participants knew little about the specialized organizations of diabetes mellitus (59%), about one fifth of participants did not know about the specialized organizations of diabetes mellitus (21%), and (20%) know enough about it. More than two thirds of participants assessed the knowledge and awareness of diabetes mellitus in Saudi Arabia as good, less than fifth of them assessed it as poor (18.2%), and only (11.9%) think it is excellent. Participants asked if they ever heard about long term complications of diabetes mellitus if blood sugar uncontrolled, (86%) heard about it, and they mentioned from who they heard about it as follow: Diabetologists (20%), relatives (17%), social media (14.7%), other doctors (15%).

Table 4 shows Common complications of DM as recognized by participants. The mostly recognized complication of diabetes mellitus were as follow in order: eye disease (80.7%), diabetic foot disease (77.9%), renal disease (52.2%), peripheral neuropathy (51.6%), sexual impairment (41.5%), heart disease (39%), high blood pressure (35.1%), sudden death (24.4%), and cerebrovascular disease (22%).

Table 5 shows common symptoms reported by participants as if it was found in a person, it may indicate the presence of DM complications. The mostly recognized symptom was much and frequent urination (66%), visual impairment (63.9%), peripheral limbs numbness and tingling (62%), obesity (43.9%), sudden loss of consciousness (26.2), and lower limb swelling (24.9%).

**Table 1: General characteristics n=385**

Character		
<b>Age</b>	From 20 to 30 (n(%))	023 (6%)
	From 31 to 40 (n(%))	054 (14%)
	From 41 to 50 (n(%))	0120 (31.1%)
	From 51 to 60 (n(%))	114 (29.6%)
	More than 60 (n(%))	74 (19.3%)
<b>Gender</b>	Male (n (%))	158 (41%)
	Female (n (%))	227 (59%)
<b>Education</b>	Not educated (n (%))	015 (3.9%)
	Basic education (n (%)) (Primary/intermediate)	077 (20%)
	Secondary (n (%))	139 (36.1%)
	Graduate (n (%))	154 (40%)

**Table-2: Diabetes Mellitus characteristics.**

Character	%	
<b>Duration of Diabetes Mellitus.</b>	1 Year	18.1%
	2 Years	11.9%
	3 Years	9.1%
	4 Years	9.8%
	5 Years or more	51%
<b>Compliance to DM medications</b>	Yes	64.9%
	No	10.9%
	Somewhat compliant	24.2%
<b>Family history of DM</b>	Yes	80%
	No	20%
<b>Number of Family Members with DM</b>	None	19%
	1	23.2%
	2	12%
	3	14.6%
	4	14.1%
	5 or more	17.1%

**Table-3: Perceived knowledge and source of information about long term DM complications.**

Character	%	
<b>Do you Know that if there are organizations specialized in DM Saudi Arabia?</b>	No	21%
	Yes, I know little	59%
	Yes, I know	20%
<b>How do you assess the knowledge and awareness of DM in Saudi Arabia?</b>	Excellent	11.9%
	Good	69.9%
	Poor	18.2%
<b>Did you heard about long term complications of DM if did not control your blood sugar</b>	Yes	86%
	No	14%
<b>From who you heard about long term DM complications if blood sugar not controlled</b>	Diabetologists	20%
	Other doctors	15%
	Relatives	17%
	Social media	14.7%
	Books, Papers	3.3%
	Volunteer campaigns	3%
	Others	13%

**Table-4: Common complications of DM participants knew about it.**

complications of DM	n=385	%
Eye disease	311	80.7%
Diabetic Foot Disease	300	77.9%
Renal disease	201	52.2%
Peripheral neuropathy	199	51.6%
Sexual impairment	160	41.5%
Heart disease	150	39%
High blood pressure	135	35.1%
Sudden death	94	24.4%
Cerebrovascular disease	85	22%
Do not know	56	14.5%

**Table-5: Common symptoms known by participants as if it found, it may indicate the presence of DM complications.**

Symptoms	n=385	%
Frequent or much urination	254	66% %
Visual impairment	246	63.9 %
Peripheral limbs numbness and tingling	239	62 %
Obesity	169	43.9 %
Sudden loss of consciousness	101	26.2 %
Lower limb swelling	96	24.9 %
I have no idea	55	14.2 %
Constipation	42	10.9 %
Difficulty swallowing	19	4.9 %
Diarrhea	15	3.9 %

**DISCUSSION:**

The chronic hyperglycemia of diabetes is associated with long-term damage, dysfunction, and failure of various organs, especially the eyes, kidneys, nerves, heart, and blood vessels. In this study, (64.9%) of participants were compliant to their medications, (24.2%) reported themselves as some compliant to their medications, and (10.9%) were incompliant to their medications. Another study reported higher results as compliant participants contributed to (87.8%) [8]. We reported the positive family history of diabetes mellitus among participants and it contributed to (80%). Another study reported similar result as (80%) of the participates have someone who was diabetic in the family [9]. In this study, (86%) of

participants were aware about complications of diabetes mellitus. Another study done recently, reported lower results, and it showed the level of knowledge of the complications of diabetes mellitus and the majority did not have knowledge on diabetes complications (60.0 %), and only (13.1 %) had adequate knowledge about diabetes complications [10]. Regarding the source of knowledge about diabetes complications, the mostly reported sources were Diabetologists and other Doctors (35%) and Relatives (17%), and social media (14.7%). Another study reported higher results, and it as follow, doctors (47.3%), relatives/friends (32%), and mass media (14.8%) [8]. In this study, the mostly recognized complication of diabetes mellitus by participants were

as follow in order: eye disease (80.7%), diabetic foot disease (77.9%), renal disease (52.2%), peripheral neuropathy (51.6%), sexual impairment (41.5%), heart disease (39%), high blood pressure (35.1%), sudden death (24.4%), and cerebrovascular disease (22%). Recent study reported different results and it were as follow: (51.5 %) knew diabetic foot as the most common complication followed by hypertension (35.4 %), neuropathy (29.2 %), hypoactive sexual arousal (25.4 %), arousal disorder (21.5 %), eye diseases (17.7 %), heart disease (9.2 %), and renal disease (5.4 %) [10]. A second study reported 67% of participants knew that DM can result to loss of sight while 46.5% knew that DM can cause poor wound healing. Few respondents knew that DM can lead to kidney failure (13.5%), skin sepsis (12.0%), heart failure (5.5%) and stroke (4.5%) [9]. Common symptoms reported by participants as if it was found in a person, it may indicate the presence of DM complications were as follow: frequent urination (66%), visual impairment (63.9%), peripheral limbs numbness and tingling (62%), obesity (43.9%), and lower limb swelling (24.9%). Another study reported the awareness about symptoms of diabetes complications and it were as follow: Diminished vision (Diabetic Retinopathy) (62%), Tingling/sensations/numbness/ burning or pain in peripheral limbs (30%), Non-healing wound/skin (25%), Swelling of legs and foot (12%), Trouble during maintaining an erection (4%), and Dry and itchy skin (2%) [11].

### CONCLUSION:

more efforts needed aiming toward the primary prevention programs that focus on education of diabetic patients toward complications and symptoms of diabetes and it should be emphasized. Compliance to diabetes medications and control of blood sugar are essential in prevention of and slowing the progression of diabetic complications, and early identification of diabetic complications is essential.

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