Original Article

Physical Activity Level and Related Factors of Diabetic Adults According to Gender

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Abstract

Purpose: This study was carried out as a comparative and descriptive study in order to investigate the physical activity level and related factors of individuals withtype 2 diabetes according to gender.
Methods: Data of the study has been collected in theEndocrinology Polyclinic of İzmir Katip Celebi University Atatürk Training and Research Hospital between June and November 2012. The study population consists of 413 individuals with type 2 diabet who meet the inclusion criteria of the study and who has consented to be part of the study. Personal Information Form and International Physical Activity Questionnaire have been used as data collection tools. T-test, Chisquare test, Pearson Correlation analysis and Mann Whitney U test, regression analysis have been used for data analysis.
Results: The activity level of 54.2% females and 41.8% males were insufficient. The physical activity scores were found to be 1265.81±1063.97 MET-min/ week for females and 1601±1006.23 MET-min/ week formales. As the income status of females and males with diabetes decreases, physical activity scores decreases. As body mass index of females decreases, physical activity scores decreases. At the end of the study, it has been seen that physical activity level of the most of women and men with type 2 diabetes isn't enough. The level of performing physical activity is lower in women than in men.
Conclusion: According to the results of the study, it has been proposed that the importance of physical activity in diabetes education should be emphasized, the reasons why physical activity level is low should be investigated and studies should be conducted to solve this problem.
KeyWords: Diabetes Mellitus, physical activity, gender, related factor

Introductıon

Diabetes is a health problem which increases all around the World rapidly and which increasingly affects more people every day. Whereas the number of adult (between 20-79 ages) diabetic people was indicated as 415 millions in the World in 2015 (8.8 %), this number is predicted to reach 642 millions (10.4 %) in 2040. People with diabetes are at higher risk of developing a number of disabling and lifethreatening health problems than people without diabetes (IDF 2015). Complications because of the illness can be prevented / delayed with the diabetic individual managing his illness well. Managing diabetes includes monitoring, pharmacotherapy, medical nutrition, diabetes training and physical activity (ADA 2016). Although regular physical activity's making glisemic control good is emphasized in different studies, it has shown that most diabetic individuals are not physically active (Genevieve *et al*. 2008, Helmerhorst *et al.* 2009, Plotnikoff *et al.* 2010, Nelson *et al.* 2002).

According to Orem's theory of lack of self care, physical activity is influenced by the biological and psychosocial characteristics, age, sex, health situation, sociocultural characteristics, developmental situation, health care system and environmental situation of the individual and the sufficiency, suitability and approachability of the sources (Fawcett 2005). In the studies analysing the relation between physical activity and sex, it was determined that the level of physical activity was higher in men than women (Oyewole *et al.* 2014, Fan *et al.* 2014, Heiss & Petosa 2014,

Greef *et al.* 2011, Vural *et al.* 2010, Mabry *et al.* 2009, Morrato *et al.* 2007, Plotnikoff *et al.* 2006, Savcı *et al.* 2006). As for the same sex groups, it was seen that the physical activity changed according to the socioeconomical status and level of education (Nelson *et al.* 2002, Morrato *et al.* 2007).

A nurse plays a supportive role in fulfilling the self care needs of the individuals with training and guiding. Providing the physical activity which is an important self care behaviour in diabetic individuals is the nurse's responsibility. It is thought that analysing the level of physical activity and its related factors in both sexes will be directive in nursing invasions and form data for the nurses to know the group they serve and to be able to plan the suitable invasions.

This study was carried out as a comparative and descriptive study in order to investigate the physical activity level and related factors of individuals with type 2 diabetes according to gender.

Methodology

The research was made as a definitive and comparative research. Individuals who applied to endocrinology policlinic between June and November 2012, between 18 – 65 ages diagnosed for Type 2 Diabetes Mellitus (T2DM) at least six months ago without orthopedical disabilities affecting their physical functions made the sample of the research.

Personal Information Form and International Physical Activity Questionnaire (IPAQ)were used as data collection tools in the research. The form was formed in order to collect information about the diabetic individuals. Information was collected about each diabetic individual's age, sex, height, weight, HbA1C value, T2DM illness time, illnesses other than T2DM, perception of health, level of education, working status, income status, marital status, accompanying people, environment, physical activity training and believing in the effectiveness of physical activity. The form was based on the literature about Self Care Deficiency Nursing Theory and Diabetes Mellitus. It was designed by the researcher (Fawcett 2005, ADA 2016). There are total 23 questions with 9 of them open-ended and 15 of them closed-ended in the form.

