

The Role of Physical Therapists in Fighting the Type 2 Diabetes Epidemic Patients Attending Primary Healthcare Centers in Makkah City, Saudi Arabia in 2022

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Abstract:

Background: Worldwide, 6% of the population are affected by diabetes mellitus and the projection for the year 2030 is 438 million. With Saudi Arabia countries suffering the bulk of the total diabetes epidemic, the Kingdom of Saudi Arabia is among the countries with the highest prevalence of diabetes mellitus (23.1%). People diagnosed with diabetes, on average, have medical healthcare expenditures that are ten times higher (\$3,686 vs. \$380) than what expenditures would be in the absence of diabetes. Medical nutritional therapy is an important aspect of diabetes care, there is an increasing, awareness of breakfast skipping, late dinner and meal contents on diabetes control In 2017, the total prevalence of diabetes was estimated to be 422 million people worldwide. Due to the aging population and continued increase in obesity rates, the prevalence is expected to rise to 592 million by 2035.

Aim of the study: assessment od role of physical therapists in fighting the Type 2 Diabetes Epidemic patients attending primary healthcare centers in Makkah City, Saudi Arabia in 2022

Methods: cross-sectional descriptive study conducted at among the Type 2 Diabetes Epidemic patients attending primary healthcare centers in Makkah City in 2022. This commentary, describes the type 2 diabetes epidemic and the health impact of diabetes type 2 and diabetes-related complications, highlights the physical therapist's role as frontline provider. Our total participants were (300)

Results: shows that most of the participants (35.0%) were in the age group 35-44 years follow by the (28.0%)were in the age >65 years. Regarding the gender the majority of them were male (72.0%) while female(38.0%), also regarding level of education the majority of participant are Intermediate school were(42.0%) High school education were(23.0%).

regarding Job the majority of participant are Not working were(41.0%) while house wife were(18.0%). Regarding Marital status the majority of participant are Married were (66.0%) while Single were(19.0%).

Conclusion: Diabetes Type 2 and its complications are major causes of morbidity and mortality and contribute significantly to rising health care costs. The dramatic increase in diabetes Type 2, paired with high rates of diabetes Type 2 complications, will contribute to higher health care costs that are only made worse by high rates of modifiable risk factors, such as obesity and physical inactivity. Physical therapists play a central role in the multidisciplinary health care team.

Keywords: Type 2 Diabetes, Epidemiology, Physical therapist, Fighting ,PHC in Makkah City.

Introduction

Over the past decade the global prevalence of type 2 diabetes has increased markedly. In 1995 an estimated 135 million people worldwide had diabetes 1 and by 2000 this figure increased to an estimated 171 million people worldwide [1] . Furthermore, this upward trend is predicted to continue or even accelerate over the coming decades, with conservative estimates projecting that by 2030 the global prevalence of type 2 diabetes will exceed 350 million, and that it will be the seventh leading cause of death worldwide [2,3]

Diabetes has emerged as one of the most serious and common chronic diseases of our times, causing life threatening, disabling and costly complications, and reducing life expectancy. [4] The global prevalence of diabetes had reached pandemic proportions with the 9th edition of the IDF reporting a prevalence of 9% (463 million adults) in 2019. [5]

The rising prevalence of diabetes has been attributed principally to the ageing of populations. However, decreasing mortality among those with diabetes due to improving medical care as well as increases in diabetes incidence in some countries resulting from increasing prevalence of diabetes risk factors, especially obesity, are also important drivers of higher prevalence. [6]

