

Exploring Awareness of Physical Exercise in Type II Diabetes Patients: Sociodemographic Influences and Barriers

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ABSTRACT

Background of the study: Metabolic diseases comprise diseases or disorders that disrupt normal metabolism. Persistent non-infectious diseases like type-2 diabetes mellitus occur with expeditious urbanization, unhealthy diet, and lack of physical exercise. If not managed promptly, it leads to catastrophic outcomes. A healthy lifestyle has a prestigious role in the mediation of diabetes. Regardless of conclusive evidence of exercise in T-2DM control and treatment, there is still a lack of exercise among diabetic patients.

Methodology: The study was a cross-sectional survey that included diagnosed patients with type-2 diabetes mellitus. Descriptive analysis was reported, and bar and pie charts were also used to give a graphical presentation of the data. For categorical variables, a Chi-square test of

association was used. A P-value of <0.05 was considered as significant.

Results: The mean age of the patients was found to be 53.98±8.19 years. The mean duration of diabetes was 10.15±6.60 years. The knowledge about physical exercises was good only in 29.5% of the study population. A significant association was found between awareness scores and sociodemographic factors except marital status.

Conclusion: The study concluded that participants with type 2 Diabetes Mellitus demonstrated a lack of knowledge regarding physical exercises as a treatment regime. The results concluded that very few physicians referred their patients to physiotherapy treatment.

Keywords: Type-2 diabetes mellitus, physical exercise, physical activity, fitness training, resistance training, strength training.

INTRODUCTION

Metabolic diseases like diabetes are characterized by increased sugar level in the bloodstream due to inadequate insulin production or abnormal functioning of the insulin¹. In hyperglycemic conditions, fasting or pre-prandial blood glucose levels are above 125 mg/dl and exceed 180 mg/ dl two hours after a meal².

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Diabetes mellitus has deleterious effects on people's quality of life all around the globe and directly increases morbidity and mortality day by day³. Type-2 diabetes or non-insulin dependent diabetes mellitus, also referred to as adult-onset DM, in which there is adequate production of insulin. However, the body's cells become inefficient to use or absorb that insulin. Around 90% of the population have NIDDM⁴. The predominance of type 2 diabetes overall is to find a good pace for its present degree of 150 million to 225 million before the decade is over and to upwards of 300 million by 2025⁵. As an outcome, the condition is as often as possible under-announced and, of the assessed 15.6 million grown-up diabetic patients within the United States, an expected 5.4 million cases stay undiagnosed⁶. In 2010, it influenced 6.4% of million grown-ups and can increment to 7.7% of million grown-ups by 2030. Somewhere within the range of 2010 and 2030, there will be a 69% expansion in quantities of grown-ups with diabetes in developing nations and a 20% expansion in developed nations⁷. The extent of type-2 diabetes rate ascribed to weight, smoking, and physical latency was evaluated at 57.5%, 1.8%, and 5.4% separately in 2012 and is expected to increment 65.7%, 2.8%, and 6.0% individually in 2050⁸. The pervasiveness of diabetes is increasing day by day, and it is prevalent in almost every country⁹. Worldwide prevalence of diabetic people is approximately 387 million. In 2014, the pervasiveness of diabetes was 8.3% and is speculated to expand to 10% by 2030¹⁰. In 2011, Asian countries were affected by this metabolic disease. An immense number of adults in China have diabetes (90 million), in India (61.3 million), and (8.4 million) adults in Bangladesh¹¹. 11.7% of the Pakistani population has type-2 diabetes. In urban areas (14.81%), type 2 diabetes is prevalent mainly in comparison with the rural areas of Pakistan (10.34%)¹². An ongoing paper demonstrated that the per-individual yearly expenses related to type-2 diabetes expanded by over 50%. An ongoing report by the American Diabetes Association demonstrated that in 1997, diabetes represented \$44.1 billion in direct social insurance on assumptions¹³. Planned structured bodily movement with many repetitions is exercise; its ultimate goal is enhancing one's physical fitness. Proper physical activity is beneficial in increasing longevity and promoting a healthy lifestyle, which is crucial in diabetes management¹⁴. Studies show that only two-thirds of diabetic adults exercise routinely, and one-third of diabetic adults live with poor lifestyles due to insufficient knowledge of the benefits of physical exercise in controlling their raised blood sugar levels¹⁵. In different studies, many consequences were considered obstacles that kept participants from engaging in physical activity, such as osteoarthritis, lack of spare time, lack of motivation, and a busy daily schedule¹⁶. In type-2 diabetes, entanglement occurs when large blood vessels become affected, bringing about cardiovascular complications like stroke and peripheral arterial disease. As the disease progresses or the duration of the disease, aggravated microvascular complications occur, which are retinopathy and nephropathy¹⁷. Modifying your diet and enrolling in a regular physical activity program assists in the management of diabetes type-2 and health hazards due to this disease. According to the American Diabetes Association (ADA), strength training and aerobic or endurance exercises benefit patients with type-2 diabetes. American Diabetes Association endorses regular 30 minutes of not less than five days a week or gross 150 minutes of exercise per week and anaerobic exercise at the minimum of two times in a whole week with aerobic exercises¹⁸.

