General

Patient Knowledge About Diabetes: Illness Symptoms, Complications and Preventive Personal Lifestyle Factors

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Aims

Knowledge plays a vital role in making better decisions for treatment. Patients should be educated about the knowledge of the disease. This study aimed to know patient knowledge about diabetes illness symptoms, complications, and preventive personal lifestyle factors.

Methods

A cross sectional research design was used to know diabetes knowledge among 261 diabetes patients. Descriptive analysis and logistic regression were used to analyze collected data.

Results

A total 261 respondents were included in this study. 71.26 % were male and 28.74% were females, and their mean age was 30.41 ±7.4 years. About 45.2 % of the respondents earned excellent knowledge ratings. The study concluded that frequent urination (94.6%), increased thirst (86.6%) and slow healing of cuts and wounds (88.5%) were the common symptoms of diabetes. Respondents knew that a family history of diabetes mellitus is the most significant risk factor, followed by being overweight /obesity (89.7%). Most respondents indicated that insulin injection (92%) and avoiding sugary foods (91.6%) were the best ways to control blood sugar. Even though work related to the medical field (p=001) and age (p=0.018) were significantly and positively associated with knowledge, the association of gender, income, level of education, medical field related education, nationality, and marital position with knowledge were not significant.

Conclusions

Our study findings has confirmed that respondents have good level of knowledge about diabetes mellitus (DM) and the associated risk factors, symptoms and chronic complications. Age and work related to the medical field have displayed a significant association with respondent's knowledge about risk factors, symptoms and complications of diabetes.

1. INTRODUCTION

The Saudi Arabian population has undergone significant lifestyle changes in the last three decades. These changes are perceived to be responsible for non-communicable diseases and their complications.[1–3] As per the International Diabetes Federation (IDF), globally, 537 million adults are already living with diabetes. In due course of time, if suitable preventive action is not taken, this number will reach up to 643 million people globally by the end of 2030.[4] As per the World Health Organization (WHO) report, in the Middle East region, Saudi Arabia is on the second rank and

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seventh place globally for diabetes situation.[5–8] Currently, approximately seven million diabetes cases and three million pre-diabetic cases in Saudi Arabia. Even the report revealed a drastic increase in the occurrence of T2D type diabetes among the population of Saudi Arabia.

Therefore, currently, diabetes emerged as the most challenging chronic disease in Saudi Arabia.

Due to the nature of this disease, health professionals alone cannot provide high-quality care to diabetic patients. This chronic disease needs comprehensive knowledge of the disease process, disease management challenges, and competent self-care to contribute effectively to the management of diabetes patients and family members' lives. Continuous attention to monitoring blood glucose and urine sugar and disciplined lifestyle activities such as medication and adjustment to dietary condition also play a vital role in diabetes management. Many studies indicate that knowledge gives patients sufficient confidence to make an appropriate decision to treat their disease.[9–13]

Therefore, self-management diabetes education is considered a fruitful tool to enhance the knowledge and abilities for the optimal self-management of diabetes.[14] Because of this, diabetic education and counseling for the patient and family members are becoming important goals of diabetic patient care today. Half of the diabetic patients do not seem aware of their diabetes disease.[15] Unfortunately, about one third of the diabetes people do not perceive it as dangerous in the beginning and development.[16,17] Therefore, it is vital to increase patient awareness about diabetes disease symptoms and motivate patients to obey necessary treatment procedures to control this public health issue.[18] Globally, knowledge related to diabetes management is insufficient, even though it is a critical aspect of this condition. Hence, it is essential to study patient knowledge about this disease, disease symptoms, complications, and personnel lifestyle factors.[19] The study aimed (a) to understand diabetes patients' knowledge about diabetes symptoms, complications, and preventive management practices in Ha'il city, Ha'il, Kingdom of Saudi Arabia, and (b) to determine demographic factors associated with diabetic patients' level of knowledge about diabetes.

As per Vision 2030, the Saudi government is very particular about controlling chronic diseases.[20] Therefore, this study finding will be beneficial and vital for the public and health policymakers in Saudi Arabia to design and implement intervention programs to increase awareness among diabetes patients of the illness symptoms, complications, and preventive personal lifestyle factors.

