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The Relationship Between Health-Promoting Behaviors and Socio-demographic and Clinical Characteristics of Patients with Diabetes Mellitus

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ABSTRACT

Objective: In this study, it was aimed to investigate the relationship between health-promoting attitudes and socio-demographic and the clinical characteristics of patients with diabetes.

Methods: The study sample comprised a total of 267 patients with diabetes mellitus aged 18 years and older, who had previously been diagnosed as Type 1 or Type 2 diabetes mellitus for at least 6 months, who had no gestational diabetes mellitus and who had presented to the Internal Diseases Outpatient Clinic in Kocaeli between June-September 2015. Collection of the data were realized by the researchers through face-to-face interviews using the "Patient Information Form" and the "Health-Promoting Lifestyle Profile-II". The validity-reliability study of the scale for the Turkish population was carried out by Bahar et al. The scale comprises six factors including health responsibility, physical activity, nutrition, spiritual growth, interpersonal relations and stress management.

Results: The patients scored highest in the interpersonal relations and scored lowest in the physical activity factors. Patients who were aged between 18-44 years, those who were high school graduates, those who were retired, those who had a well-balanced income and those with no additional chronic disease had higher scores in Health-Promoting Lifestyle Profile-II compared to others. We found that the health-promoting attitudes were not affected by the duration of diabetes mellitus, body mass index or the presence of diabetes in the family.

Conclusion: We determined that healthy lifestyle attitudes were demonstrated moderately by the patients with diabetes mellitus, and these attitudes were found to be associated with socio-demographic and clinical variables such as patient's age, education status, diabetes type and presence of diabetes complications.

Keywords: Demographic factors, disease attributes, diabetes mellitus, health promotion, nurse.

1. INTRODUCTION

Diabetes mellitus (DM) is a common chronic disorder which deteriorates the glycemic control, affects the life activities, life span and the quality of life of the individual, leads to acute and chronic complications and requires continuous medical care (1-3).

DM is treated with oral antidiabetics, insulin, diet and exercise (4-6). Glycemic control is achieved with medical treatment, educating the patients and changing their lifestyles (7). Patients with DM should adopt a healthy lifestyle to reduce the complications of disease in physical, psychological and social terms. A number of factors including environmental factors, economic status and social support affect the patients with DM health-promoting attitudes, adaptation effort and concomitant control of blood glucose levels (8). Previous studies have reported that demographic characteristics such as cognitive and social factors, age and gender affect the quality of life and glycemic control in patients with diabetes (9,10).

A number of models have been developed to explain the relationship between health and illness. The "Health Promotion Model (HPM)" is one of these, which was developed by Pender. It has been used in practice to determine the cognitive and affective factors affecting the health-promoting attitudes. According to this model, demographic and biological characteristics, interpersonal interactions, situational and behavioral factors affect the development of health (11). The "Health Promoting Lifestyle Profile" was developed based on the Health Promotion Model. This scale measures the individual's health-promoting behaviors and it is used to assess the healthy lifestyle attitudes in daily practice (12).

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Health-Promoting Attitudes that play a significant role in disease prevention and chronic disease management are classified as health responsibility, spiritual growth, physical activity, nutrition, interpersonal relations and stress management. The health responsibility expresses that an individual care about his/her health and he/she can take responsibility and decide on his/her health. Spiritual growth is a positive approach towards events in order to enhance the inner peace of the individual, the desire to achieve life goals and the state of well-being. Physical activity is the planning of mild, moderate and severe activities by the individual throughout the day. Nutrition is the individual's conscious choice of food and proper nutrition according to the meal order. Interpersonal relations include having a verbal or non-verbal communication with the social environment, establishing meaningful relationships and sharing own feelings. Stress management is an individual's ability to reduce and control tension arising from physiological and psychological causes (13). A patient with DM should be able to take health responsibility, deal with the disease, perform physical activity according to the treatment plan, adapt to the diet, express emotions and thoughts and reduce the stress burden of the disease by learning to cope with stress (4, 8,14).