Diabetes is a serious disease that has been identified by world leaders as 1 of 4 non-communicable diseases to be targeted for action.[7] Worldwide prevalence of diabetes nearly quadrupled from 108 million persons in 1980 to 422 million in 2014, while the age-adjusted prevalence nearly doubled from 4.7% to 8.5% during the same period.[8] As it has in the past 2 decades, the prevalence of diabetes is expected to rise further as the population ages and adult obesity rates continue to increase.[9] Implementation of effective interventions to delay the onset of diabetes and reduce the effects of established diabetes is desperately needed[10]. Although a substantial proportion of the increase in type 2 diabetes has been attributed to increased levels of obesity and other lifestyle changes, speculation exists as to whether the Saudi population has a genetic predisposition to type 2 diabetes. Part of the rationale behind this speculation is the fact that Saudi Arabia has one of the highest rates of consanguineous marriages in the world[11] It is estimated that up to 80% of patients referred to outpatient physical therapy have diabetes, pre diabetes, or diabetes risk factors,[12] providing the perfect opportunity for physical therapists to intervene. Diabetes has the potential to negatively impact every tissue important for maintaining optimal function of the body's systems required to produce human movement, collectively known as the human movement

system (eg, musculoskeletal, nervous, endocrine, pulmonary, cardiovascular, integumentary). It is vital that physical therapists assert their role as front-line providers for patients with or at risk for diabetes.[13]

Given the impact of diabetes on health and well-being, it is vital that physical therapists assert their role as front-line providers for patients with or at risk for diabetes[14]. We therefore asked, “What is the role of physical therapists in fighting the diabetes epidemic”?

We propose that physical therapists intervene in 3 important ways. **First** Provide Guidance on Physical Activity Participation for Patients Who Have or Are at Risk for Diabetes . **Second** Regularly Screen Patients for Risk Factors for Diabetes and Diabetes-Related Complications . **Third** Advocate Regular Physical Activity as a Key Component of the Treatment of Chronic Diseases in All Patient Interactions . The increasing prevalence of physical inactivity and poor diet are the major causes of worldwide epidemics of overweight and obesity and consequently type 2 diabetes. When the balance is disturbed, and energy intake is higher than its expenditure throughout a certain period, overweight and obesity develop (15). Physical activity is effective in reducing abdominal fatness and protects against the weight gain typical of middle age (16). Physical activity might delay or prevent glucose intolerance turning into diabetes and produce significant improvements in blood sugar level(17).

Literature Review

Consanguinity is known to increase the risk of a number of polygenic disorders and a study by Fletcher et al (2018) has suggested that a correlation exists between consanguinity and familial aggregation of type 2 diabetes in Saudi Arabia [18] .

Sudharsanan, et al.(2018) report that countries with large populations such as China, India, Pakistan, and the USA contribute the most to the total number of people with diabetes. However, despite the WP having a larger total population, the greatest absolute growth in the number of people with diabetes over time is expected to take place in the SEA and MENA Regions. This reflects the variation in forecasted population changes in these regions in terms of greater mean age, overall population size and increasing proportions of people living in cities. [19]

Alsomali, et al.(2019) found in study Over the last few decades, the tremendous surge in socioeconomic growth probably contributed to unhealthy dietary habits in Saudi Arabia. In addition to the consumption of high-calorie traditional food (e.g. dates), excessive consumption of high calorie and fat based diets (e.g. fast food) is very common in Saudi Arabia [20].

The most of systematic review has shown that there is generally low Knowledge about the Risk of Type 2 Diabetes among Adults with Visiting the attending primary healthcare also about the risk factors and its complications among the Saudi population in particular . Most diabetes mellitus patients had low to moderate knowledge scores in Riyadh, Jeddah, Al Hasa, Al-Khobar, and Mecca. Also unexpectedly, health professionals in Saudi Arabia also had low knowledge scores about diabetes mellitus especially type 2.[21,22]

Dendup et al.(2018) report that in the United States, the risk of developing type 2 diabetes was higher among those in lower socioeconomic positions, including lower levels of education, occupation, and income.³ American Indians/Alaska Natives have the highest

prevalence of diabetes, followed by non-Hispanic blacks and Hispanics. African Americans are more likely to develop diabetes than white and Asian.[23]

Moreover, the management of diabetes and its risk factors is still suboptimal [24]. Some clinical studies from Saudi Arabia, it is reported that not only the Saudi patients have poor knowledge of diabetes [25], but the physicians at primary care centres also have suboptimal awareness of proper diabetes management [26]

demonstrated by Bawazeer et al.(2021)Due to westernization of the Saudi Arabian diet, the increased intake of high levels of fat, free sugars, sodium and cholesterol have become much more common in the daily dietary pattern [27,28]. Whicher et al.(2020) reported a lower level of leisure time physical activity among the Saudis. An increase in the prevalence of T2DM is also observed during the same period, which is attributed to the dramatic changes in lifestyle, in addition to genetic predisposition of Saudi people to diabetes, and a high prevalence of consanguineous marriages [29].