METHODOLOGY

This research strategy was conducted using a cross-sectional study design. A self-designed questionnaire assessed the awareness of physical exercise among type-2 diabetes mellitus patients. Included were physician-diagnosed patients who reported confirmed type-2 DM and who attended and enrolled at Dow National Institute of Diabetes and Endocrinology for routine care and follow-up. Exclusion criteria included patients with cognitive impairment and other types of Diabetes. A non-probability, purposive technique was used for sampling to get an appropriate data pool. The

sample size was calculated using the Open-Epi calculator. The proportion of good awareness core was taken as 29%. With a 6% margin of error and 95% confidence level, the total sample size was 220¹⁷. The study included the targeted population of males and females previously diagnosed with type-2 DM within an age limit of 30-65 years. Those with other types of diabetes and cognitive impairment were not included in the study. Informed consent was obtained from the study participants, and the patients' rights, like confidentiality and withdrawal, were ensured. A brief self-designed questionnaire consisting of 13 items was used to assess the knowledge regarding physical exercises associated with socio-demographics. The questionnaire completion took approximately 10 minutes—the internal consistency and reliability commenced at 0.64 (Cronbach alpha). The main variables about knowledge of physical exercises were assessed by asking about the awareness of regular exercises like brisk walking, cycling, gardening, household chores, anaerobic exercises, swimming, and frequency and duration of exercises. For analysis, overall awareness scores were computed by culminating the knowledge scores for the above ten activities and labelled into three specific categories, "Poor", "Fair", and "Good". The data collected through the questionnaire was used for statistical analysis in SPSS version 16.0. Pearson Chi-square test was performed to explore the association between awareness of physical exercise, barriers, and sociodemographic factors. P-value ≤ 0.05 was taken as significant.

RESULTS

Table 1 shows the overall awareness scores among type-2 DM patients. The awareness score was distinguished as poor, fair, and reasonable. The results concluded that only a few participants had good knowledge of physical exercises (n=65, 29.5%), mostly had fair knowledge (n=81, 36.8%), and (n=74, 33.6%) had poor knowledge of exercise in the management of type-2 DM.

	N	%
Poor	74	33.6
Fair	81	36.8
Good	65	29.5

Table 1. Awareness scores of physical exercises among type-2 DM patients (n=220)

Table 2 depicts the impact of different sociodemographic factors on awareness scores among type-2 DM patients. The results showed that there was a significant association between awareness of exercises for diabetes control and age (p-value <0.001) and gender (p-value <0.001). Likewise, older adults have good awareness (n=55, 48.2%) compared to young adults (n=2, 6.2%). In the same way, males have an excellent awareness score (n=56, 61.5%) compared to females (n=9, 7.0%). Furthermore, significant associations were found between awareness of physical exercises and occupation (p-value < 0.001) and duration of diabetes (p-value <0.001). Likewise, the retired population has a good awareness score (n=29, 82.9%) compared to unemployed participants (n=7, 5.8%). In the same manner, participants who were suffering from diabetes for an extended period seem to have good awareness (n=54, 29.5%) as compared to those with less years of diabetes duration (n=7, 11.5%). However, there was no significant association between exercise awareness and marital status.

Characteristics	Awareness of Physical Exercises			p-value
	Poor n(%)	Fair n(%)	Good n(%)	
Age in groups				
<45years	13 (40.6)	17 (53.1)	2 (6.2)	<0.001
45-55years	37(50.0)	29 (39.2)	8(10.8)	
>55years	24 (21.1)	35 (30.7)	55 (48.2)	
Gender				
Male	7(7.7)	28(30.8)	56(61.5)	<0.001
Female	67 (51.9)	53(41.1)	9 (7.0)	
Marital status				
Married	69 (33.2)	75 (36.1)	64(30.8)	0.200
Unmarried	0 (0)	2(66.7)	1(33.3)	
Widow/divorced	5(55.6)	4(44.4)	0(0)	
Occupation				
Employed	7 (10.8)	29(44.6)	29 (44.6)	<0.001
Unemployed	66 (55.0)	47 (39.2)	7 (5.8)	
Retired	1 (2.9)	5(14.3)	29 (82.9)	
Duration of diabetes				
<5years	29 (47.5)	25 (41.0)	7 (11.5)	<0.001
5-10years	23 (41.8)	28 (50.9)	4 (7.3)	
>10years	22 (21.2)	28 (26.9)	54 (29.5)	

