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Awareness About Diabetes And Its Complications Among Patients With Diabetes Mellitus

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Abstract

Objective: Awareness of diabetes and its potential complications is crucial for effective management and prevention of long-term health risks. This study aimed to assess the level of awareness and understanding of diabetes and its complications among patients diagnosed with type 2 diabetes mellitus.

Methods: A cross-sectional study included 200 patients with type 2 diabetes mellitus as per the American Diabetes Association (ADA) criteria. Type 1 diabetes and gestational diabetes patients were excluded from the study. The duration of the study was 8 months. The patient's awareness regarding diabetes and its complications was assessed as per the prefixed questionnaire. Analysis of the data was carried out with SPSS version 28. The Chi-square test was used to investigate the association of awareness of diabetes mellitus with various independent variables variable as age and duration of diabetes. The level of statistical significance was $p < 0.05$.

Results: Among the participants, 80 (40%) were male and 120 (60%) were female. A significant portion of patients 73 (36.5%) were never informed about diabetes or its complications. 69 (34%) of patients were never educated about the symptoms of hypoglycemia. 142 (71%) of the patients had a glucometer and 88 (44%) participants had poor follow-up and never checked HbA1C. Moreover, Patients with longer diabetes duration were more likely to visit ophthalmologists at regular intervals (P value 0.023). 111 (56%) never checked their urine for proteinuria and 172 (86%) were aware that diabetes can affect their kidneys. Foot care and awareness of diabetic foot complications were lacking among patients. 48 (24%) examined their feet daily, 66 (33%) never examined their feet, and 73 (36%) were never told about foot care by their doctors. The statistically significant impact of age on patients' knowledge regarding blood sugar levels (P=0.009) and foot care (P=0.013)

Conclusion: There is a significant lack of awareness among individuals with diabetes, highlighting the urgent need for educational initiatives. Both the public and private healthcare sectors should take the responsibility of providing awareness programs.

Keywords: Type 2 diabetes mellitus, awareness, complications.

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1. Introduction

Diabetes mellitus, a chronic metabolic disorder characterized by hyperglycemia, poses a significant global health challenge. With an alarming rise in its prevalence and incidence, diabetes has emerged as a major public health concern affecting millions of individuals worldwide. It is estimated that approximately 463 million adults aged 20-79 years were living with diabetes in 2019, and this number is projected to escalate to 700 million by 2045[1,2]. 90% of these individuals suffer from type 2 diabetes mellitus[2]. The prevalence of diabetes is immensely rising and Pakistan comes to number three after China and India[2,3]. According to the report issued by the International Diabetes Federation 26.7% of the Pakistani population had diabetes in 2022[4]. The escalating burden of diabetes and the mortality associated with it imparts emotional and economic stress on patients as well as economic strain on the country. It necessitates a deeper understanding of the disease and its associated complications, as well as a focus on increasing awareness among diabetic patients.

Diabetes is a major cause of cardiac-related mortalities, blindness, kidney failure, and depression[5]. Age more than 43 years, family history, obesity, hypertension and dyslipidemias are well-known risk factors for diabetes.[6] Intensive glycemic control reduces the occurrence and advancement of microvascular complications[7]. Diabetic neuropathy, a potentially fatal complication, affects nearly 50% of individuals with diabetes, impacting both peripheral and autonomic nerves. The likelihood of developing

diabetic neuropathy increases in direct correlation with the duration and severity of high blood sugar levels.[8]

Awareness of diabetes and its potential complications is crucial for effective management and prevention of long-term health risks[9]. Individuals diagnosed with diabetes need to be well-informed about the nature of the disease, its causes, risk factors, symptoms, and the importance of regular monitoring and appropriate management strategies. Furthermore, understanding the potential complications that can arise from uncontrolled diabetes is vital for patients to actively engage in self-care and take necessary preventive measures.[10]

This study aimed to assess the level of awareness and understanding of diabetes and its complications among patients diagnosed with type 2 diabetes mellitus.

2. Materials & Methods

A cross-sectional study was conducted over 8 months at Sheikh Khalifa bin Zayed al Nahyan Hospital Rawalakot, Pakistan after approval from the ethics review committee. The purpose is to assess diabetes awareness and its complications among patients diagnosed with type 2 diabetes mellitus attending the hospital's outpatient department. The detection of type 2 diabetes mellitus follows the guidelines established by the American Diabetes Association (ADA) in 1997. These criteria involve a single elevated glucose reading accompanied by symptoms such as excessive urination, extreme thirst, increased hunger, and weight loss. Alternatively, the diagnosis can be made based on elevated readings on two separate occasions: a fasting plasma glucose level of 7.0 mmol/L (126 mg/dL) or a plasma glucose level of 11.1 mmol/L (200 mg/dL) two hours after an oral glucose tolerance test[11].