Rationale

Although more intense and longer durations of physical activity correlate directly with improved outcomes, even small amounts of physical activity provide protective health benefits as part of the multidisciplinary team, physical therapists should be front-line providers in diabetes type 2 prevention and management. Physical therapists should be the provider of choice to assist patients who have been diagnosed with diabetes type 2 or who are at risk for diabetes in achieving their physical activity goals. Physical therapists' education provides both broad and in-depth content covering the pathophysiology of diabetes and associated comorbidities, screening for and treatment of diabetes complications, and prescription of physical activity for individuals with specific and important limitations of the human movement system that moderate physical activity tolerance. The researcher noticed that most diabetic type 2 patients wrongly think that physical activity is harmful to them and tend to avoid exercise for fear of hypoglycemia.

Aim of the study:

To assessment the role of physical therapists in fighting the Type 2 Diabetes Epidemic patients attending primary healthcare centers in Makkah City, Saudi Arabia in 2022 .

Objective:

An observational study in Saudi Arabia indicated assessment the physical therapists in fighting the Type 2 Diabetes epidemic patients attending primary healthcare centers in Makkah City, Saudi Arabia in 2022

Methodology:

Study design:

This study is descriptive cross-sectional study was conducted among 300 of the Type 2 diabetes among role of physical therapists in fighting the Type 2 Diabetes Epidemic patients attending primary healthcare centers.

Study Area

The study has been carried out in the city of Makkah Al-Mokarramah Makkah is the holiest spot on Earth. It is the birthplace of the Prophet Mohammad and the principal place of the pilgrims to perform Umrah and Hajj. It is located in the western area in Kingdom of Saudi Arabia and called the Holy Capital. Contains a population around 2 million. This study was conducted among the patients attending primary healthcare centers. in Makkah, Saudi Arabia. During the April to June, 2022, and it reflects a diversified demographic profile with a considerable portion of the population comes from rural descent, while others come from an urban one. This difference translates into biological, socioeconomic and lifestyle differences in the Makkah population.

Study Population

The study has been conducted regarding Role of Physical Therapists in Fighting the Type 2 Diabetes Epidemic patients attending primary healthcare centers Makkah City, Saudi Arabia in 2022 During the April to June, 2022 the period of study in 2022..

Selection criteria:

Inclusion criteria

- Type 2 Diabetes Epidemic patients
- Diagnosis of Type 2 diabetes.
- Attending in primary health care center.
- Resident in Makkah province.
- Sound cognitive abilities
- All nationalities
- Both males and females.

Exclusion criteria:

- Pediatric patients.
- Patients with severe cognitive impairment such as dementia or delirium.
- Patients unwilling to give written consent to participate.

Sample size

The type 2 diabetes among role of physical therapists in fighting the Type 2 Diabetes Epidemic patients attending primary healthcare centers Makkah City, Saudi Arabia in 2022. The sample size has been calculated by applying Raosoft sample size calculator based on (The margin of error: 5%, Confidence level: 95%, and the response distribution was considered to be 20%) accordingly the Sample size is (300) of the type 2 Diabetes Epidemic patients with attending in primary health care center Makkah City, Saudi Arabia in 2022 (male and female) after official communication with the primary health care center Makkah City, and adding 10 more to decrease margin of error. After adding 5% oversampling, the minimum calculated sample has been 300. Computer generated simple random sampling technique was used to select the study participants.

Sampling technique:

Systematic random sampling technique is adopted. After that, by using random number generator, then simple random sampling technique has been applied to select the participant. Also, convenience sampling technique will be utilized to select the participants in the study. By using systematic sampling random as dividing the total Type 2 Diabetes Epidemic patients by the required sample size; (300).

