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Diabetic patients' knowledge and awareness about importance of daily activity for their health

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ABSTRACT

Background: It's been proved that daily activity increases insulin sensitivity, general health, and risk profiles of cardiovascular disease. Therefore; physical activities help to reduce the effects of diabetes on the human body. Unfortunately, the physical level is low among diabetic patients and this might be due to a lack of understanding about the value of exercise. The object of this paper is to assess knowledge and awareness of daily activity importance among diabetic patients in KSA. *Methods:* The observational study was done in KSA. A total of 380 diabetic patients are included in the study, all of whom live in Saudi Arabia. All the patients were answering a questionnaire that assesses their knowledge about the importance of physical activities. Eventually, data was analyzed by SPSS to identify their knowledge level. *Results:* There were 380 participants in the investigation, with 60.5% of them being female. The participants' ages varied from 18 to 76 years old, making up 43.7% of the sample. There was a 62.2% average knowledge score. The knowledge of physical activity was significantly associated with the type of diabetes, family history of diabetes, having dyslipidaemia, and having kidney disease. *Conclusion:* In this investigation, we discovered that the sampled people with diabetes had rather low levels of knowledge about physical exercise. More people with T1DM, those with favourable disease history, and people without dyslipidaemia or renal disease were shown to have better knowledge.

Keywords: Diabetic, IANB, physical activity, Exercise.

1. INTRODUCTION

Diabetic is a series of metabolic diseases distinguished by persistently elevated blood sugar levels because a pancreatic lack or inadequate amount of insulin or an inability of the body to utilise insulin. blood glucose concentrations stay high, causing different organ damage because of the uncontrolled DM (Almetahr et al., 2020). To help regulate diabetes needs to make physical-activities contribute to a decrease in the consequences of DM on the human body, so that's simply means that patients need to follow the

different behaviours' of self-care which their health professionals to them (Alhaiti et al., 2020; Alzaylaee et al., 2022). In the Middle-East, Saudi Arabia has the second-highest rate of diabetes and is ranked seventh in the world, the Organization for World Health reports (WHO). Around 7 million people are diabetic, and nearly 3 million people have pre-diabetes, according to estimates (Abdulaziz Al Dawish et al., 2016) specifically in the last three decades. According to previous KSA surveys, There really are 12 epidemic levels of diabetes nationwide, with extremely high rates concentrated in large cities (Al-nozha et al., 2004).

A longitudinal study in Finnish studied the physical activity's effect on CVDs risks in 2180 type-I diabetic individuals and the findings imply that exercise, particularly high-frequency, high- intensity exercise, may lower its incidence (Tikkanen-Dolenc et al., 2017). Exercise has been proven to enhance insulin sensitivity, weight control, and cardiovascular risk profiles. Some evidence suggests that behavioural adjustments, including dietary changes and exercises, in patients may even result in the remission of a recently diagnosed illness. According to certain research based on small populations, T2DM patients have a poor physical level. In a cohort study aiming to measure diabetes patients' level of physical activity, only 57.4 percent reported any type of purposeful physical exercise (Klupa et al., 2015). Since lake of information is a major contributor to this number, a study assessed healthcare providers' knowledge and confidence in advising persons with type-1 DM on physical exercise. Moreover, they reported a lack of understanding of particular physical activity requirements, either for the general population or for persons with type 1 diabetes (Knight et al., 2016).

Many studies suggest that physical activity lowering the incidence of cardiovascular diseases, so in this study we aim to measure the awareness and knowledge of diabetic patient towards the importance of physical activity in Saudi Arabia.

2. MATERIALS AND METHODS

Study design

This is an observation cross-section study which was conducted from November 2021 – Jun 2022 in Saudi Arabia. Saudi Arabia is located in Western Asia part of world.

Subject Participants, recruitment and sampling procedure

The study included a sample from diabetes patients who live in Saudi Arabia. The size of the population is 380. Using the Raosoft calculator, the sample size was estimated with a confidence level of 95% and margin of error 5%.Diabetic patients from all ages, male and female, who live in Saudi Arabia and agree to participate, was included. Diabetic patients who live outside Saudi Arabia will be excluded.

Method for data collection and instrument

Data on knowledge and awareness among diabetic patients were collected using the self-administered online questionnaire which consists of three sections. The first section included questions about the patients' sociodemographic characteristics, such as their age, gender, and educational status. It also contains questions to assess comorbidities e.g. family history of diabetes, duration of diabetes, date of last reading of HbA1c, hypertension, hypercholesterolemia, kidney disease, and smoking. The second section included questions to assess knowledge about the appropriate physical activities for diabetic patients. Lastly, the third section included questions about level of physical activities.