The International Physical Activity Questionnaire (IPAQ) used for determining the physical activity levels of the individuals was developed by Craig and his friends in 2003 (Craig *et al.* 2003). In its study for validity and reliability in Turkey conducted by Ozturk with university students in 2005, its test repeating test reliability was found r=0.69; its simultaneous validity correlation coefficent was found r=0.66 and its criteria validity was found r=0.30. In its factor analysis, it was determined that the short form was divided into four factors and all weight of the factor loads indicated a correlation in the positive direction. Its relation between the short form and Caltrac accelerometer was determined as r=0.30 (p=0.008) (Ozturk 2005).

IPAQ short form questionnaire consists of seven questions for determining the time of heavy physical activity, moderate physical activity, walking and daily time spent sitting (without moving) within the last seven days.

Weekly time of each activity (minutes) and the Metabolic Equivalent (MET) energy values formed for UFAA were multiplied in the calculation of energy consumptions about physical activity. Level of physical activity is determined in three categories according to the MET method:

Inadequate level of physical activity $0 <$ Total MET-minutes week < 600

Low level of physical activity $600 \leq$ Total MET-minutes week < 3000

Adequate level of physical activity (benefical in terms of health) $3000 \geq$ MET-minutes/week

The analysis of the data was made in computer environment using SPSS 15.00 software programme by the researcher. Biological and psychosocial characteristics of the diabetic men and women were given in numbers and percentages and moreover, chi square and t tests were made. Chi square test was used for analysing the physical activity levels of the Type 2 diabetic individuals in accordance with their sexes. T test was used for obtaining the physical activity scores of the Type 2 diabetic individuals in accordance with their sexes. T tests, Mann-Whitney U tests, Pearson Correlation analyses and regression analyses were made for analysing the total physical activity scores of the men and women according to their biological and psychosocial characteristics.

Results

There are the biological and psychological characteristics of the diabetic individuals in

Table 1. 27 % of the Type 2 diabetic individuals are men and 73 % of them are women. 66 % of the Type 2 diabetic men and 52 % of the Type 2 diabetic women use only insulin. 47 % of the diabetic men and 49 % of diabetic women define their health status as ‘’moderate’’. 48 % of the diabetic men and 57 % of diabetic women graduated from primary school. 71 % of the men and 89 % of women do not work. 58 % of the men and 44 % of the women have income equal to their expenses. 47 % of the male individuals and 50 % of the female individuals have regular diabetes check once in 3-6 months. 84 % of the participating men and 80 % of the participating women are married. 60 % of the male participants and 61 % of the female participants live in apartment buildings. 77 % of the men and women live in the province center.

76 % of the male participants and 74 % of the female participants expressed that they believed in the influence of physical activity in diabetes control. 38 % of the diabetic men and women were trained for physical activity. Average age of the Type 2 diabetic men is 54 and the average age of the Type 2 diabetic women is 53. The body mass index (BMI) averages of the men are 28 kg/ m^2 and the BMI average of the women are 31 kg/m^2. The average of the HbA1c values is 8 % in women and it is the same in men. Men have had diabetes for 10 years and women have had diabetes for 8 years in average (Table 1).

Although the 413 individuals who participated in the study completed the Personal Information Form, six individuals answered the questions wrongly in IPAQ or did not complete the questionnaire at all. Because of this reason, the number of the male individuals was accepted as 110 and the number of the female individuals was accepted as 297.

In the study, whereas the 5.5 % of the male individuals were active at adequate level, 4.7 % of the female individuals are active at adequate level. The percentage of the individuals whose activity was inadequate was 41.8 % in the men and it is 54.2 % in the women (Table 2).

Men’s vigorous physical activity, moderate physical activity, walking and total physical activity total scores were found higher than the women’s. The men’s vigorous physical activity average is 608.53±523.77MET-minutes/week and the women’s vigorous physical activity average is 471.44±451.73 MET-minutes/week ($p\leq0.05$). As for the moderate level physical activity scores, the men’s average score is 459.40±395.02 MET-minutes/week and the women’s average score is 289.27±282.46 MET-minutes/week ($p\leq0.05$). In the average scores of walking, the men’s average score is 549.57±370.42 MET-minutes/week and the women’s average score is 457.72±399.35 MET-minutes/week ($p\leq0.05$). The men’s total physical activity score is 1601±1006.23 MET-minutes/week and the women’s total physical activity score is 1265.81±1063.97 MET-minutes/week ($p\leq0.05$) (Table 3).