2. METHODS

2.1. STUDY DESIGN

A cross sectional research design was adopted for the current study. The study participants were invited from different diabetes clinics situated in Hail city. The inclusion and exclusion criteria adopted for the recruitment of respondents were: (a) aged above 18 years; (b) living with diabetes and taking some treatment; (c) voluntarily giving informed consent to participate in this study and (d) those who did not agree to give their consent were excluded from this study. The purposive sampling method was used to recruit 261 respondents for this research study.

2.2. MEASUREMENT INSTRUMENT

This study used a validated Arabic survey questionnaire about DM knowledge, attitude, and practices.[21] Author's permission obtained to administer this questionnaire. The validated questionnaire was administered with minor changes to make it suitable for research on the Saudi Arabian population. A pilot study was conducted with 22 public respondents, 12 of whom had a history of DM and 10 of whom had no history of DM. To check the face validity as well as the content validity of the survey tool. In addition, before administering the final survey tool, two Ph. D. holders in Clinical Pharmacy revised the Arabic version of the questionnaire. The first section of the questionnaire contains respondents' demographic information.

This questionnaire contains eight key questions to assess participants' knowledge about diabetes risk factors, diagnosis, prevention, and complications. Yes, No, and Don't Know, were the three categorical responses to the questions. Each accurate response was worth one point, and the total score was calculated out of 26. Poor, moderate, and good knowledge were assigned to score ranges 0–13, 14–18, and 19–26, respectively.

2.3. DATA COLLECTION

Before administrating the questionnaire, each participant was explained about the aim and purpose of data collection as well as the content of questionnaire, in the concern clinic wards. Participation in this study was voluntarily. Data confidentiality and individual identification of participants was ensured by not collecting any identifying information from the participants.

2.4. DATA ANALYSIS

Data analyses were performed using statistical package for social science (SPSS), version 26. Respondents' demographic data, such as age, gender, marital status, level of education, nationality, income, and work-related to medical field were described using descriptive statistics. The backward LR method was used to perform binary logistic regression, and $p < 0.05$ was considered as significant. To examine the questionnaire's internal consistency, the Cronbach alpha value was calculated for the adopted scale, and test results obtained about respondents' knowledge about DM were 0.859.

3. RESULTS

3.1. DEMOGRAPHIC CHARACTERISTICS

Out of total 261 respondents, 71.26 % were male and 28.74% were females, and their mean age was 30.41 ±7.4 years. 56% of respondents were below the age of 30 years. 64.8% of the respondents have up to secondary school ed-

Table 1. Demographic characteristics of respondents (N = 261).

	Number	%
Age		
• <30 years	146	56
• ≥ 30 years	115	44
Gender		
• Male	186	71.26
• Female	75	28.74
Level of Education		
• Up to secondary school	46	64.8
• College	17	6.5
• University	169	17.6
• Master	24	9.2
• PhD	5	1.9
Medical field related education		
• Yes	81	31.03
• No	240	68.97
Work-related to the medical field		
• Yes	59	22.61
• No	244	77.39
Income per month		
• < SAR 5000	108	41.4
• SAR 5001 to SAR 10000	68	26.1
• >SAR 10000	85	32.5
Marital status		
• Married	157	60.3
• Unmarried	101	38.7
• Divorced	3	1.0
Nationality		
• Saudi	210	80.5
• Not Saudi	51	19.5

ucation, followed by university (17.6%). 68.97% of the respondents do not have an education related to the medical field. 77.39% of respondents were not from medical related work fields, and 41.4 % had less income than SAR 5000 per month. 60.3% of the respondents were married, and 80.5 % were from Saudi Arabia (Table 1).

3.2. KNOWLEDGE ASSESSMENT

Eight questions about the disease, dysfunction of organs, treatment, risk factors, symptoms, management, diagnosis, and effect on other organs were used to assess DM knowledge. Respondents' average knowledge score was 16.83 ± 4.4. About 45.2 percent of the respondents, earned excellent knowledge ratings. Only 13% of respondents received a score range of 0-13, indicating a low level of knowledge about DM.

Table 2. Respondents' knowledge about the dysfunction of organs leads to DM (N = 261).

