DOI: https://doi.org/10.53350/pjmhs2216192

ORIGINAL ARTICLE

Awareness and Understanding of Diabetes Complications among Patients of Diabetes Mellitus

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ABSTRACT

Background: Diabetes mellitus (DM) is an emergent threat to public health, causing a burden of devastating complications and related health issues. In the modern era, the management of DM has greatly depended on awareness and knowledge dissemination and patient education about its significance.
Aim: To evaluated the awareness and understanding of DM complications among patients with diabetes.
Study design: Cross-sectional study
Place and duration of study: Family Medicine Clinics in Faisalabad from 1st Sep to 31st December 2020.
Methodology: One thousand, one hundred and eighty diabetic patients with age over 14 years from urban and rural areas were included. Non-consenting and seriously ill patients were excluded. A structured interviewer-administered questionnaire based on demographics, personal and familial diabetic history and diabetes complications-related awareness items were used.
Results: 83.2% patients were symptomatic, and 16.3% had an incidental diagnosis. Most of these patients were suffering from type 2 DM, and more than 40% never had their HbA1c level checked. Comprehensive assessment of awareness relating to diabetes complications showed that 75.8% knew about muscle weakness, lower limb sensory defect (76.9%), eye problems (70.4%), infections (66.8%), foot complications like amputation (63.1%) and hypertension (62.9%). A significant association was found between age and diabetic history with respect to diagnosis and familial history of diabetes ($p<0.05$). Moreover, the awareness of DM complications was significant among the patients aged 41 to 65 years ($p<0.05$).
Conclusion: Most of the enrolled patients were aware of complications of diabetes, including muscle weakness, lower limb sensory defect, eye problems, infections, foot complications like amputation and hypertension. Female gender and patients aged 41 to 65 years had a significantly greater understanding of diabetic complications.
Key words: Diabetes mellitus, Awareness, Complications, Clinical outcomes

INTRODUCTION

Diabetes mellitus (DM) is a very multifaceted disease that has arisen as one of the leading health concerns globally.[1] The prevalence of DM has escalated at alarming levels, as it is affecting almost 200 million people worldwide, with a projected 32 million deaths each year[1,2]. The prevalence of DM has amplified around the globe in the last three decades. The integer increased to 285 million by 2010, which is expected to rise to 439 million by 2030. As per International Diabetes Federation (IDF), Pakistan has become the 7th largest populace with 6.2 million diabetic patients worldwide. By the year 2025, it will take fourth place with 14.5 million diabetics[2-4]. This accounts for 10% of the adult populace already suffering from DM, while an extra 10% are glucose intolerant. With all the prevailing figures, it is known that DM not only decreases life expectancy by 10 to 30% but also leads to numerous complications associated with the progression of the disease[3,4].

The complications of DM can be acute, chronic or both. Micro-vascular and macro-vascular complications are considered chronic. These include diabetic nephropathy, sensory, motor and autonomic diabetic neuropathy, diabetic retinopathy as micro-vascular complications. The macrovascular complications are coronary artery disease that leads to angina or myocardial infarction, peripheral vascular disease that further causes intermittent claudication, cerebrovascular incidences such as transient ischemic attack and stroke, sensory neuropathy and vascular damage in diabetic foot[5-7]. On the other hand, ketoacidosis, hyperglycemia-related hyperosmolar state, hypoglycemic coma, infections of respiratory and periodontal origins are considered as acute complications.[6,7] All these DM complications are reported as less severe and less prevalent in patients with well-controlled blood sugar levels. DM needs a multidimensional approach for management with patient informed decisions related to nutrition, physical activity, blood pressure and weight management, blood glucose monitoring, medication adherence and regulation of different complications.[8,9] Patients of DM often lack information and understanding about their illness and thus often have poor self-controlling abilities; apt knowledge is also vital to observe diabetes indications as soon as they occur that can aid them to avoid risky lifestyles[10,11]. Awareness about DM and its related complications enriches the capability of patients to handle and regulate their ailment; however, poor understanding of DM is linked with the amplified frequency of hospitalization[12]. Patients with DM need to understand the significance of the awareness about their disease and treatments for better outcomes.

Hence, the objective of this study was to find out the knowledge of diabetic patients about their disease to evaluate the patient education and to assess the extent of strategies needed to aware them.