The total physical activity average scores of the men (1430.31±967.28 MET-minutes/week) who use insulin within Type 2 diabetes treatment ways are higher than the women’s scores (1098.96±841.47 MET-minutes/week) in a meaningful way ($p\leq0.05$) (Table 4).

When the average score of the men who perceived their health as ‘’good’’ was found 1893.45±977.90 MET-minutes/week in the study, the average score of the women who perceived their health as ‘’good’’ was found 1388.95±1296.01 MET-minutes/week ($p\leq0,05$). The average score of the male individuals with graduated from secondary school or with higher level of education is 1885.28±973.49 MET-minutes/week. The average score of the female individuals graduated from secondary school or with higher level of education is 1455.15±934.54 MET-minutes/week ($p\leq0.05$).

The total physical activity score of the diabetic male individuals who did not work was found 1537.76±1020.33 MET-minutes/week. The total physical activity score of the diabetic female individuals who did not work was found 1236.77±1073.34 MET-minutes/week ($p\leq0.05$). When the income status is regarded, the score of the men whose ‘’income is lower than their expenses’’ is 1548.82±992.26 MET-minutes/week. The score of the women whose ‘’income is lower than their expenses’’ is 1206.49±852.94 MET-minutes/week ($p\leq0.05$). Total score of the men who defined their income as ‘’equal to their expenses’’ was found 1640.30±1043.12 MET-minutes/week. Total score of the women who defined their income as ‘’equal to their expenses was found 1257.58±963.54 MET-minutes/week ($p\leq0.05$).The physical activity score of the individuals who are not regularly checked once in 3-6 months is 1368.63±995.19 MET-

minutes/week in men and it is 1052.81±755.74 MET-minutes/week (p≤0.05) in women.

Table 1: Biological and Psychosocial Characteristics of Type 2 Diabetic Men and Women

Biological and Psychosocial Characteristics		Women n=301 (%)	Men n=112 (%)	x^2	p
Type of treatment[1]	OAD	122 (40.5)	29 (25.9)		
	Insulin	157(52.2)	74 (66.1)	7.666	**.022****
	OAD + Insulin	22 (7.3)	9 (8)		
Comorbidity[1]	Yes	187 (62.1)	67 (59.8)	.183	.669
	No	114 (37.9)	45 (40.2)		
Perception of health[1]	Good	110 (36.5)	42 (37.5)		
	Moderate	148 (49.2)	53 (47.3)	.122	.941
	Bad	43(14.3)	17 (15.2)		
Education[1]	No literacy	40 (13.3)	4 (3.6)		
	Primary school	172 (57.1)	54 (48.2)	16.621	**.000****
	High school and more	89(29.6)	54 (48.2)		
Working status[1]	Employed	33(11)	32 (28.6)	22.093	**.000****
	Unemployed	268 (89)	80 (71.4)		
Household income[1]	Income is lower than their expenses	152 (50.5)	37 (33.0)		
	Income equal to their expenses	133 (44.3)	65 (58)	10.398	**.005****
	Income is higher than their expenses	16 (5.3)	10 (8.9)		
Regular diabetes check once in 3-6 months[1]	Yes	151 (50.1)	53 (47.3)	.264	.607
	No	150 (49.9)	59 (52.7)		
Marital status[1]	Married	243(80.7)	95 (84.8)	.919	.338
	Single	58 (19.3)	17 (15.2)		
Type of housing[1]	Apartment	184 (61.1)	68 (60.7)	.006	.939
	Detached house	117 (38.9)	44 (39.3)		
Geographic strata[1]	Urban	232 (77.1)	87 (77.7)	.017	.897
	Rural	69 (22.9)	25 (22.3)		
Believe in theeffect of physical activity[1]	Yes	225 (74.8)	86 (76.8)	.182	.670
	No	76 (25.2)	26 (23.2)		
Receiving physical activity training[1]	Yes	114 (37.9)	41 (36.6)	.056	.813
	No	187 (62.1)	71 (63.4)		
Number of physical activity training[1]*	Once	62(54.4)	18 (43.9)		
	Twice	26 (22.8)	13 (31.7)	9.574	.296
	Three times and more	26 (22.8)	10 (24.4)		
		Mean ± SD	**Mean ± SD**	**t**	**P**
Age[2]		53.05±9.76	54.38±10.11	.225	.635
BMI[2]		31.19±6.51	28.09±4.61	11.318	**.001****
HbA1c [2]		8.04±2.38	8.04±2.16	1.528	.217
Duration of Diabetes[2]		7.805±6.219	10.05±7.899	9.939	**.002****