Type 1 diabetes and gestational diabetes patients were excluded from the study. Information was gathered using a questionnaire that was distributed either in person via face-to-face interviews in the participant's native language through online surveys, or a combination of both, based on what was most convenient and preferred by the participants. The questionnaire encompassed a range of topics, including socio-demographic information, general knowledge about diabetes, perceptions of symptoms, risk factors, diagnosis, complications, and treatment methods. The participants were required to respond with either "YES" or "NO" and select from various options provided in the questionnaire based on their knowledge. The patients were categorized into three groups based on the duration of their diabetes: those with the disease for less than 5 years, those with diabetes for 5 to 10 years, and those with diabetes for over 10 years. Additionally, they were divided into two distinct age categories: patients aged over 50 and patients aged 50 or younger. The collected data was analyzed using SPSS version 28, and the Chi-square test was employed to explore potential associations between diabetes awareness and various independent variables like age and duration of diabetes. The level of statistical significance was $p < 0.05$.

3. Results

This study included 200 patients to assess their awareness and practices related to diabetes and its complications. 80 (40%) were male and 120 (60%) were female. Among them, 70 (35%) were classified as obese, 28 (14%) had a previous history of ischemic heart disease, and 10 (5%) had a stroke. The frequency of duration of diabetes among participants is shown in Figure 1. 12 (6%) participants did not adhere to their prescribed treatment, and 38 (19%) people did not observe the recommended dietary restrictions. The frequency of responses to different questions regarding diabetes awareness and the result of the Chi-square test showing significant differences based on the duration of Diabetes and age of patients are shown in Table 1, Table 2 and Table 3 respectively.

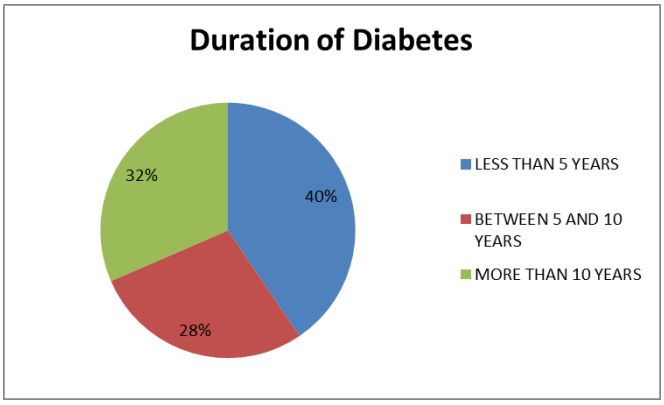

Figure-1 Frequency of Duration of Diabetes

142 (71%) patients had a glucometer at home but 17 (8.5%) never checked their blood sugars after diagnosis. Among those who monitored their blood sugar, 38.5% checked it once a month, and 17% checked it at least 3 times a week. A significantly higher percentage of 170

(85%) patients aged less than 50 years check their blood sugar more frequently as compared to patients more than 50 years old (P value=0.005)

Table-1 Frequency of responses to questions regarding Diabetes Awareness

Questions	Frequency of Responses (%)	
	Yes	No
Do you know diabetes can affect your vision?	85.5	14.5
Do you feel the sensation of pins and needles in your hands and feet?	57	43
Do you regularly take your diabetes treatment?	83.5	16.5
Have you ever gotten your Urine checked for proteinuria?	55.5	44.5
Do you know Diabetes can affect your kidneys?	86	14
Have you ever had any infection of your feet?	12	88
Are you a smoker?	18.5	81.5
Do you have Ischaemic Heart Disease like angina, Myocardial Infarction?	14	86
Have you ever had a stroke?	5.5	94.5
Have your doctor told you about complications of diabetes mellitus?	63.5	36.5
Have your doctor told you about dietary restrictions for diabetes mellitus?	82.5	17.5
Have your doctor told you about normal levels of blood sugar for diabetes mellitus?	63	37
Has your doctor ever referred you to an ophthalmologist (eye specialist)?	34.5	65.5
Has your doctor told you about your foot care for Diabetic patients?	63.5	36.5
Have you ever been admitted with any complications of diabetes mellitus?	34.5	65.5
Has your doctor told you about the symptoms of hypoglycemia (low blood sugar)?	65.5	34.5
Do you have a glucometer at home?	71	29

88 (44%) patients had poor follow-up and their HbA1C was never checked. 42 (21%) patients get it done once a year whereas 39 (19.5%) had regular follow-up and their HbA1C was checked every 3 months.