Previous studies in the literature have reported that healthy lifestyle attitudes contribute positively to the health status in chronic diseases. Furthermore, social and medical factors including age, gender, education level, marital status and the duration of DM affect the health-promoting behaviors and the quality of life in patients with DM. Moreover, 'Type 2 DM prevention programs' were found to be effective in promoting healthy lifestyle behaviors (15-20). In this context, we aimed to investigate the association between socio-demographic and clinical characteristics of patients with diabetes and their health-promoting attitudes in order to contribute to nursing practice and the current literature.

Study Questions

Q1: Do healthy lifestyle attitudes show alterations in patients with Type 1 and Type 2 DM based on socio-demographic characteristics?

Q2: Do healthy lifestyle attitudes show alterations in patients with Type 1 and Type 2 DM based on clinical characteristics?

2. METHODS

2.1. Study sample and design

This study, which was descriptive and cross-sectional, was conducted with patients who had presented to the Internal Diseases Outpatient Clinic of a public hospital in Kocaeli, a city located in western Turkey, between June and September 2015. Considering that the number of patients with DM presenting to the outpatient clinic during the same period of the previous year was 872, the sample size representing the universe was calculated as 267 patients at a confidence interval of 95%, an error rate of 5% and a statistical significance level of $p<0.05$. 290 patients were interviewed to reach the sample. Participants who did not fulfill the inclusion criteria during the study and refused to participate in the study (n = 23) were not included in the sample.

The study population comprised 267 patients aged 18 years and older, who had been diagnosed as Type 1 or Type 2 DM for at least 6 months, who had no gestational DM, who were cognitively competent to respond to the scale and the questionnaire and who gave consent to participate in the study.

2.2. Data collection

Patients with DM eligible for the inclusion criteria were first informed about the procedure of the study and written informed consent forms were signed by those who agreed to participate. The data were collected by the researchers in the Internal Diseases Outpatient Clinic through the face-to-face interview method and each interview lasted for nearly 30 minutes. The data were collected in the waiting room of the clinic after the examination during the non-busy hours (afternoon) of the outpatient clinic. The patients filled in the "Patient Information Form" and then, the "Health Promoting Lifestyle Profile-II (HPLP-II)" questionnaire was administered to collect data about the healthy lifestyle attitudes. Responses were recorded assuming that the patient statements were correct. The data were collected by the researchers through the face-to-face interview method and there were no missing data.

2.3. Instruments

2.3.1. The patient information form: This form consisted of 19 questions, which were generated by the researchers. The questions aimed to gather information about the socio-demographic and clinical characteristics of the patients.

2.3.2. Health-Promoting Lifestyle Profile-II (HPLP-II): The original "Health Promoting Lifestyle Profile" (HPLP) scale, developed by Walker, Sechrist and Pender (1987), consists of 48 items and 6 subscales (self-actualization, health responsibility, exercise, nutrition, interpersonal support, and stress management). The scale was revised in 1995 and named as "Health Promoting Lifestyle Profile-II" (HPLP-II). The revised scale consists of 52 items and 6 subscales (health responsibility, spiritual growth, physical activity, nutrition, interpersonal relations, stress management). This is a 4-point likert-type scale, and it is scored as never (1), sometimes (2), frequently (3) and regularly (4). The lowest score for the scale is 52 and the highest score is 208. The lowest score for physical activity and stress management subscales is 8 and the highest score is 32. The lowest score for the other subscales is 9 and the highest score is 36. The overall score of the scale gives the score of health-promoting lifestyle and all items are positive. A high score indicates that the health-promoting lifestyle attitudes are displayed at a high level, while low scores indicate that these behaviors are displayed

less frequently (13). The validity-reliability study of the scale for the Turkish population was conducted by Bahar et al. in 2008, and the Cronbach's Alpha reliability coefficient was determined as 0.92. The Alpha reliability coefficients of the subscales were between 0.79 and 0.87 (21). In this study, the Cronbach's Alpha reliability coefficient of the total scale was determined as 0.94, while the Cronbach's Alpha reliability coefficients of the subscales were determined as 0.87 for interpersonal relations, 0.85 for spiritual growth, 0.65 for nutrition, 0.76 for stress management, 0.83 for physical activity and as 0.81 for health responsibility.