[1]Chi-square tests (x^2) was used. [2] Test of significance of difference betweent womens (t) has been used

*In the calculations of physical activity in the field of education the number of women (n=114) and physical activity in education the number of male (n=41) were performed. ** p≤0.05

Table 2: Physical Activity Levels Of Individuals With Type 2 Diabetes According To Gender

Physical Activity Levels	Women n=297 (%)	Men n=110 (%)	Total n=407 (%)	x^2	p
Adequate	14 (4.7)	6 (5.5)	20 (4.9)	4.976	.083
Low-leveladequate	122 (41.1)	58 (52.7)	180 (44.2)		
Inadequate	161 (54.2)	46 (41.8)	207 (50.9)		

Chi-squaretests (x^2) was used. ** p≤0.05

Table 3: Physical Activity Scores Of Individuals With Type 2 Diabetes According To Gender

Physical Activity Scores	IPAQ Scores		t	p
	Women (n: 297) Mean ± SD	Men (n: 110) Mean ± SD		
Vigorous Physical Activity (MET-minutes/week)	471.44±451.73	608.53±523.77	-2.594	**.010****
Moderate Physical Activity (MET-minutes/week)	289.27±282.46	459.40±395.02	-4.812	**.000****
Walking (MET-minutes/week)	457.72±399.35	549.57±370.42	-2.101	**.036****
Total Physical Activity (MET-minutes/week)	1265.81±1063.97	1601±1006.23	-2.870	**.004****

Test of significance of difference between twomeans (t) wereused. ** p≤0.05

Table 4: Total Physical Activity Scores of Individuals With Type 2 Diabetes According To Gender

Biological and Psychosocial Characteristics		Total Physical Activity Scores			
		Women (n=297) Mean ± SD	Men (n=110) Mean ± SD	t, Z	p
Type of treatment	OAD [2]	1430.90±1274.26	1817.94±1027.30	-1.878	.060
	İnsulin [1]	1098.96±841.47	1430.31±967.28	-2.628	**.009****
	OAD + İnsulin [2]	1525.79±1042.60	2277.00±922.55	-1.632	.103
Comorbidity	Yes [1]	1249.48±944.67	1462.34±1030.09	-1.532	.127
	No[1]	1292.04±1235.67	1810.94±942.35	-2.516	**.013****
Perception of	Good[1]	1388.95±1296.01	1893.45±977.90	-2.267	**.025****
health	Moderate[1]	1107.91±781.31	1445.70±1031.77	-2.454	**.015****
	Bad[2]	1057.47±1189.79	1375.76±873.11	-.419	.675
Education	No literacy[2]	1226.15±981.08	522.00±79.06	-1.572	.116
	Primary school[1]	1176.61±1153.59	1399.77±980.38	-1.271	.205
	Secondary schoolor with higher level of education [1]	1455.15±934.54	1885.28±973.49	-2.606	**.010****
Working status	Employed[1]	1498.15±969.66	1764.91±966.28	-1.102	.275
	Unemployed[1]	1236.77±1073.34	1537.76±1020.33	-2.211	**.028****
Household income	Income is lower than their expenses[1]	1206.49±852.94	1548.82±992.26	-2.167	**.032****
	Income equalt otheir expenses[1]	1257.58±963.54	1640.30±1043.12	-2.509	**.013****
	Income is higher than their expenses [2]	2113.59±2486.49	2099.15±890.08	-1.319	.187
Regular diabetes	Yes[1]	1477.39±1267.41	1852.52±965.47	-1.961	.051
check once in 3-6 months	No[1]	1052.81±755.74	1368.63±995.19	-2.445	**.015****
Marital status	Married[1]	1252.80±1069.32	1637.96±101.48	-2.993	**.003****

	Single[2]	1320.63±1048.68	1403.85±982.73	-.231	.817
Type of housing	Apartment[1]	1398.65±1206.98	1831.26±947.08	-2.648	**.009****
	Detached house[1]	1055.58±744.03	1244.22±1001.65	-1.285	.201
Geographic strata	Urban [1]	1295.25±1120.07	1683.47±981.04	-2.820	**.005****
	Rural[2]	1164.79±843.04	1324.04±1061.11	-.031	.975
Believe in theeffect	Yes [1]	1344.25±1152.38	1670.46±970.27	-2.303	**.022****
of physical activity	No[2]	1033.66±699.33	1379.88±1105.41	-.594	.552