Received on 24-07-2021
Accepted on 11-12-2021

MATERIALS AND METHODS

This cross-sectional study was conducted at Family Medicine Clinics in Faisalabad District from 1st Sep to 31st December 2020. A total of 1180 diabetic patients ≥14 years of age from urban and rural areas of Faisalabad District were recruited. While non-consenting and seriously ill subjects were excluded from the study sample. Before initiation, the study protocol was approved by the Ethical Review Board of the College of Family Medicine, Karachi. All the procedures in this study followed the Declaration of Helsinki. The data were collected using a structured interviewer-administered questionnaire. This included inquiring about the patient's demographic details, personal and familial diabetic history and diabetes complications-related awareness items. The collected data were analyzed using SPSS-20. A Chi-square test was used to determine the effect of age and gender on a patient's history and diabetes awareness. P≤ 0.05 were used to declare statistically significant variables.

RESULTS

The majority of 59.5% were females and mean age was 50.32±11.52 years; apparently, a significant proportion of patients belonged to the 41 to 65 years of age group, and 22.5% were between 14 to 40 years of age. The majority, 394 (33.4%), were illiterate, while only 4.7% had completed graduation. Moreover, living background, marital status and occupational status were also inquired (Table 1).

It was found that 32.0% of cases were diagnosed 5 to 10 years ago, 83.2% were symptomatic, while 16.3% were incidentally diagnosed. The majority of cases (74.3%) were diagnosed by the family physician. Of the enrolled patients, 92.3% of cases were of type 2 DM, and 8.8% had a paternal history of diabetes, while 21.9% had a positive maternal history. Moreover, 15.9% of patients were getting the routine HbA1c check-up (<3 months), 25.8% of patients had last checked their HbA1c level more than six months ago while 44.6% never had it checked. Around 63% reported that none of their family members suffered diabetes complications (Table 2).

Most of the study participants had knowledge about the major complications of diabetes, i.e. 75.8% knew about muscle weakness, lower limb sensory defect (76.9%), eye problems (70.4%), infections (66.8%), foot complications like amputation (63.1%) and hypertension (62.9%). Among the less commonly known or heard off by the enrolled cases were diabetic ketoacidosis/HNOK, dyslipidemia, myocardial infarction/angina, stroke and dental disease (Table 3).

The independent variables, including age and gender, were tested for association with diabetic history and awareness of DM complications. A significant association was found between age and diabetic history w.r.t. diagnosis and familial history of diabetes ($p<0.05$). Moreover, the awareness of DM complications was significant among the patients aged 41 to 65 years ($p<0.05$), which may be due to the reason that the major proportion of the studied population belonged to this age group (Table 4).

Although a significant effect of gender was observed on the diagnostic and familial history of diabetes ($p<0.05$), and same was the trend for awareness of DM complication, i.e. the females had significantly more knowledge of the potential complications than males. Based on these findings, we cannot suggest that gender is a potential influencer as the male to female ratio greatly varied in the studied population (Table 5)

Table 1: Demographic characteristics of diabetes patients (n=1180)

Variable	No.	%
Age (years)		
14 – 40	266	22.5
41 – 65	809	68.6
>65	103	8.7
Not reported	2	0.2
Gender		
Male	478	40.5
Female	702	59.5
Living background		
Rural	413	35.0
Urban	763	64.7
Not Reported	4	0.3
Marital status		
Single	25	2.1
Married	1093	92.6
Divorced/Separated	8	0.7
Widow/Widower	54	4.6
Educational status		
Illiterate	394	33.4
Primary (1-5)	229	19.4
Secondary (6-10)	363	30.8
Intermediate (11-12)	115	9.7
Graduation (13-16)	55	4.7
Post-graduation (>16)	24	2.0
Occupational status		
Student	9	0.8
Self-Employed	272	23.1
Unemployed	55	4.7
Private Service	104	8.8
Government Service	73	6.2
Housewife	667	56.5