2.4. Ethical Aspect

Before commencing the study, permission was obtained from Bahar and his colleagues who conducted the Turkish validity-reliability study of HPLP-II. Ethics approval was obtained from the Ethics Committee of the Institute (22/06/2015-1) and the institution where the study was conducted (09/07/2015-1307). Oral and written informed consents were obtained from patients with DM who agreed to participate in the study. The study was conducted based on ethical principles. The study was carried out in accordance with the principles of the Helsinki Declaration.

2.5. Data Analysis

The data obtained in the study were analyzed using the SPSS package program. The Mann-Whitney U test was used to compare the non-parametric continuous data between two independent groups, and the Kruskal Wallis H-Test was used for comparison of the non-parametric continuous data between three and more independent groups. The Spearman's correlation analysis was used to determine the relationship between two continuous variables. The Mann Whitney U test was used as a post-hoc test to perform pair-wise analyses of the differences between each of the two groups following the Kruskal Wallis H test. The results were evaluated at a confidence interval of 95% and a significance level of 5%.

3. RESULTS

The socio-demographic and clinical characteristics of patients with DM (n=267) have been demonstrated in Table 1. In addition to the results shown in the table, we found that mean age of the patients was 57.52±13.77 years old; the mean body mass index (BMI) was 30.19 ± 6.73 kg/m2 and the mean duration of DM was 9.61 ± 7.86 years. All of the patients had health insurance. The most common complication of diabetes was nephropathy, 15.0% had diabetic foot and 10.1% had coronary heart disease furthermore, 21% of the patients had concomitant hypertension. We found that 36% of the patients used insulin, 45.3% of the patients used oral antidiabetic and 50.2% were on a diabetic diet.

The patients had a mean score of 122.83±24.154 from the whole scale. On analysis of the mean scores of patients from the subscales, we found that the highest score was obtained from the interpersonal relations subscale (24.70±5.99) and the lowest score was obtained from the physical activity subscale (12.74±4.39) (Table 2).

Table 1. *Socio-demographic and clinical characteristics (n=267)*

Characteristics	n	%
Age (57,52±13,77 [18-89])		
18-44	44	16,5
45-64	133	49,8
65 and above	90	33,7
Gender		
Female	177	66,3
Male	90	33,7
Marital status		
Married	221	82,8
Single	46	17,2
Educational status		
Illiterate	35	13,1
Literate	43	16,1
Primary school	147	55,1
High school	30	11,2
University	12	4,5
Occupation/job		
Officer	11	4,1
Worker	20	7,5
Self-employment	4	1,5
Housewife	169	63,3
Retired	56	21,0
Unemployed	7	2,6
Economic status		
Income< expenditure	44	16,5
Income> expenditure	13	4,9
Income= expenditure	210	78,7
BMI (30.19±6.73 [17,30-49,94])		
Normal (18.5-24.9 kg/m2)	67	25,1
Overweight (25-29.9 kg/m2)	79	29,6
Obese (≥30 kg/m2)	121	45,3
Type of DM		
Type 1	41	15,4
Type 2	226	84,6
Family history of DM		
Present	171	64,0
Absent	96	36,0
Diabetes education		
Received	143	53,6
Not received	124	46,4
Complication of DM		
Present	215	80,5
Absent	52	19,5
Other chronic disease		
Present	59	22,1
Absent	208	77,9
Duration of DM (year) (9,61±7.86 [1-40])		