[1] Test of significance of difference between two means (t) wasused. [2] Mann-Whitney U test (Z) wasused. ** p≤ 0.05

Table 5: Correlation of Total Physical Activity Scores and Biological and Psychosocial Characteristics Of Individuals WithType 2 Diabetes According To Gender

Biological and Psychosocial Characteristics	Total Physical Activity Scores			
	Women n=297		Men n=110	
	r	p	r	p
Age	-.045	.438	-.147	.125
BMI (kg/ m²)	-.125	**.032****	.069	.476
HbA1C	-.105	.070	.138	.150
Duration of Diabetes	-.066	.258	-.144	-.133
Number of physical activity training*	.161	.088	.215	.177
The time passed after the last physical activity training*	-.223	**.017****	-.061	.703

Correlation analysis (r) wasused.
** p≤ 0.05

Table 6. Regression Analysis Of Biological And Psychosocial Characteristics Of Women And Men According to Total Physical Activity Scores

Biological and Psyhosocial Characteristic	Total Physical Activity Scores					
	ß	t	p	F	Model (p)	R^2
Women						
Household income	423.061	3.807	**.000****			
Regular diabetes check once in 3-6 months	211.939	1.536	.126			
Believe in the effect of physical activity	144.572	.924	.356	56.832	**.000****	.601
Perception of health	24.702	.298	.766			
Education	73.799	.828	.408			
Working status	-89.864	-.438	.661			
BMI	37.468	2.153	**.032****			
Men						
Household income	361.088	2.292	**.024****			
Regular Diabetes check once in 3-6 months	109.313	.510	.611			
Believe in the effect of physical activity	-58.587	-.245	.807	42.275	**.000****	.750
Perception of health	190.806	1.562	.121			
Education	204.053	1.634	.105			
Workingstatus	-169.746	-.881	.381			
Comorbidity	-103.141	-.591	.556			

Analysis of variance(F) wasused. $R^{2:}$Multi- explanatory factor ** $p \leq 0.05$

In the study, the physical activity score of the married men was found 1637.96±1011.48 MET-minutes/week and the physical activity score of the married women was found 1252.80±1069.32 MET-minutes/week (p≤0.05). Average score of the diabetic men living in the province center was found 1683.47±981.04 MET-minutes/week and the average score of the diabetic women living in the province center was found 1295.25±1120.07 MET-minutes/week (p≤0.05). In the study, average score of the men living in apartment buildings is 1831.26±947.08 MET-minutes/week and the average score of the women living in apartment buildings is 1398.65±1206.98 MET-minutes/week (p≤0.05). Average score of the men who believe in the influence of physical activity in diabetes management is 1670.46±970.27MET-minutes/week.

Average score of the women who believe in the influence of physical activity in diabetes management is 1344.25±1152.38 MET-minutes/week (p≤0.05). There is a statistically meaningful relation between the BMI values and the total physical activity scores of the female diabetic individuals (r=-.125; p=.032).

A meaningful relation was found between the time passed after the last physical activity training and the total physical activity scores of the Type 2 diabetic women (r=-.223 p=.017) (Table 5).

Regression analysis was made in order to analyse the influence of the variables found meaningful in consequence of the t test, Mann-Whitney U test and Pearson correlation analyses made in order to analyse the total physical activity scores of the diabetic men and women in accordance with their biological and psychocosial characteristics on the physical activity scores. Income status of the diabetic female individuals increase their physical activity score (ß=423.061, p=.000). Female individuals' total physical activity scores increase as their BMI values increase (ß=37.468, p=.032).The male diabetic individuals' income status increase their total physical activity level (ß=361.088, p=.024) (Table 6).

Discussion

Regular physical activity in diabetic individuals reduces the complications such as cardiovascular diseases, cerebrovascular diseases (paralysis, ischemic paralysis) and atherosclerosis and increases the life quality within the control of diabetes (Kartal *et al.* 2008, ADA 2016, Colak *et al.* 2015).