Analysis and entry method

Data was entered into the computer using the "Microsoft Office Excel Software" (2016) software for Windows. The data was then be imported to the Statistical Package for Social Science Software (SPSS) software, version 26 (IBM SPSS Statistics for Windows, Version 20.0 Armonk, NY: IBM Corp.), where it was statistically analyzed. We calculated the knowledge score by scoring 1 for correct answer and 0 for other responses, where then each knowledge item score was added and a percentage was calculated. We used Kruskal-Walli's test and Mann-Whitney test for associating the knowledge score with sociodemographic factors. A p-value of <0.05 was considered statistically significant.

3. RESULTS

The study included 380 participants of whom 60.5% were females. Age ranged from 18 to 76 years, as participants aged 18 to 30 years constituted 43.7% of the sample. Nearly one-third (36.1%) of the respondents were from Asir region, followed by Riyadh region (23.2%), Makkah (15.5%), and Tabuk (12.4%). Of all, 34.2% reported having T2DM, and 32.4% reported having T1DM and 33.4% did not know. Over half of participants had a diploma or a bachelor degree (61.1%). Obese people constituted 28.2% of the

sample; whereas overweight people were 28.9% and 35.5% had healthy weight. Half of the participants (50.5%) had a positive family history of diabetes. In our sample, the prevalence-rate of hypertension was 25%, dyslipidaemia was 18.7%, kidney disease was 6.8%, and 19.5% of respondents were smokers (table 1).

Table 1 Sociodemographic characters of participants (n=380).

Parameter		Frequency (%)
Gender	Female	230 (60.5%)
	Male	150 (39.5%)
Age, y	18-30	166 (43.7%)
	30-60	181 (47.6%)
	60-76	33 (8.7%)
Region of residency	Riyadh	88 (23.2%)
	Makkah	59 (15.5%)
	Al-Madinah	10 (2.6%)
	Al-Qaim	11 (2.9%)
	Ash-Sharqiyah	14 (3.7%)
	Asir	137 (36.1%)
	Tabuk	47 (12.4%)
	Hail	8 (2.1%)
	Al-Hudud Ash-shamaliyah	3 (0.8%)
	Jizan	3 (0.8%)
Type of diabetes	T1DM	123 (32.4%)
	T2DM	130 (34.2%)
	I don't know	127 (33.4%)
Educational level	None	18 (4.7%)
	Primary school	17 (4.5%)
	Middle school	18 (4.7%)
	High school	74 (19.5%)
	Diploma or Bachelor	232 (61.1%)
	Master or PHD	21 (5.5%)
BMI	Underweight	28 (7.4%)
	Healthy weight	135 (35.5%)
	Overweight	110 (28.9%)
	Obese	107 (28.2%)
Family history of diabetes	No	115 (30.3%)
	Yes	192 (50.5%)
	I don't know	73 (19.2%)
Hypertension	No	251 (66.1%)
	Yes	95 (25%)
	I don't know	34 (8.9%)
Dyslipidaemia	No	262 (68.9%)
	Yes	71 (18.7%)
	I don't know	47 (12.4%)
Kidney disease	No	316 (83.2%)
	Yes	26 (6.8%)
	I don't know	38 (10%)
Smoking	No	306 (80.5%)
	Yes	74 (19.5%)

Table 2 shows the knowledge items and the responses of participants. Overall, 91.3% correctly acknowledged that It is recommended to actually start with modest activity and progressively escalate to a more intense regimen as tolerated. The majority (75%), also, acknowledged that adults with diabetes are encouraged to perform a minimum of (one-hundred-fifty) minutes of moderate-intensity (eg, brisk walking) aerobic exercise per week. Only 36.8% responded "no" to the statement "It is possible to continue vigorous exercise in the presence of ketosis," and 45.8% chose "ingest extra food, in the form of 15 to 30 grams of quickly absorbed carbohydrate which should be taken 15 to 30 minutes before exercise" to the statement "What is appropriate to do if blood glucose level is less than 100 mg/dL". Average knowledge score was 62.2%.

Table 2 Knowledge items about daily activity among participants (n=380).

Parameter		Frequency (%)
It is recommended to begin a gentle exercise program and to gradually progress to a more vigorous program as tolerated.	No	2 (0.5%)
	Yes*	347 (91.3%)
	I don't know	31 (8.2%)
Adults with diabetes are encouraged to perform at least one-hundred-fifty minutes of moderate-intensity (eg, brisk walking) aerobic exercise per week.	No	34 (8.9%)
	Yes*	285 (75%)
	I don't know	61 (16.1%)
It is possible to continue vigorous exercise in the presence of ketosis.	No*	140 (36.8%)
	Yes	81 (21.3%)
	I don't know	159 (41.8%)
What is appropriate to do if blood glucose level is less than 100 mg/dL	Avoid exercise completely	56 (14.7%)
	Ingest extra food, in the form of 15 to 30 grams of quickly absorbed carbohydrate which should be taken 15 to 30 minutes before exercise*	174 (45.8%)
	I don't know	150 (39.5%)
Knowledge score, %	Mean ± SD	62.2 ± 26.2
*Correct answer.		