Min: Minimum, Max: Maximum, Sd: Standard deviation

Table 2. *The mean HPLP-II and subscale scores (n=267)*

Subscales	Min.	Max.	Mean±Sd
Health responsibility	10	36	21,99±5,29
Physical activity	8	30	12,74±4,39
Nutrition	9	29	20,28±3,99
Spiritual growth	11	35	23,77±5,70
Interpersonal relations	9	36	24,70±5,99
Stress management	10	32	19,34±4,62
HPLP-II total	61	178	122,83±24,15

Min: Minimum, Max: Maximum, Sd: Standard deviation

Table 3. *Comparison of HPLP-II and subscale scores according to socio-demographic characteristics (n=267)*

Characteristics	Health Responsibility Mean±Sd	Physical Activity Mean±Sd	Nutrition Mean±Sd	Spiritual Growth Mean±Sd	Interpersonal Relations Mean±Sd	Stress management Mean±Sd	HPLP-II (Total) Mean±Sd
Age							
	r=-0,109	r=-0,266[a]	r=-0,064	r=-0,189[a]	r=-0,211[a]	r=-0,116	r=-0,202[a]
	p=0,074	**p<0,001**	p=0,299	**p=0,002**	**p=0,001**	p=0,057	**p=0,001**
18-44[1]	21,61±5,09	14,80±4,96	20,41±3,35	24,30±5,00	25,82±4,90	9,77±3,50	126,71±18,72
45-64[2]	22,74±5,08	12,72±4,03	20,59±4,04	24,72±5,72	25,28±5,93	19,76±4,55	125,81±23,73
65 and over[3]	21,08±5,58	11,77±4,31	19,78±4,21	22,10±5,67	23,32±6,37	18,51±5,12	116,56±26,05
	p=0,037[b]	**p<0,001**[b]	p=0,346	**p=0,004**[b]	**p=0,032**[b]	p=0,080	**p=0,009**[b]
	KW=6,574	KW=15,641	KW=2,122	KW=11,118	KW= 6,874	KW= 5,042	KW= 9,420
	2>3	1>2>3		1>3, 2>3	1>3, 2>3		1>3, 2>3
Gender							
Female	22,10±5,31	12,02±3,80	20,25±3,85	23,31±5,66	24,55±6,08	19,07±4,51	121,31±23,03
Male	21,78±5,29	14,16±5,10	20,34±4,29	24,68±5,70	25,01±5,84	19,88±4,83	125,84±26,10
	p=0,766	**p=0,002**[c]	p=0,616	**p=0,038**[c]	p=0,509	p=0,249	p=0,176
	MW=7 788,0	MW=6 095,5	MW=7 667,0	MW=6 731,5	MW=7 572,0	MW=7 279,5	MW=7 158,0
Marital status							
Married	22,25±5,48	12,91±4,43	20,55±3,90	23,97±5,68	24,93±5,99	19,42±4,68	124,05±24,52
Single	20,76±4,11	11,91±4,17	19,02±4,25	22,72±5,75	23,63±5,95	18,93±4,38	116,98±21,60
	p=0,077	p=0,109	**p=0,018**[c]	p=0,177	p=0,238	p=0,477	p=0,084
	MW=4 243,0	MW=4 326,0	MW=3 960,0	MW=4 441,0	MW=4 521,5	MW=4 745,0	MW=4 260,0
Education							
Illiterate[1]	19,97±4,48	10,00±2,69	19,23±3,71	21,02±4,48	22,23±4,83	18,00±4,28	110,46±18,37
Literate[2]	20,26±5,30	11,28±3,62	19,23±4,37	22,00±6,57	23,19±7,04	18,18±5,13	114,14±27,24
Primary school[3]	22,78±5,32	13,30±4,53	20,56±3,87	24,35±5,33	25,23±5,90	19,72±4,47	125,95±23,20
High school[4]	23,00±5,42	14,10±4,23	20,97±4,13	25,70±6,34	26,97±5,65	20,83±4,66	131,57±24,23
University[5]	21,92±4,25	15,75±4,73	22,00±3,67	26,08±4,25	25,33±3,80	19,00±4,20	130,08±18,99
	p=0,003[b]	**p<0,001**[b]	p=0,061	**p=0,001**[b]	**p=0,003**[b]	**p=0,037**[b]	**p<0,001**[b]