Table 2: Personal and familial diabetes history

Question	No.	%
How many years ago were you diagnosed?		
< 5 years	606	51.3
5-10 years	378	32.0
> 10 years	192	16.3
Not reported	4	0.33
How were you diagnosed?		
Incidental	192	16.3
Symptomatic	982	83.2
Not reported	6	0.50
Who diagnosed you?		
Self	192	16.3
Family Physician	877	74.3
Specialist	109	9.2
Not reported	2	0.2
Type of Diabetes		
Type 1	70	5.9
Type 2	1089	92.3
GDM	15	1.3
Others	2	0.2
Not reported	4	0.3
How many siblings are diabetic?		
Nil	707	59.9
Brother	159	13.5
Sister	105	8.9
Both	207	17.5
Not reported	2	0.2
Was any of your parents suffering from diabetes at the time of your diagnosis?		
None of them	651	55.2
Father	104	
Mother	258	21.9
Both	160	13.6
Not Reported	7	0.59
When did you last check your HbA1c		
< 3 months	188	15.9
3-6 months	141	11.9
> 6 months	305	25.8
Never	526	44.6
Not reported	20	1.69
Did anyone suffer from any complications of diabetes in your family?		
Yes	431	36.5
No	743	63.0
Not reported	6	0.50

Table 3: Awareness regarding diabetes complications

Complication	Response		
	Yes	No	Don't Know
Hypertension	742 (62.9%)	337 (28.6%)	99 (8.4%)
Myocardial infarction/Angina	380(32.2%)	586(49.7%)	212 (18%)
Renal failure (Nephropathy)	688(58.3%)	401 (34%)	89 (7.5%)
Eye problem (retinopathy/ Cataract)	831(70.4%)	288(24.4%)	57 (4.85)
Stroke	396(33.6%)	593(50.3%)	189 (16%)
Infection (UTI, Respiratory, Skin)	788(66.8%)	284(24.1%)	106 (9%)
Foot complication (Amputation)	745(63.1%)	398(33.7%)	35 (3%)
Muscle Weakness and pain (Amyotrophy)	895(75.8%)	250(21.2%)	33 (2.8%)
Dyslipidemia	316(26.8%)	479(40.6%)	383(32.5%)
Dental Disease	431(36.5%)	528(44.7%)	219(18.5%)
Lower limb sensory defect	908(76.9%)	234(19.8%)	36 (3.1%)
Death In Early Age	502(42.5%)	412(34.9%)	264 (22.4%)
Poor Bone healing	788 (66.8%)	351(29.7%)	39 (3.3%)
Hypoglycemia	728(61.7%)	371(31.4%)	79 (6.75)
Diabetic ketoacidosis/HNOK	108(9.2%)	687(58.2%)	383(32.5%)

Table 4: Diabetic history and awareness of complications in association with the age of DM patients