	Frequency	Percentage (%)
Lung	15	5.7
Kidney	22	8.4
Pancreas	215	82.4
Liver	9	3.5

Most respondents (82.4 %) were aware that DM is caused by pancreatic dysfunction, followed by the kidney (8.4%). In comparison, the lever was reported as the second least affected organ due to DM (3.5%), followed by the lungs (5.7%) (Table 2). 93.1% of Respondents were aware that a family history of diabetes mellitus is the most significant risk factor, followed by being overweight /obesity (89.7%). It was found that 79.3% of the respondents expressed their opinion that eating too much sugar is also a cause of DM, followed by stress levels (73.9%) (Figure 1). The study result explained that respondents perceived that the condition of frequent urination (94.6%), increased thirst (86.6%), and poor wound healing (88.5 %) are the most common symptom of DM (Figure 2).

In the case of diagnosis of DM, the study participants were in favor that blood sugar can be controlled by insulin injection (92 %), avoiding sugary foods (91.6%), and regular exercise (86.6%) (Table 3). Even 87.4% of the respondents perceived that measuring blood glucose after fasting is the best way to diagnose diabetes (Table 4).

The study findings indicated kidney as a most frequently affected organ (65.9 %), due to diabetes disease, followed by stroke (44.8 %) (Figure 3).

Binary logistic regression was used to examine respondents' knowledge about diabetes with the help of predictor variables such as medical field related work, age, gender, income, level of education, medical field related education, marital status, and nationality. The model was statistically significant based on the results of the Omnibus tests, sig value is 0.001 (sig. <0.05), and Hosmer and Lemeshow test, sig value is 0.772 (sig. >0.05). The model explained between 17.9 % (Cox & Snell R Square) and 24.8% (Nagelkerke R Square) of the variance in the dependent variable and correctly classified 72.4% of the cases. Work-related to the medical field and age have significantly contributed to the model as shown in Table 5, but other predictor variables have not contributed significantly. The odds ratio for work related to the medical field and age have reported 4.677, and 1.046, respectively, which indicate that these two types of respondents have better knowledge about DM (Table 5).

4. DISCUSSION

The Kingdom of Saudi Arabia aimed to transform its economic and national growth by implementing Vision 2030.[20] The health care transformation is one of the essential pillars of this initiative. In continuation, the Ministry of Health (MOH), Saudi Arabia, has introduced a new health