Data collection tool

The data was collected through a questionnaire that was developed by the researchers after reviewing the related literature. It was translated into simple Arabic language to suit the understanding level of the entire study subjects. Self-administrated questionnaire was used. The questionnaire contains four sections. First section: containing items related to demographic data as age, sex, marital status, and occupation. The second section questions to assess the diagnosis of Pre diabetes and Diabetes. The third section consisted of questions of risk factor and Complications from diabetes of Type 2 Diabetes.

Data collection technique:

Researcher has been visiting the PHC Makkah City, Saudi Arabia in 2022. The city has seven sectors of PHC divided into three inners and four outers (Al-Zahir, Al-Adel, Al-Kakyeea, Al-Sharaee, Al-Jamom, Al-Kamel, and Kolese). Each sector consists of a group of Primary Health Care Centers. The researcher is concerned with one of the inner PHC of Al-kakyeea sector called " Al-Zahir PHCC". After getting the approval from the ministries of health . The researcher has been obtained permission from participants. After the arrival of the participants has been explained the purpose of the study to all participants attending

Data entry and analysis:

The data were coded and introduced to the Statistical Package of Social Sciences (SPSS, version 24). The data were analyzed to present the findings in descriptive and inferential statistics. The descriptive statistics include frequencies and percentages for categorical variables and standard deviations were used to summarize numerical data. The significant associations between demographic and background variables were detected at < 0.05 significance level.

Pilot study:

A pilot study has been conducted in the same sector due to the similarity to the target group using the same questionnaire to test the methodology of the study. As a feedback, the questionnaire has been clear and no defect has been detected in the methodology

Ethical considerations:

Permission from the directorate of health , verbal consents from all participants in the questionnaire were obtained. All information was kept confidential, and results will be submitted to the department as feedback. The researcher described the aim and objectives of the study for the residents. No names were required to assure confidentiality of data, and all information was kept confidential only for this study's purposes.

Budget: Self-funded**Table 1: Distribution of Socio-demographic characteristics of participant in the study about physical therapists in fighting the type 2 diabetes epidemic (n=300)**

	N	%
Age (year)		
35-44	105	35
45-54	66	22
55-64	45	15
>65	84	28
Gender		
Male	216	72
Female	84	28
Nationality		
Saudi	264	88
Non-Saudi	36	12
Educational level		
Primary school/below	57	19
Intermediate school	126	42
High school	69	23
University	30	10
Postgraduate	18	6
Job		
Governmental employee	51	17
Private sector employee	45	15
Professional worker	27	9
House wife	54	18
Not working	123	41
Marital status		
Single	57	19
Married	198	66
Divorced	36	12
Widowed	9	3
Monthly family income (SR)		
<5000	96	32
5000-10000	120	40
>10000	84	28

Table 1 shows that most of the participants (35.0%) were in the age group 35-44 years follow by the (28.0%) were in the age >65 years. Regarding the gender the majority of them were male (72.0%) while female (28.0%), also regarding level of education the majority of participant are Intermediate school were (42.0%) High school education were (23.0%). regarding Job the majority of participant are Not working were (41.0%) while house wife

were(18.0%). Regarding Marital status the majority of participant are Married were (66.0%) while Single were(19.0%). Regarding the Monthly family income (SR) the majority of participant between 5000-10000 were(40.0%) follow by <5000 were(32.0%).