Variable		Age Group (Years)			P value
		14-40	41-65	>65	
How many years ago were you diagnosed?	< 5 years	183 (30.2%)	401 (66.2%)	22 (3.6%)	<0.001*
	5-10 years	63 (16.7%)	277 (73.5%)	37 (9.8%)	
	> 10 years	18 (9.4%)	129 (67.5%)	44 (23%)	
How were you diagnosed?	Incidental	58 (30.2%)	123 (64.1%)	11 (5.7%)	<0.001*
	Symptomatic	206 (20.9%)	684 (69.8%)	90 (9.16%)	
Who diagnosed you?	Self	65 (33.95)	113 (58.9%)	14 (7.30%)	<0.001*
	Family physician	165 (18.8%)	628 (71.85%)	82 (9.35%)	
	Specialist	36 (33%)	66 (60.6%)	7 (6.40%)	
Type of diabetes	Type 1	36 (51.4%)	30 (42.9%)	4 (5.7%)	<0.001*
	Type 2	221 (20.3%)	769 (70.7%)	97 (8.9%)	
	GDM	7 (46.75%)	6 (40%)	2 (13.3%)	
	Others	2 (100%)	-	-	
How many siblings are diabetic?	Nil	160 (22.6%)	488 (69.2%)	57 (8.06%)	0.673
	Brother	40 (25.2%)	106 (66.7%)	13 (8.2%)	
	Sister	25 (23.85%)	67 (63.8%)	13 (12.4%)	
	Both	41 (19.8%)	146 (70.5%)	20 (9.7%)	
Was any of your parents suffering from diabetes at the time of your diagnosis?	None of them	116 (17.8%)	468 (72%)	66(10.13)	<0.001*
	Father	37 (35.6%)	63 (60.6%)	4 (3.8%)	
	Mother	59 (23%)	182 (70.8%)	16 (6.2%)	
	Both	53 (33.1%)	90 (56.3%)	17 (10.6%)	
When did you last check your HbA1c	< 3 months	47 (24.7%)	124 (66%)	17 (9%)	0.002*
	3-6 months	33 (23.4%)	97 (68.8%)	11 (7.8%)	
	> 6 months	43 (14.1%)	223 (73.1%)	39 (12.8%)	
	Never	139 (26.4%)	349 (66.6%)	36 (6.9%)	
Did anyone suffer from any complications of diabetes in your family?	Yes	96 (22.2%)	302 (70.1%)	33 (7.7%)	0.855
	No	169 (22.6%)	502 (67.7%)	70 (9.39%)	
Awareness regarding diabetes complications	Hypertension	128(17.30)	537(72.50)	76(10.3)	<0.001*
	Myocardial infarction/Angina	80 (21.1)	262 (68.9)	38 (10%)	0.544
	Renal failure (Nephropathy)	158 (23)	478 (69.5)	52 (7.6%)	0.028*
	(Retinopathy / cataract)	167 (20.1)	578 (69.7)	84 (10.1%)	0.006*
	Stroke	91 (23)	274 (69.2)	31 (7.8%)	0.933
	Infection (UTI, Respiratory, Skin)	155 (19.7)	554 (70.5)	77 (9.8%)	0.007*
	Foot complication (Amputation)	163 (21.9)	524 (70.5)	56 (7.5%)	0.186
	Muscle weakness & pain	204 (22.8)	614 (68.8)	75 (8.4%)	0.476
	Dyslipidemia	80 (25.3)	210 (66.5)	26 (8.2%)	0.345
	Dental disease	102 (23.8)	282 (65.7)	45 (10.5%)	0.520
	Lower limb sensory defect	197 (21.7)	634 (69.9)	76 (8.4%)	0.053*
	Death in early age	108 (21.5)	356 (70.9)	38 (7.6%)	0.622
	Poor bone healing	182 (23.2)	539 (68.6)	65 (8.3%)	0.724
	Hypoglycemia	167 (23)	486 (66.9)	73 (10.1%)	0.054*
	Diabetic ketoacidosis /HNOK	36 (33.3)	59 (54.6)	13 (12%)	0.016*

**P<0.05 is considered statistically significant*

Table 5: Diabetic history & awareness of complications in association with the gender of DM patients

Variable	Gender		P value
	Male	Female	
How many years ago were you diagnosed?			
< 5 years	231 (38.1%)	375 (61.9%)	0.025*
5-10 years	152 (40.25)	226 (59.8%)	
> 10 years	93 (48.4%)	99 (51.6%)	
How were you diagnosed?			
Incidental	55 (28.6%)	137 (71.4%)	<0.001*
Symptomatic	421 (42.9%)	561 (57.1%)	
Who diagnosed you?			
Self	105 (54.7%)	87 (45.3%)	<0.001*
Family physician	340 (38.8%)	537 (61.2%)	
Specialist	33 (30.3%)	76 (69.7%)	
Type of Diabetes			
Type 1	42 (60.6%)	28 (40%)	<0.001*
Type 2	432 (39.7%)	657 (60.3%)	
GDM	2 (13.3%)	13 (86.7%)	
Others	2 (100%)	-	
How many siblings are diabetic?			
Nil	326 (46.1%)	381 (53.9%)	
Brother	46 (28.9%)	113 (71.1%)	<0.001*
Sister	38 (36.2%)	67 (63.8%)	
Both	68 (32.9%)	139 (67.1%)	
Was any of your parents suffering from diabetes at the time of your diagnosis?			
None of them	271(41.6)	380(58.4)	<0.001*
Father	59(56.7)	45(43.3)	
Mother	84(32.6)	174(67.4)	
Both	61(38.1)	99(61.9)	
When did you last check your HbA1c			
< 3 months	100 (53.2%)	88 (46.8%)	<0.001*
3-6 months	81 (57.4%)	60 (42.6%)	
> 6 months	135 (44.3%)	170 (55.7%)	
Never	154 (29.3%)	372 (70.7%)	
Did anyone suffer from any complications of diabetes in your family?			
Yes	173 (40.1%)	258 (59.9%)	0.411
Awareness regarding diabetes complications			
Hypertension	284 (38.3%)	458 (61.7%)	0.007*
Myocardial infarction/Angina	162 (42.6%)	218 (57.4%)	0.545
Renal failure (Nephropathy)	271 (39.4%)	417 (60.6%)	0.075
Eye problem (retinopathy/Cataract)	318 (38.3%)	513 (61.7%)	0.006*
Stroke	159 (40.2%)	237 (59.7%)	0.082
Infection (UTI, respiratory, skin)	357 (45.3%)	431 (54.7%)	<0.001*
Foot complication (Amputation)	279 (37.4%)	466 (62.6%)	<0.001*
Muscle weakness & pain (amyotrophy)	335 (37.4%)	560 (62.6%)	<0.001*
Dyslipidemia	143 (45.3%)	173 (54.7%)	0.004*
Dental Disease	172 (39.9%)	259 (60.1%)	0.526
Lower limb sensory defect	387 (42.6%)	521 (57.4%)	0.030*
Death In Early Age	198 (39.4%)	304 (60.6%)	<0.001*
Poor Bone healing	308 (39.1%)	480 (60.9%)	0.130
Hypoglycemia	332 (45.6%)	396 (54.4%)	<0.001*
Diabetic ketoacidosis/ HNOK	49 (45.4%)	59 (54.6%)	0.222