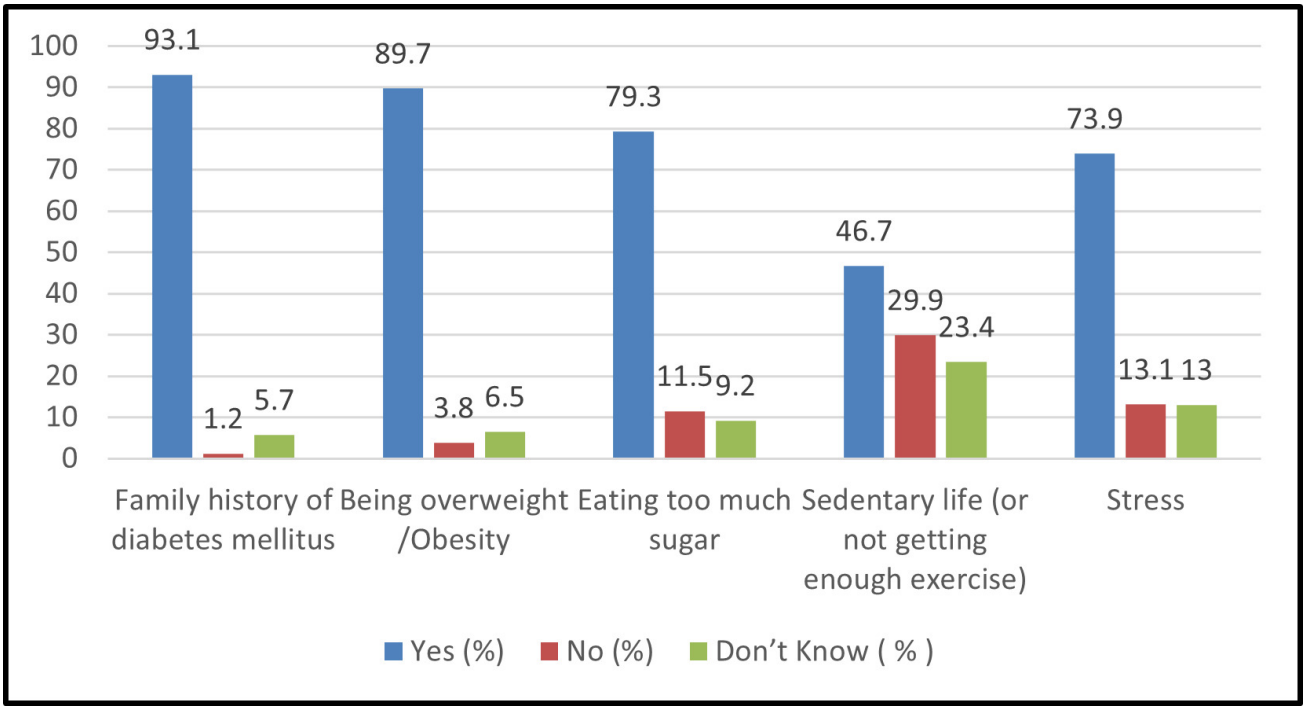

Figure 1. Respondents' knowledge about Risk factors of DM

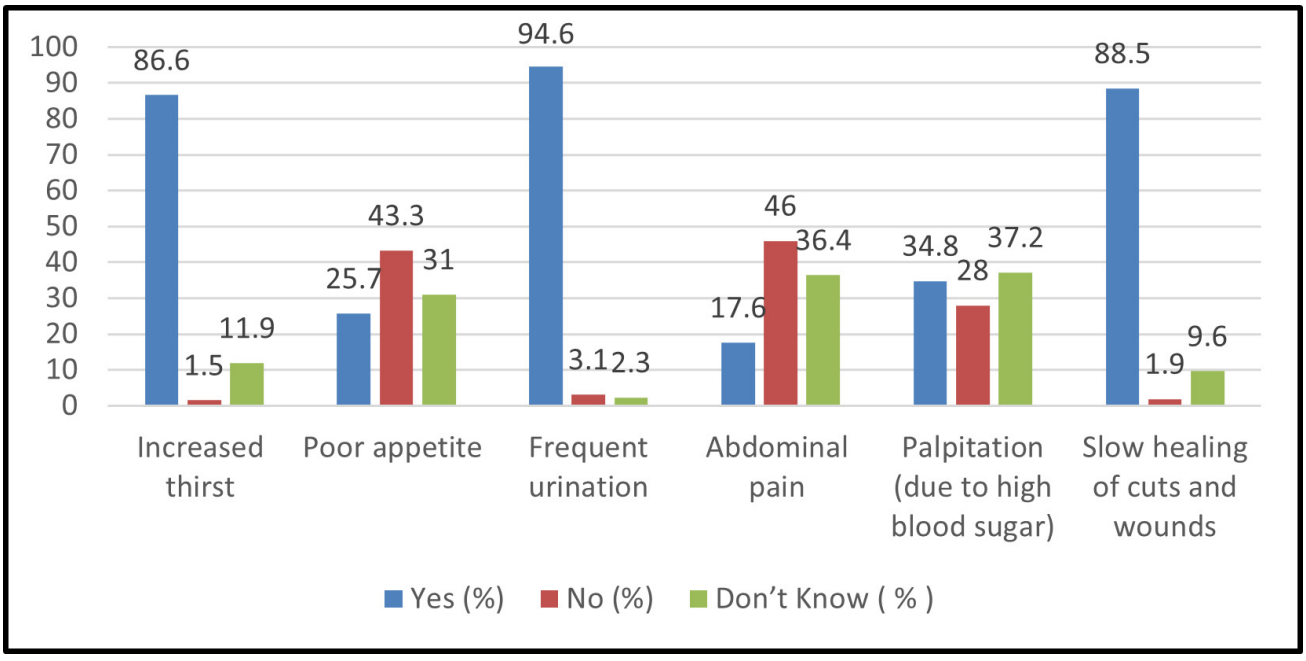

Figure 2. Respondents' knowledge about Symptoms of DM

system to handle their current and future health needs. At the same time, the primary healthcare system is considered an essential factor in dealing with chronic diseases in the country. Therefore, MOH has implemented a series of health education and health promotion campaigns to aware 3 million targeted people about diabetes and many other important health issues.[22] One, World Health Organization (WHO), report explained that globally, diabetes caused a 5% increase in premature mortality from 2006 to 2016. Even in 2019, it was reported that diabetes was the ninth leading cause of death globally, with an estimated 1.5 million deaths caused by diabetes only.[23]