In the study, the women's total physical activity levels are lower than the men's. Other studies conducted in a way similar to this study also indicate that the rate of the men who do adequate physical activity is higher than the women's. In the study conducted by Oyewole and his friends in Nigeria with 122 diabetic individuals, the rate of the active male individuals was found 70 % and the rate of the active female individuals was found 68 % and they said that men were more active than women (Oyewole *et al.* 2014). In the study conducted by Fan and his friends in China with 6348 diabetic individuals, the men's total physical activity scores were found higher than the women's (Fan *et al.* 2015). In these studies, some activities requiring physical characteristics, women's and men's having different socialization experiences and women's usually being in a house centered position were indicated as the reasons of it. Traditional roles, child care, division of labor at home and especially doing a paid job outside the house make serious obstacles for women to participate in free time activities (Ersoy 2009). Also self efficacy, social normative belief, attitudes, intention, experince influence ohysical activity (Joo *et al.* 2015).

Vigorous physical activities mean activities in which physical effort is made with much more breathing. Activities at moderate level are activities which require physical strength and cause breathing a little more frequently than the normal. Walking activity can be walking at work, at home, for transport from one place to another or only for rest, sport, exercise or hobby. Total physical activity means the all of the activities.

In the study, the vigorous activity scores, moderate level physical activity scores, walking scores and total physical activity scores of the men was found meaningfully higher than the women. 60.2 % of the men and only 25.9 % of the women work according to the 2011 reports of Turkish Statistical Institute (TUIK 2016). Moreover, in the report, when the time spared for housework is regarded (cooking, washing the dishes, cleaning, washing up, ironing, sewing, gardening, construction-repairing, shopping, childcare), it is indicated as 5.22 hours in average in women and 0.81 hours in average in men. In these activities, the activities except the activities done while sitting are considered as moderate

level physical activities because they cause making efforts at moderate level. The women's physical activity status being low can be explained with their not being able to spare time for heavy physical activity because of their spending more time at home and sparing more time for housework. The results of the study are similar to the study conducted by Savcı and his friends with university students (Savcı *et al.* 2006). In the study conducted by Savcı, the men's heavy physical activity scores, moderate level physical activity scores, walking scores and total physical activity scores are meaningfully higher than the women's scores. The male individuals' total physical activity score averages were found higher than the women's averages also in the study by Plotnikoff and his friends (Plotnikoff *et al.* 2006).

In the study conducted by Balkau and his friends, the men's vigorous physical activity scores were found higher than the women's scores (Balkau *et al.* 2008). The moderate level activity score was found higher than men in women and the total physical activity score was found similar in men and women. The reason why this result is different is probably using accelerometer. Because activities done in water cannot be measured by accelerometer. However, one of the most active moderate level activity in scoring is swimming in the other studies.

When it is analysed in accordance with the income status, the income status and the total physical activity score are positively related in both groups. The individuals' physical activity levels decrease as their income status decreases. The results of the studies by Plotnikoff and his friends were found similar to our study (Plotnikoff *et al.* 2006). This result can be explained with the increase in the individuals' access to health institutions where they can have physical activity training in diabetes and sports facilities where they can do physical activities as their income level increases.

In the study conducted by Ranasinghe and friends in Sri Lanka with diabetic individuals, men were found more inactive in groups with low and moderate income status and women were found more inactive among the individuals with high income level (Ranasinghe *et al.* 2014). In the compilation work by Heiss and Petosa , a negative relation was found between income level and physical activity (Heiss % Petosa 2014). Among its reasons, they think that that the individuals have less time to spare for themselves, thus their time for going to the facilities where they can do physical activity decreases as the socioeconomical level increases.

A positive relation was found between the BMI and physical activity scores of the women. When the other studies made are regarded, as different from our study, a negative relation was found between the BMI value and the level of physical activity (Fan *et al.* 2014, Nelson *et al.* 2002, Plotnikoff *et al.* 2006, Ranasinghe *et al.* 2014). There are many factors such as excessive energy take, inadequate consumption of energy, genetic predisposition, low fat oxidation, reduced sympathetic activity, psychological stress and low socioeconomical level besides physical activity in the aetiology of the high BMI (Eker 2002). If it is thought that only physical activity will not be enough for the body mass index's change in the positive direction, evaluation of this result alone may be misleading.

Conclusion

In a conclusion, physical activity levels of the most of the women and men were found inadequate in the study conducted in order to determine the diabetic individuals' levels of physical activity and the related factors in accordance with their sexes. The women's total physical activity scores are lower than the men's. The level of physical activity decreases as the income status decreases in both sexes. Total physical activity score decreases as the BMI decreases in women. In accordance with these results, analysing the reasons of the low physical activity levels with qualitative studies, analysing the situations preventing the female individuals' physical activity, analysing the relation between the income status and the BMI and conducting the same study with different measurement tools like accelerometer in order to abolish the problems faced in questionnaires can be recommended for the researchers.

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