Table 2 Distribution of diagnosis of Pre diabetes and Diabetes

	Normal		Pre diabetes		Diabetes	
	N	%	N	%	N	%
Fasting plasma glucose, mg/dL	90	30	36	12	174	58
2-h plasma glucose after 75-g OGTT, mg/dL	45	15	45	15	210	70
Random plasma glucose, mg/dL	57	19	63	21	180	60
Glycated hemoglobin, %	60	20	33	11	207	69

Abbreviation: OGTT, oral glucose tolerance test

Table (2) shows the distribution of diagnosis of Pre diabetes and Diabetes. While regarding the Fasting plasma glucose, mg/dL, the most of participant from Diabetes were (58.0%) while Normal were (30.0%) while Pre diabetes were (12.0%). Regarding the 2-h plasma glucose after 75-g OGTT, mg/dL, the most of participant from Diabetes were (70.0%) while Pre diabetes and Normal were (15.0%), while regarding the Random plasma glucose, mg/dL, the most of participant from Diabetes were (60.0%) while Normal were (19.0%) while Pre diabetes were (15.0%). While regarding the Glycated hemoglobin, %, the most of participant from Diabetes were (69.0%) while Normal were (20.0%) while Pre diabetes were (11.0%)

Figure (1) Distribution of diagnosis of Pre diabetes and Diabetes of participant in the study

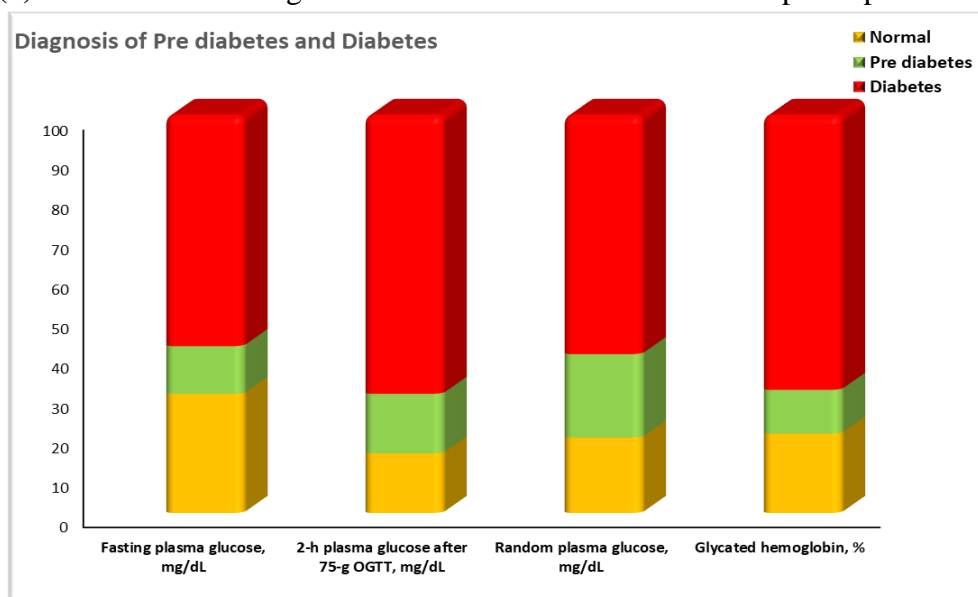


Table 3 Distribution of risk factors among patients with type 2 diabetes of participant in the study .

Risk factor	No	%
Duration of DM Group		
<5 years	135	45
5-14 Y	93	31
>15 y	72	24
Chronic disease		
Asthma	135	45
High blood pressure	69	23
High fat and cholesterol	180	60
Heart diseases	126	42
Arthritis or other rheumatic diseases	57	19
What type of treatment do you use for diabetes		
Tablets	75	25
Tablets with insulin	111	37
Insulin	114	38
Complications from diabetes		
Yes	75	25
No	225	75
Physical activities or exercise		
Yes	135	45
No	165	55