Table 3 shows the practice items and their responses. The average hours spent per week for regular participation in sports was 4.4 ± 6.4 hours per weeks, whereas the average total years of participation in competitive sports was 3.7 years. Only 18.4% of respondents ever had a gym membership and 30% had a job that required physically demanding work. Of all, 10.5% have spent at least one month on a bed or a chair as a result of an injury or an illness.

Table 3 Practice items about daily activity among participants (n=380).

Parameter		Frequency (%)/ Mean ± SD
In general, about how many hours per week did you regularly participate in sports and other vigorous physical activities (excluding walking and time spent in school physical education classes)?		4.4 ± 6.4
Have you ever participated in a group or individual sport (including any games played in physical education lessons at school)?	No	262 (68.9%)
	Yes	118 (31.1%)
If that's so, how long did you engage in competitive activities overall?		3.7 ± 3.7

have you ever had a membership on a gym	No	214 (56.3%)
	Yes	70 (18.4%)
	I don't know	96 (25.3%)
Have you ever had a job that required physically demanding work?	No	266 (70%)
	Yes	114 (30%)
If yes, how many physically active jobs have you ever held?		2 ± 1
If yes, what is the total number of years that you have worked in these physically demanding jobs? (sum of years spent in jobs mentioned above)		7.8 ± 9.2
Have you ever spent any time confined to a bed or a chair for greater than 1 month as a result of an injury or an illness?	No	340 (89.5%)
	Yes	40 (10.5%)
If yes, how old were you when you first became confined to a bed or chair?		31 ± 18
In general, about how many hours per day did you spend watching television?		5.9 ± 3.1

Knowledge score was crossed with the socio-demographic factors of the participants in table 4. There was a significant association between the knowledge of physical activity and type of diabetes (p=0.000), family history of diabetes (p=0.044), and suffering from dyslipidaemia (p=0.000) and kidney disease (p=0.000). Better knowledge was noted amore those with T1DM (70 ± 22.7), those has a favourable history of the disease (64.9 ± 26), and those who are not suffering from dyslipidemia (66.1 ± 24), or kidney disease (65 ± 24.8).

Table 4 Knowledge score in association with sociodemographic characters among participants (n=380).

Parameter		Knowledge score (Mean ± SD)	P-value
Gender	Female	63.7 ± 25.2	0.276
	Male	60 ± 28	
Age	18-30	62.8 ± 26	0.886
	30-60	62.8 ± 24	
	60-76	56.9 ± 38.2	
City of residency	Al-Riyad	64.8 ± 33	0.071
	Makkah	58.1 ± 22.5	
	Al-Madinah	62.5 ± 24.3	
	Al-Qaim	70.5 ± 18.8	
	Ash-Sharqiyah	50 ± 24.1	
	Asir	61.7 ± 26	
	Tabuk	62.3 ± 18	
	Hail	65.7 ± 26.6	
	Al-Hudud Ash-shamaliyah	75 ± 25	
	Jizan	100 ± 0	
Type of diabetes	T1DM	70 ± 22.7	0.000
	T2DM	62.5 ± 29	
	I don't know	54.6 ± 24.7	
Educational level	None	48.7 ± 27.8	0.102
	Primary school	54.5 ± 29.7	
	Middle school	51.4 ± 36.9	
	High school	62.5 ± 26.3	
	Diploma or Bachelor	63.9 ± 24.2	
	Master or PHD	70.3 ± 30.3	
BMI	Underweight	65.2 ± 25.8	0.247
	Healthy weight	60.8 ± 26.9	

	Overweight	66.4 ± 23.6	
	Obese	59.2 ± 28	
Family history of diabetes	No	62.4 ± 24.9	0.044
	Yes	64.9 ± 26	
	I don't know	55.2 ± 28.3	
Hypertension	No	64.1 ± 25	0.183
	Yes	59.3 ± 29.2	
	I don't know	57.4 ± 26.5	
Dyslipidemia	No	66.1 ± 24	0.000
	Yes	57.1 ± 29.1	
	I don't know	49 ± 29	
Kidney disease	No	65 ± 24.8	0.000
	Yes	57.7 ± 32.3	
	I don't know	42.8 ± 26.6	
Smoking	No	62.5 ± 26.4	0.760
	Yes	61.2 ± 26.3	

4. DISCUSSION

Physical activity lowers mortality, prevents cancer, musculoskeletal and cerebrovascular illnesses, boosts metabolism, and enhances mental health. A large body of evidence suggests that as physical exercise or bodily fitness improves, mortality decreases. The Shanghai women's study found that even without purposeful exercise, daily physical activity is good to health (Matthews et al., 2007). This cross-sectional study included 380 adult participants with diabetes mellitus. The study aimed to measure the awareness and knowledge of diabetic patient towards the importance of physical activity in Saudi Arabia.