**P ≤ 0.05 is considered statistically significant*

DISCUSSION

This study has provided data about the awareness of complications of diabetes mellitus among diabetic patients at Family Medicine Clinics in Faisalabad District, Pakistan.

A broad assessment of the awareness was taken under consideration involving 1180 patients. The majority of the study subjects knew well about the understanding of major complications of the disease. They were well informed about muscle weakness, lower limb sensory defect, eye problems, infections, foot complications like amputation and hypertension (Table 3).

However, people were less aware of the complications associated with diabetes like ketoacidosis, dyslipidemia, myocardial infarction, angina, stroke and dental disease. These results are similar to the findings from the studies conducted in various other geographical regions.[13,14] In the current study, age,

sex, educational level, occupation, and family history of DM were significantly associated with awareness of DM complications. A study conducted in Pakistan showed male patients with better knowledge due to cultural influence, restricting females in the house[15].

Another local study from Pakistan suggested consistency in knowledge between both genders[16]. Our study, contrary to this, observed a significant effect of gender with a greater trend of awareness about DM complications among females. This cannot suggest gender as a potential influencer, but it can be assumed that owing to the increasing trend of health awareness on social media, the affluent society females have more access to information. The differences regarding age suggested that the awareness of DM complications was significant among the patients aged 41 to 65 years ($p<0.05$), which can be due to the fact that the majority of this age group study population has gone through more advising and health education during their follow-up visits along with non-formal education they gain by self-curiosity about the disease. Another study supports these findings that as individuals' access to any electronic media is now popular and becomes a direct source of information irrespective of occupation, income status, and educational status.[17] This can be the overall reason for improved patient education about general information regarding DM. However, the rare disease complications remained unheard of. Furthermore, patients with a family history of DM are more likely to have awareness of DM complications than their counterparts due to their family experience[18,19].

Although the study contributed significant scientific findings regarding the literacy and awareness of diabetes complications in the population of Faisalabad, but there are certain limitations that need to be addressed; the major one was the cross-sectional design of the study. Furthermore, the health outcomes among these patients referring to their DM awareness weren't also determined. Large-scale, multicentre studies involving study sites from all over Pakistan are required to establish the national database concerning diabetes knowledge and awareness to help modulate the preventive measures.

CONCLUSION

The enrolled population was well-informed regarding the DM complications. Among the frequently known complications were muscle weakness, lower limb sensory defect, eye problems, infections, and foot complications. Females and patients aged 41 to 65 years were more aware of the diabetes complications than the counterparts.

Acknowledgement: We would like to express our deepest thanks to the College of Family Physicians, Karachi and acknowledge their support in this research.

Conflict of interest: Nil

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