Our study findings indicated that healthy food, regular physical exercise, and insulin injection are the ways to control or delay the inception of diabetes. Other studies conducted in Saudi Arabia,[8,24] concluded that overweight and poor eating habits are the personal risk factors of diabetes, which support the result of our study. Previous research also revealed that the knowledge level of diabetes decides the successful self-management and health outcomes of

Table 3. Respondents' knowledge about controlling blood sugar. (N = 261).

	Yes (%)	No (%)	Don't Know (%)
Insulin injection	92	2.6	5.4
Oral medications	75.9	6.1	18
Regular Exercise	86.6	5.7	7.7
Avoiding sugary foods	91.6	3.4	5
Regular eating of (herbs and ginger)	43.7	16.5	39.8

Table 4. Respondents' knowledge about the best way to diagnose DM. (N = 261).

	Yes (%)	No (%)	Don't Know (%)
Measuring urine sugar is the best way to diagnose diabetes	53.2	25.3	21.5
Measuring blood glucose after fasting is the best way to diagnose diabetes	87.4	12.6	0

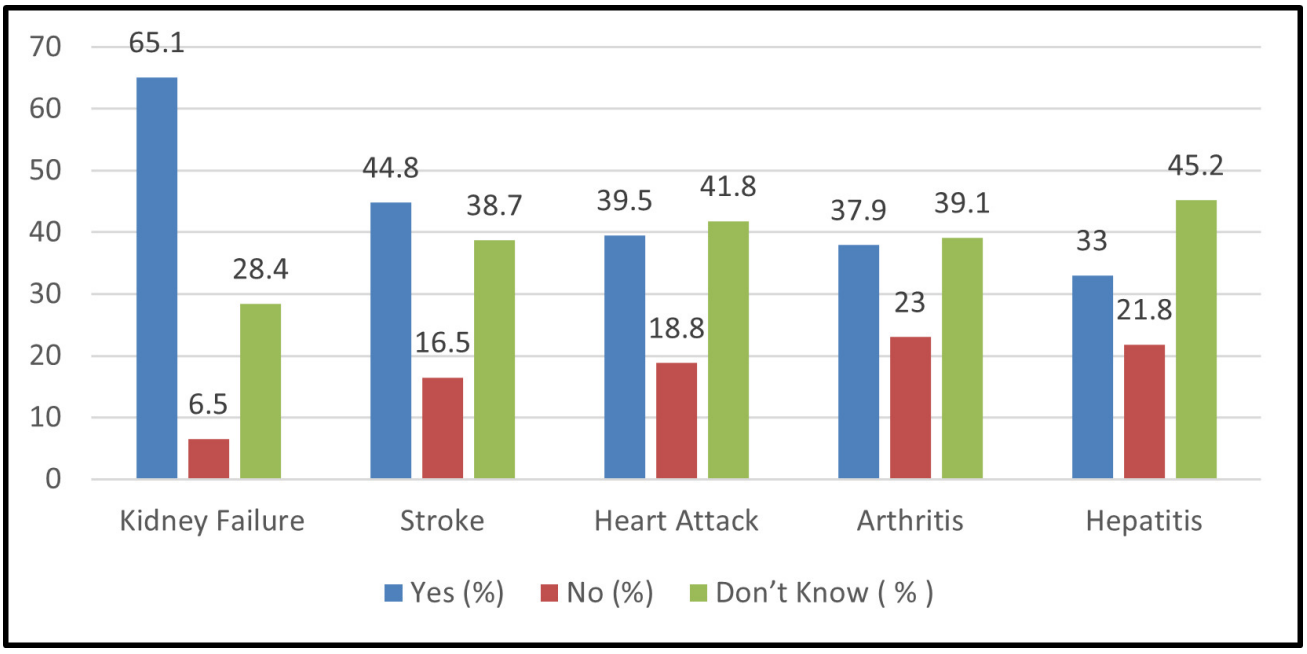

Figure 3. Respondent's knowledge about the effect of DM on other organs

Table 5. Logistic regression predicting the respondents' good knowledge about DM.