For many years, researchers have been researching the use of exercise to prevent and treat cardiovascular illnesses. Physical activity helps to prevent cerebrovascular disease by lowering blood pressure, diabetes, and dyslipidaemia. Obesity and insulin resistance, often known as metabolic syndrome, are also improved (Matthews et al., 2007). Physical activity has been shown to have beneficial effects on the musculoskeletal system, such as preventing osteoporosis, reducing fractures, and improving the function of people with rheumatoid and degenerative arthritis. Physical activity is also important for lowering musculoskeletal discomfort and assisting wounded people in their rehabilitation. Back discomfort, shoulder impingement syndrome, myopathy syndrome, fibromyalgia syndrome, plantar fasciitis, and ankle sprains can benefit from exercise therapy (Matthews et al., 2007).

In 2018, the United States 5 Department of Health & Human Services released physical activity guidelines for Americans. It was adapted from the US Physical Activity Guidelines from 2008 and the World Health Organization (WHO) Physical Activity Guidelines from 2010. According to these guidelines, adults are urged to engage in moderate aerobic physical activity for at least one hundred fifty minutes per week, or seventy-five minutes of high intensity exercise, according to all physical activity guidelines. High-intensity exercise entails intensive activity. Both terminologies have been used interchangeably in this article. We can suppose that one minute of high intensity exercise equals two minutes of moderate intensity exercise. When combining high and moderate intensity activities, moderate intensity activity should account for 150 minutes or more per week. If you do 50 minutes of high intensity activity every week (100 minutes of moderate intensity) and 60 minutes of moderate intensity activity, you'll have 160 minutes of moderate physical activity (Organization, 2010).

In our study, the majority acknowledged that adults with diabetes are encouraged to perform at least 150 minutes of moderate-intensity aerobic exercise per week. In our study, the average knowledge score was 62.2%. The knowledge levels found in this study are lower than those reported by similar publications (Mwimo et al., 2021; Ranasinghe et al., 2015; Roux et al., 2019; Thungathurthi et al., 2012). Our study found a significant association between the knowledge of physical activity and type of diabetes (p=0.000), family history of diabetes (p=0.044), and suffering from dyslipidemia (p=0.000) and kidney disease (p=0.000). Better knowledge was noted amore those with T1DM (70 ± 22.7), those with +FM of the disease (64.9 ± 26), and those who are not suffering from dyslipidemia (66.1 ± 24), or kidney disease (65 ± 24.8).

A higher risk of cardiovascular disease is linked to diabetes. In fact, cardiovascular illnesses and myocardial abnormalities leading to heart failure are the primary causes of morbidity and mortality in T2D patients (Teven et al., 1998). Physical activity is prescribed with caution in diabetics due to the risk of causing an acute cardiac episode. According to the study lack of time (43.2%), ineffectiveness of physical activity (2.7%) and patients' health (45.9%) are the primary barriers to participate a physical activity.

Early mortality can be decreased by engaging in regular physical activity, particularly cardiovascular mortality, by 20% to 30% (Gałuszka et al., 1990). This may necessitate a period of supervised education leading to patient autonomy in management of his effort, particularly through the teaching of self-perception of exercise intensity.

A recent study in type 2 diabetics found a lowering of plasma glucose levels over 24 hours and postprandial glucose peaks after 6 weeks of EIHI (Little et al., 2011). On the other side, it has been proven that physical activity lowers mortality and morbidity in the general population (Njororai & Njororai, 2017). In their meta-analysis, Thomas et al., (2006) found that frequent physical activity has a positive effect on T2D patients' glycaemic balance, with an average decrease. Physical activity literacy is associated with a higher level of physical activity (Hui et al., 2014). For that reason, educational-supportive interventions are recommended to increase physical activity and other behavioural changes (Wang et al., 2021).

5. CONCLUSION

Our study found relatively low knowledge levels of physical activity among sampled adults with diabetes. Better knowledge was noted amore those with T1DM, those with positive family-history of the disease, and those who are not suffering from dyslipidaemia or kidney disease. We recommend conducting more sessions of patient education towards increasing awareness of physical activities and exercise and their positive effects on diabetic patients.

Ethical approval

The research proposal was approved by the Ethical Committee of Human Research at the Ministry of health, in Saudi Arabia with Ethical approval number (202/275).

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This study has not received any external funding.

Conflicts of interest

The authors declare that there are no conflicts of interests.

Data and materials availability

All data associated with this study are present in the paper.

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