Diabetic patients exceeding 50 years were relatively more aware (66.7%) of their normal blood sugar levels as a significantly higher percentage of people above 50 years were told by physicians about normal blood sugar levels (P value 0.009). Only 15.5% of patients above 50 years smoke smoke as compared to patients under 50 years. This difference was statistically significant as shown by a P value of 0.016.

The majority of patients (85%) were aware of diabetic retinopathy. As the duration of diabetes increased, a higher percentage of patients became aware of the impact of diabetes on vision, and this trend was statistically significant with p p-value of 0.000. (65.5%) of patients were never referred by their physicians to an ophthalmologist, indicating a potential gap in specialist care for diabetes-related eye complications.

Moreover, Patients with longer diabetes duration were more likely to visit ophthalmologists at regular intervals (P= 0.038) as they were more likely to be referred by their physician to the ophthalmologist (P = 0.023).

114 (57%) reported experiencing pins and needles in their hands and feet. 172 (86%) were aware that diabetes can affect their kidneys but 111 (44%) never checked their urine for proteinuria. However, only 31% of patients reported going for a walk daily, while 31% never went out for a walk or exercise. Patients with longer diabetes duration appear to have slightly lower rates of daily walking compared to those with shorter diabetes duration.

Additionally, the percentage of patients who never go out for a walk tends to increase with longer diabetes duration and with age above 50 years. These findings were significant shown by P values 0.006 and 0.012. These findings may have implications for promoting physical activity and managing diabetes over time.

Foot care and awareness of diabetic foot complications were lacking as only 48 (24%) examined their feet daily, 66 (33%) never examined their feet, and 73 (36%) were never told about foot care by their doctors. 12% experienced foot infection.

A greater proportion of patients aged less than 50 were informed by their treating physician about foot care (80%) compared to patients aged more than 50 (55.6%). These differences were statistically significant,

highlighting the impact of age on patients' knowledge regarding blood sugar levels and foot care as indicated by a p-value of 0.009 for blood sugar and 0.013 for foot care.

Table-2 Result of the Chi-square test showing significant difference based on the duration of Diabetes.

Duration of diabetes						
			Less than 5 years	5-10 years	More than 10 years	Pearson Chi-Square Asymptotic significance (2-sided)
1.	Frequency of going to ophthalmologist for evaluation of diabetic retinopathy	6 monthly	17	15	20	0.038
		Annually	11	13	16	
		Never	53	28	27	
2.	Do you know diabetes can affect your vision	Yes	60	50	61	0.000
		No	21	6	2	
3.	How frequently do you go out for a walk	Daily	30	22	10	0.006
		3 times a week	9	4	5	
		Five times/week	1			
		Infrequently	17	10	30	
		Never	24	20	18	
4.	Have your doctor referred you to an ophthalmologist	Yes	25	14	30	0.023
		No	56	42	33	

73 patients (36.5%) claimed that they were never informed about diabetes or its complications by their doctors. Additionally, 69 (34%) patients were never educated about the symptoms of hypoglycemia.

4. Discussion

The findings of this study reveal a concerning lack of knowledge and suboptimal adherence to recommended guidelines, underscoring the pressing requirement for educational campaigns. Diabetes mellitus is a chronic disorder and patient education, training and self-management are very important to control blood sugars and prevent complications associated with long-term and uncontrolled diabetes mellitus.

A diabetic patient needs to be aware of the disease, optimum blood sugar levels with treatment, lifestyle modifications and complications due to the disease itself and drugs. Our study highlights gaps in awareness

and practices among diabetic patients. Improvements are needed in areas such as regular blood sugar and HbA1c monitoring, foot care education, patient counselling about diabetes and its complications, and appropriate referrals to specialists.

Table-2 Result of Chi-square test showing significant difference based on the age of patients

Age of patients					
			50 and below	Above 50	Pearson Chi-Square Asymptotic significance (2-sided)
1.	How frequently do you check your blood sugar	3 TIMES WEEKLY	15	19	0.005
		ONCE WEEKLY	14	10	
		ONCE FORTNIGHTLY	13	35	
		ONCE MONTHLY	15	62	
		NEVER	8	9	
2.	How frequently do you go out for a walk	DAILY	25	37	0.012
		3 TIMES A WEEK	9	9	
		FIVE TIMES / WEEK	1	0	
		INFREQUENTLY	13	44	
		NEVER	17	45	
3.	Are you smoker	Yes	14	50	0.016
		No	21	115	
4.	Have your doctor ever told you about normal blood sugar level	YES	36	90	0.009
		NO	29	45	
5.	Has your doctor told you about foot care for diabetics	Yes	52	13	0.013
		No	75	60	