Independent variables	B	SE	Odds ratio	95% CI	*p*-value
Work-related to the medical field	1.543	0.336	4.677	2.420-9.040	0.000
Age	0.045	0.019	1.046	1.008-1.086	0.018

p-value < 0.05.
Poor and moderate knowledge score coded 0, good knowledge score coded 1.
B, regression coefficient; SE, standard error associated with the coefficient B; CI, confidence interval.

the patient.[25,26] A study conducted in North-East Slovenia[27] revealed that it is essential to involve patients in consultations about T2D to become empowered in their illness management and to reduce avoidable complications as well as to progress their health outcomes.

The condition of frequent urination, increased thirst and poor wound healing are the most common symptom of DM. Another finding of this study was that kidney failure and stroke were the most frequently affected organs by the diabetes disease. Even, it was found that there is a significant association between the work related to the medical

field and age and the level of knowledge about DM. The finding that age showed a significant relationship with the knowledge level of diabetes is consistent with the study conducted in Ghana.[28]

Family history of diabetes mellitus, being overweight, eating too much sugar and high stress levels were the most crucial risk factors for diabetes. A study conducted in Ethiopia[29] also indicated that most respondents consider family history of diabetes as the leading risk factor for diabetes. A previous study in Saudi Arabia[30] also found the effect of diabetes knowledge on behavior. It described that still the participants continue to consume sweet foods even though they were very conscious about the harmful effects of sweetie on oral hygiene. Therefore, it is essential to ascertain mediations that support peoples' approaches regardless of their levels of knowledge about the disease. This finding is similar to the findings of a study completed in Ghana[31] and Ethiopia.[32] These studies explained that the level of knowledge is very much important to help patients about precise actions in the management of diabetes illness. Further study described that more the knowledge level, more likely patients will understand and decide self care actions such as exercise, diet, and blood sugar testing etc..

Further, the study found that respondents have good knowledge about diabetes. This finding is supported by other studies administered in Saudi Arabia[19] and Malaysia.[33] However, knowledge score were found low in a study conducted in Nepal[34] also. Such differences among the findings of many studies may be due to the availability of resources in the country. As the study in Nepal[34] indicated, they do not have enough resources to implement health education and health promotion campaigns. However, Saudi Arabia has exercised much effort to improve the working mechanism of the 937 centers by providing 100,000 medical consultations physically and more than 15,000 via social media platforms.[22] It was found that different studies used different instruments among different cultural or age groups, but still the findings of this study is relevant for the policy maker as well as for the society. However, we did not study how individuals acquired knowledge of diabetes. The current study was performed among diabetes outpoints only. Hence, the findings cannot be generalize among the all diabetic patients in the country. This is one of the limitation of this study.

5. CONCLUSION

This study has revealed a higher level of awareness about diabetes and its chronic complications. Work related to the medical field and age have a significant association with the patient's knowledge about risk factors, symptoms and complications of diabetes. It was found that approximately half of the respondents only considered that physical exercise also plays a significant risk factor in getting diabetes. Therefore, a specific awareness program should be planned and implemented among the country's population to know the role of physical exercise in maintaining sound health. Although the study found a good level of knowledge about diabetes among participants, further study should be conducted on a larger sample size to generalize the findings.

AUTHOR CONTRIBUTIONS

Conceptualization R.K.; project management, R.K., B.P. and R.I.; original draft preparation, R.K. and M.S.; data collection and analyzing, R.K., R.I. and M.S.; final draft reviewing and editing, R.K., R.I., M.T. and B.P. All authors agreed to the published version of the manuscript.

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ETHICAL CONSIDERATIONS

Before commencing this research study, ethical approval was obtained from the Ethical Review Committee, University of Hail (Permission number: H-2020-197). In addition, the person in charge of the selected health care facilities granted the permission.

INFORMED CONSENT STATEMENT

Informed consent was obtained from all subjects involved in the study.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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