Table 2. Impact of different sociodemographic factors on awareness scores of physical exercises among type-2DM patients (n=220)

Table 3 shows the sociodemographic characteristics of the study participants. A total of 220 patients with type-2 DM were included in this study. The mean age of the patients was commenced to be 53.98 years (SD: ±8.19). Among 220 patients, there were more females (n=129, 58.6%) than males (n=91, 41.4%). The majority of the participants were married (n=208, 94.5%), followed by widow/divorced (n=9, 4.1%) and then unmarried (n=3, 1.4%). About half of the participants were unemployed (n=120, 54.5%), employed (n=65, 29.5%), and very few of the participants were retired (n=35, 15.9%). The mean duration of diabetes was 10-15 years (SD±6.60).

Characteristics	n	%
Age(years)		
Mean± SD	53.98±8.19	
min-max	32-65	
Gender		
Male	91	41.4
Female	129	58.6
Marital status		
Married	208	94.5
Unmarried	3	1.4
Widow/divorced	9	4.1

Occupation		
Employed	65	29.5
Unemployed	120	54.5
Retired	35	15.9
Diabetes duration (years)		
Mean± SD	10.15±6.60	
min-max	1-28	

Table 3. Socio-demographics of study participants (n=220)

Figure 1 depicts the knowledge about physical exercises among type-2 DM patients. More than half of the study population declared regular physical exercise essential (n=168, 76.4%). Most participants quoted that walking should be a brisk walk to be more advantageous (n=149, 67.7%). Only a few participants knew that cycling was beneficial to control their diabetes (n=76, 34.5%). Moreover, half of the participants do not know about the impact of cycling on glycemic control (n=112, 50.9%). Very few individuals declared gardening an adequate type of physical activity for diabetic patients (n=75, 34.1%). However, almost half of the diabetic population does not know the beneficial effects of gardening (n=100, 45.5%), and more than half of the participants (n=112, 50.9%) and (n=100, 45.5%) do not choose cycling and gardening, respectively. They do not consider them as essential exercises. More than half of the participants think minimal exertion, like household chores, is adequate to control diabetes (n=127, 57.7%). A minority of the study participants mentioned another type of aerobic exercise, like swimming, to illustrate effective exercise (n=51, 23.2%). However, more than half of the participants not cite swimming as a profitable exercise in diabetes management (n=169, 76.8%). Meanwhile, some participants thought exercising five days a week was good for them (n=127, 57.7%). The duration of exercise for at least 30 minutes a day was considered beneficial (n=115, 52.3%). However, most participants needed a more precise awareness of the duration of physical activity (n=80, 36.48%). Very few individuals were aware of the importance of anaerobic exercises (n=40, 18.2%), and more than half of the participants did not mention resistance exercise as an illustration of advantageous exercises (n=127, 57.7%). Only some individuals know that exercise on weekends is insufficient to control diabetes (n=82, 37.3%). Meanwhile, most participants did not need to learn the frequency of exercises.

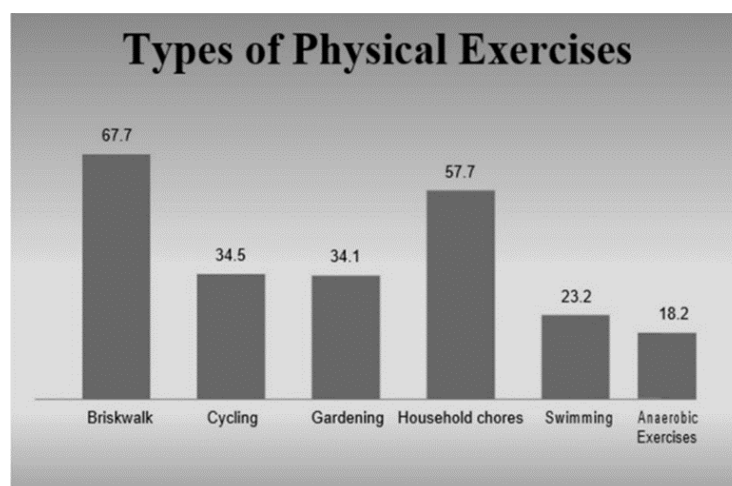


Figure 1. :Knowledge about the type of exercise among type 2 Diabetes Mellitus

Table 4 shows what barriers patients had that prevented them from exercising regularly. More than half of the participants had no leisure time to exercise (n=111, 50.5%). Meanwhile, only a few lacked family support as a barrier (n=12, 5.5%), and most participants' lack of family support was not an obstacle (n=208, 94.5%). Only a few had no proper gymnasium near the area (n=22,