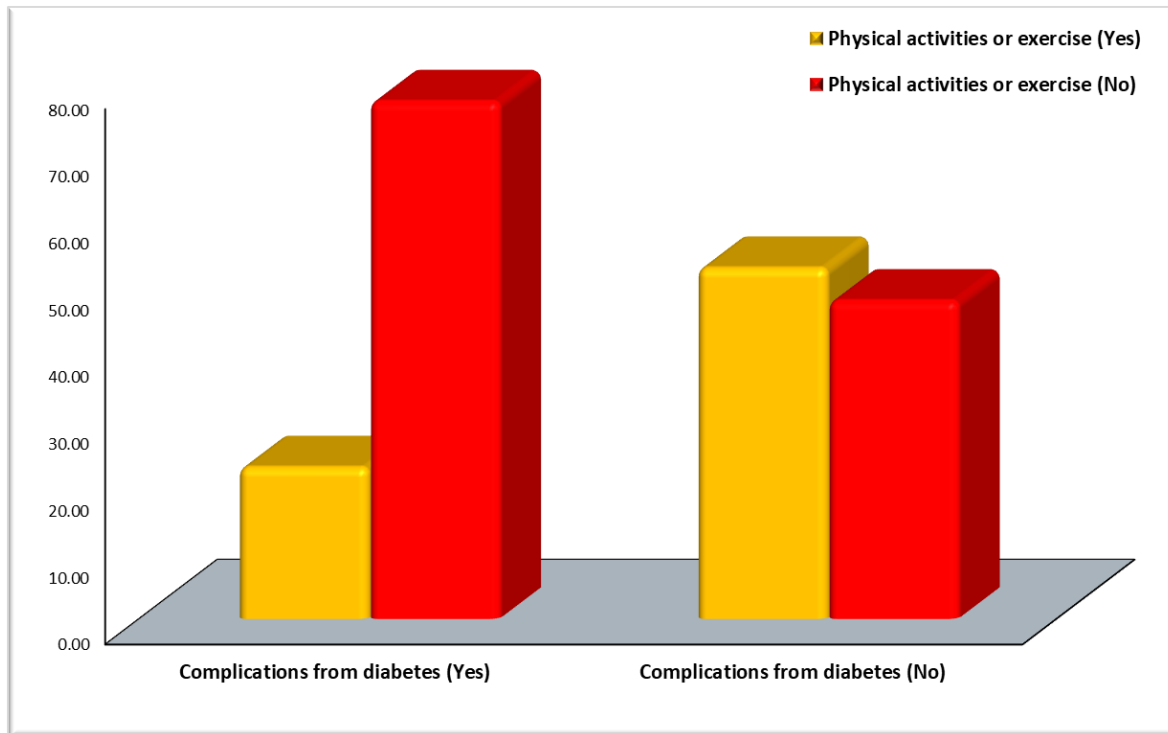
Table (3) shows the risk factors among patients with type 2 diabetes of participant in the study, regarding the Duration of DM Group, the most of participant in <5 years were (45.0%) while 5-14 years were (31.0%) while >15 years were (24.0%). Regarding the Chronic disease the most of participant in High fat and cholesterol were (60.0%) while asthma were (45.0%), while heart diseases were (42.0%), regarding the what type of treatment do you use for diabetes, the most of participant in insulin were (38.0%) while tablets with insulin were (37.0%). While regarding the Complications from diabetes the most of participant answer No were (75.0%) while Yes were (25.0%), regarding the physical activities or exercise the most of participant answer No were (55.0%) while Yes were (45.0%) .

Table 4 Distribution of complications from diabetes of participant in the study

		Complications from diabetes					
		Yes		No		Total	
		N	%	N	%	N	%
Physical activities or exercise	Yes	17	22.67	118	52.44	135	45
	No	58	77.33	107	47.56	165	55
	Total	75	100.00	225	100.00	300	100
Chi-square	X ²	18.967					
	P-value	<0.001*					

Table 4 Regarding distribution of the patient's with of complications from diabetes of participant in the study show a significant relation between the Complications from diabetes and physical activities or exercise while P-value <0.001 and X^2 18.967, regarding the physical activities or exercise in YES the most of participant answer No were (52.44%) while Yes were(22.67%) while regarding Physical activities or exercise in NO the most of participant answer Yes were (77.33%) while No (47,56%)

Figure (2) Distribution of complications from diabetes of participant in the study



Discussion

The current assessment surveyed a large number of participants, 300 participants to assessment role of physical therapists in fighting the Type 2 Diabetes Epidemic patients attending primary healthcare centers in Makkah City, Saudi Arabia in 2022