Addressing these gaps can contribute to better management and prevention of diabetes and its associated complications. More than 50% of our study population were diabetic patients who were less than 60

years of age. 33% never examined their feet and physician of 36% of patients never talked about foot care in outpatient departments and wards with their patients. This percentage although less but still more than that observed by Shyam Kishore[12] and fellows. They checked about knowledge of the patient regarding foot care. They found that only 12.5% of patients were educated regarding foot care and it is important to counsel people regarding foot care to prevent immense financial and health care burdens due to micro and macrovascular complications of diabetes mellitus. The T Goie and his colleague[13] found that 90% of patients were never counselled regarding the diabetic foot care disease which is quite higher than our patients. 22% of patients examine their feet only when some problem arises. When diabetic foot disease guidelines were taken into consideration diabetic patients' knowledge about foot care was deficient. They suggested that there should be better screening and prevention programs and patients should be educated about the complications and risk factors should be modified aggressively.

Huda Younis[14] found that in Karachi diabetic patients were aware of the complications of diabetes mellitus. 83% of patients were aware of cardiac complications which is similar to the patients in our study which is 86%. 60% of their study group knew about diabetes mellitus and 33% were about the fact that stroke is a well-established complication associated with diabetes mellitus. People who have experienced complications were more aware than people without these complications. Only 17% of our patients had a history of ischemic heart disease while 7% had stroke.

Khamrunissa H Sheikh[15] conducted a study in Jeddah, Saudi Arabia, to assess the understanding of risks and complications associated with diabetes mellitus among young individuals. The study revealed that awareness levels were higher when it came to diabetes treatment compared to monitoring and general knowledge about diabetes. Interestingly, women exhibited a greater level of knowledge than men concerning the treatment of diabetes mellitus. Additionally, our study found that diabetic patients aged 50 had relatively higher awareness regarding blood sugar levels.

S Preethikea[16] assessed awareness about diabetes mellitus and its complications in the general population. 96% of the people were aware of symptoms, complications investigation and complications of diabetes and only 3.2% were unaware

In our research around 70% of patients have had diabetes for more than 5- 10 years and the duration of diabetes is directly proportional to the frequency of non-alcoholic fatty liver diseases as suggested by Shazia Siddiq[17] and in Sargodha, Pakistan it is found by Sehrish Latif [18] and colleagues that prolong the duration and poor glycemic control lead to amputation in 78% of patients who presented with diabetic foot.

Research conducted in India examined the level of understanding regarding diabetic nephropathy among individuals with type 2 diabetes. The findings revealed that a significant portion of diabetic patients lacked fundamental knowledge about both diabetes and diabetic nephropathy. Furthermore, the study indicated that the level of awareness is linked to the duration of diabetes[19]. Our study identified that a large majority of participants demonstrated awareness regarding diabetic nephropathy, neuropathy, and retinopathy.

Research carried out in Trinidad revealed that 41.9% of participants knew the term HbA1C. Furthermore, the study identified a direct relationship between the awareness of HbA1C and the level of education received by type 2 diabetic patients[20]. In our study, we found that a large number of participants never checked their HbA1C as they were not aware of its importance in monitoring their disease. Only 15% of participants check their HbA1C every 3 months.

Through a systematic analysis of the literature, this research aims to provide valuable insights into the current state of awareness among diabetic patients regarding their condition and associated complications. The findings of this study can potentially inform healthcare providers, policymakers, and public health organizations in designing targeted interventions and educational campaigns to bridge the existing knowledge gaps and empower individuals living with diabetes to make informed decisions about their health.

5. Conclusion

There is a significant lack of awareness among individuals with diabetes, highlighting the urgent need for educational initiatives. Both the public and private healthcare sectors should take the responsibility of

providing awareness programs. It is crucial to develop and execute outreach programs and employ mass media to enhance public knowledge about this disease. Moreover, it is essential to educate healthcare professionals so they can effectively counsel and raise awareness among diabetic patients during each visit. This education should cover various aspects, including the nature of the disease, the significance of adhering to prescribed medications, adopting a healthy lifestyle, and maintaining regular follow-ups to prevent and delay complications.

CONFLICTS OF INTEREST- None

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Contributions:

F.B, K.M - Conception of study

F.B, K.M, L.M - Experimentation/Study Conduction

F.B, K.M, S.S, S.K - Analysis/Interpretation/Discussion

F.B, K.M, L.M, S.S, A.M, S.K - Manuscript Writing

F.B, K.M, A.M - Critical Review

F.B, K.M, L.M - Facilitation and Material analysis

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