10.0%). Moreover, most participants had proper gymnasiums near the area, but other factors restrained them from doing any physical activity (n=198, 90.0%). More than half of the respondents had joint-related co-morbidities that restrained them from exercising (n=81, 36.8%). A minority of the participants considered financial problems (n=7, 3.2%) and Diabetic complications (n=19, 6.6%) an obstacle to engaging in any physical activity program. However, more than half of the participants (n=213, 96.8%) and (n=201, 91.4%) had not mentioned financial problems and diabetic complications as a barrier, respectively.

Barriers	N	%
No leisure time		
Yes	111	50.5
No	109	49.5
Lack of family support		
Yes	12	5.5
No	208	94.5
No proper gymnasium		
Yes	22	10.0
No	198	90.0
Joint related co-morbidities		
Yes	81	36.8
No	139	63.2
Financial problems		
Yes	7	3.2
No	213	96.8
Diabetic complications		
Yes	19	8.6
No	201	91.4

Table 4. Barriers to doing physical exercises among type-2 DM patients (n=220)

Table 5 depicts the impact of different barriers on awareness scores of physical exercises among type-2 DM patients; most participants had good awareness about physical exercises but reported no leisure time as a primary obstacle that restrained them from doing any physical activity (n=33, 29.7%). After that, some participants reported joint-related co-morbidities as a barrier despite having good awareness (n=29, 35.8%). Very few of the participants had good awareness and claimed to have different barriers like lack of family support, no proper gymnasium, financial problems, and complications of diabetes. The results conclude that there is no significant association between barriers and physical exercise awareness (P-value >0.05).

Characteristics	Awareness about physical exercises			p-value
	Poor n (%)	Fair n(%)	Good n(%)	
No leisure time				
Yes	29.7	40.5	29.7	0.394
No	37.6	33	29.4	
Lack of family support				
Yes	50	33.3	16.7	0.414

No	32.7	37	30.3	
Proper gymnasium				
Yes	50	31.8	18.2	0.204
No	31.8	37.4	30.8	
Joints related co-morbidities				
Yes	33.3	30.9	35.8	0.230
No	33.8	40.3	25.9	
Financial problems				
Yes	28.6	42.9	28.6	0.937
No	33.8	36.6	29.6	
Diabetes complications				
Yes	26.3	36.8	36.8	0.703
No	34.3	36.8	29.9	

Table 5: Impact of different barriers on awareness score of physical exercises among type II Diabetes mellitus Patient

The frequency of physical therapy management among diabetic patients. The results show that of the total 220 patients. Most study participants do not perform physical exercises for diabetes management (n=203, 92.3%). While very few of the patients did physical exercises for diabetes management (n=17, 7.7%). However, most participants were never referred by their physician to an exercise trainer/professional for diabetes management (n=205, 93.2%). While only a few were referred by their physician (n=15, 6.8%).

DISCUSSION

The present study analyzed and revealed the awareness about physical exercises concerning type-2 DM, and shows the association of awareness with different socio-demographics and barriers among type-2 DM patients. Awareness regarding physical exercise treatment provision was also reported. The mean duration of type-2 diabetes mellitus in this study was 10-15 years, almost similar to the study by Navaneeth *et al.*, where the mean age was 8.8 years. Most of the participants in this study had a mean age of 53.98 years (range 32-65 years), similar to the study conducted by Navaneeth *et al.*, where the mean age was 54.09 years¹⁹. This reflects the fact that type-2 diabetes mellitus has its onset after the age of 32 years. Among the 220 studies participants, 91(41.4%) were males and 129(58.6%) were females. Male patients were more likely to have a good awareness of diabetes. The finding was based on studies done in Ethiopia²⁰. This higher knowledge level of male patients could be because they are more likely to be educated and likely to go to diabetic clinics. Therefore, they will have fewer barriers to communicating with healthcare professionals. Despite the conclusive evidence of lifestyle modifications, especially exercise and its beneficial effects in Type-2 DM control, it is also essential to reduce cardiovascular risk factors. Still, there needs to be more knowledge about exercise, mainly due to insufficient health education programs on the benefits of exercise and its importance in reducing blood sugar levels; healthcare providers play an essential role in improving knowledge regarding exercise. The findings of this study are similar to that of Mukhopadhyay²¹. They also documented that most participants had average exercise awareness for diabetes management. Advancing age is a non-modifiable risk factor for many chronic diseases. Correlation of different age categories with exercise awareness enhancement was undertaken. Among the respondents who were younger, less than 45 years and between 45-55 years and above 55 years, 2%, 8%, and 55% had good awareness scores, respectively. This shows that, as age advances, awareness about treatment possibilities like exercises also increases. The association between different age categories and awareness was statistically significant, consistent with Fatima Al Maskari's study²². This could be due to changes in literacy levels and getting more information on blood sugar control through different social