Although the role of physical therapists in fighting the Type 2 Diabetes Epidemic patients attending primary healthcare centers very important but the prevalence of diabetes mellitus (DM) is high among populations in Makkah City, patients often lack the role of physical therapists in fighting the Type 2 Diabetes Epidemic patients [30]. There may be a gap between knowledge about the risk of Type 2 Diabetes among patients with Visiting the PHC, despite the high prevalence . Cross-sectional studies have suggested that the prevalence of T2DM in Saudi ranges from 10% to 30%[23].This is the first study to assessment role of physical therapists in fighting the Type 2 Diabetes Epidemic patients attending primary healthcare centers in Makkah City .

In the present study, shows that most of the participants (35.0%) were in the age group 35-44 years follow by the (28.0%)were in the age >65 years. Regarding the gender the majority of them were male (72.0%) while female(38.0%), also regarding level of education the majority of participant are Intermediate school were(42.0%) High school education

were(23.0%). regarding Job the majority of participant are Not working were(41.0%) while house wife were(18.0%). Regarding Marital status the majority of participant are Married were (66.0%) while Single were(19.0%(. Regarding the Monthly family income (SR) the majority of participant between 5000-10000 were(40.0%) follow by <5000 were(32.0%). (See table1)

Diabetes mellitus is a group of chronic metabolic conditions all characterized by high level of Fasting plasma glucose, mg/dL and show distribution of diagnosis of Pre diabetes and Diabetes of participant in the study (See Figure 1)

There are no modifiable and modifiable risk factors for development of type 2 diabetes (Table 3). No modifiable risk factors include age, sex, socioeconomic position, race/ethnicity, genetic predisposition, history of gestational diabetes, and low birth weight.[31,32] While European studies show a higher risk of diabetes in men compared with women, this was not consistently observed in the United States.[33] similar in the United States, the risk of developing type 2 diabetes was higher among those in lower socioeconomic positions, including lower levels of education, occupation, and income. American Indians/Alaska Natives have the highest prevalence of diabetes, followed by non-Hispanic blacks and Hispanics. African Americans are more likely to develop diabetes than white and Asian individuals.[34] For American Indians, the rates of diagnosed diabetes range from 5.5% to 33.5% in different tribes and population groups.[22] Although genetic factors also play a role, primary risk factors appear to be those that are not genetic.[30]

Regarding distribution of the patient's with of complications from diabetes of participant in the study show a significant relation between the Complications from diabetes and physical activities or exercise while P-value <0.001 and X² 18.967, regarding the physical activities or exercise in YES the most of participant answer No were (52.44%) while Yes were(22.67%) while regarding Physical activities or exercise in NO the most of participant answer Yes were (77.33%) while No (47,56%)(See table 4). Physical activity is an effective “medicine” for diabetes and other chronic diseases.[35]

Powell, et a.(2018) reported Given that patients likely have 2 or more comorbidities,13 the benefit of physical activity may go far beyond that of treating diabetes alone. Benefits of physical activity include improved glucose control, insulin sensitivity, maximum rate of oxygen consumption, and blood pressure.[36] The improvements may require modifications to the patient’s pharmacologic management plan. Therefore, the physical therapist should facilitate patient follow-up visits with the primary care physician when needed. Important information to communicate with the physician includes glucose monitoring logs, resting and exercise blood pressure and heart rate, and key physical performance measures. A full review of the effects of physical activity on diabetes and other chronic diseases is available.84

Conclusion

Physical therapists’ education provides both broad and in-depth content covering the pathophysiology of diabetes and associated comorbidities, screening for and treatment of diabetes complications, and prescription of physical activity for individuals with specific and important limitations of the human movement system that moderate physical activity tolerance Patients may not be regularly referred to physical therapists for guidance on the development of physical activity programs for chronic conditions, such as diabetes type 2

Only low percentage of referrals to physical therapy in the Saudi Arabia patients attending primary healthcare centers were for diabetes as the primary health condition to be treated. While it is true that the vast majority of patients seen in outpatient settings have diabetes or are at risk of diabetes.

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