media reforms or experiences as the age advances. Regular physical exercises are appropriate to maintain glycemic status; in this study, only 29.5% had a good awareness score, and among the respondents regarding occupation, those who were unemployed out of 5.8% had good awareness only, while retired and employed workers had 82.9% and 44.5% had good awareness scores respectively. Unemployed participants have more probability of getting diabetes as compared to employed and retired participants. The findings of this study are similar to those of Thamarai Rajappa²⁰. Which also documented that only 29% had good awareness scores and sedentary habits have a greater chance of developing diabetes as compared to workers with different job descriptions; showing an association between employment status and awareness of physical exercises in diabetes management was commenced to be significant. This consistent finding could be due to more socialization, interaction with different people, and information accessibility. In contrast to the study by Man Kin Wong, no association between increasing age, gender, and physical exercise awareness was assessed, which might be due to the difference in sample size, limited capacity of the study setting within an allocated time interval, or due to the inclusion of all types of diabetes²³. Another research finding also contrasts with this study, which shows no correlation between age groups and awareness, and no differences were observed about gender and awareness as well²⁴. Overall awareness level among this study respondents was that only 29.5% had good awareness of physical exercises, 36.8% had fair awareness, and 33.6% needed better awareness of physical exercises. Among the patients with a duration of diabetes less than five years and between 5-10 years and above ten years, 7%, 4%, and 54% had good awareness scores, respectively. This shows that, as the duration of diabetes increases, the awareness score about physical exercises in glycemic control also increases. An association between diabetes duration and awareness was found to be significant, consistent with the study of CK. Priyanka Raj et al.²⁵. This consistent direct relation might be due to enhanced literacy levels or information perceived as the disease progresses. In this study, most patients were unaware of the benefits of being physically active and needed more information concerning the type, duration, and frequency of physical exercises. The proficiency of doctors was also analyzed by asking questions regarding referrals and providing physical training exercises. For most study participants, 93.2% stated that their physician never referred them to any exercise professional. They have only received ambiguous guidance from health care practitioners lacking general awareness of interventional possibilities as same findings stated by P. Ranasinghe et al.²⁶. In his article culminating the lack of awareness provided by health care professionals, which leads to poor adherence to exercises, might be due to inadequate advice given by physicians as the majority of the physicians dealing with diabetes patients do not have any expertise in the field of exercise recommendations. The majority (36.8%) of the study participants were found to have fair knowledge in this study, which is in contrast to the result of a study done in North Ethiopia²⁷. where the participants were found to have good knowledge about diabetes mellitus. The difference in knowledge may be due to variations in the literacy of study patients, lack of communication and counselling, and the unavailability of information on diabetes due to some barriers. The study of Sari Alhaik aimed to evaluate the level of knowledge about Self-care in diabetes mellitus patients. In the survey, the average level of self-care awareness among diabetes mellitus patients was moderate, 52.28%. Most participants had supreme knowledge about meals 70.2% and exercise awareness at the 1 west level 42.5%. Understanding diabetes self-care has a significant association between age, education level, and years of diabetes, which is consistent with this study's findings²⁸. There is a restriction existing in this study, which includes the need for more availability of sufficient cases due to sample size results from limits in the generalized ability because data is collected only from a single hospital unit, not depictive of the entire population with type-2 DM.

CONCLUSION

The present outcomes demonstrated the commonness of the need for more awareness regarding physical exercises for the management of type-2 DM. Educational programs on the significance

of physical exercises should be planned for a healthier lifestyle to share an even sacred place in managing type-2 DM. The outcomes suggest that physicians working in any health care centre should also focus on the importance of non-pharmacological treatment through a referral process.

AUTHORS' CONTRIBUTION:

The following authors have made substantial contributions to the manuscript as under:

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