	KW=15,995	KW=33,789	KW=9,006	KW=19,416	KW=15,724	KW=10,237	KW=22,635
	3,4>1,2	3,4,5>1,2		3,4,5>1,2	3,5>1; 4>1,2	3,4>1,2	3,4>1,2; 5>1
Occupation/job							
Officer[1]	22,00±3,85	15,55±4,76	21,09±2,95	24,09±3,86	24,82±3,63	19,90±3,24	127,45±16,10
Worker[2]	21,40±4,99	14,50±4,73	19,95±2,78	24,45±5,49	25,35±4,91	18,10±3,54	123,75±20,06
Self-employment[3]	22,00±1,41	12,50±3,11	23,50±3,32	26,00±2,71	23,25±3,09	21,00±2,58	128,25±4,87
Housewife[4]	21,86±5,38	11,83±3,73	20,11±3,88	23,13±5,57	24,32±6,10	18,98±4,50	120,24±23,39
Retired[5]	22,89±5,66	14,45±5,15	20,95±4,71	25,68±6,24	26,08±6,42	20,86±5,41	130,91±28,44
Unemployed[6]	19,71±3,99	11,86±5,79	17,00±3,42	20,14±4,84	21,71±5,82	17,57±3,99	108,00±19,41
	p=0,498	**p=0,001**[b]	**p=0,048**[b]	**p=0,024**[b]	p=0,245	p=0,108	**p=0,043**[b]
	KW=4,364	KW=21,373	KW=11,197	KW=12,976	KW=6,682	KW=9,023	KW=11,439
		1,2,5>4	1,2,3>6; 4,5>6	3,5>6; 5>4			5>4,6
Income							
Income<expenditures[1]	20,32±4,90	11,95±3,33	18,70±4,01	20,98±5,79	22,05±5,95	17,68±4,38	111,68±23,26
Income>expenditures[2]	21,92±4,99	14,54±5,78	20,00±3,02	25,07±6,20	25,15±5,27	19,69±5,02	126,38±22,44
Income=expenditures[3]	22,35±5,34	12,79±4,47	20,63±3,93	24,27±5,50	25,24±5,92	19,66±4,95	124,95±23,89
	p=0,112	p=0,462	**p=0,019**[b]	**p=0,003**[b]	**p=0,011**[b]	**p=0,031**[b]	**p=0,008**[b]
	KW=4,373	KW=1,544	KW=7,896	KW=11,581	KW=9,006	KW=6,977	KW=9,734
			3>1	3>1	3>1	3>1	3>1

Sd: Standard deviation, aSpearman's correlation analysis, bKruskal Wallis H-Test (KW), cMann Whitney-U Test (MW).

Table 3 shows the comparison of HPLP-II and its subscale scores of the patients based on the socio-demographic characteristics (Table 3). There were differences in some subscales or total scores of HPLP-II based on age, gender, marital status, educational status, occupation, and the economic status of the patients. Table 4 demonstrates the comparison of HPLP-II and its subscale scores of the patients based on clinical characteristics (Table 4). Those with Type 1 DM, those who had been educated on diabetes care and those without complication of diabetes were found to have higher physical activity scores compared to the others ($p<0.05$, for all). The mean scores of the patients who had chronic diseases other than DM were lower in both the physical activity subscale and the overall scale compared to those without other chronic diseases ($p<0.05$, for both). In addition, patients using oral antidiabetics together with insulin therapy (n = 52, 19.5%) had a lower physical activity score than the others ($p <0.05$).

Table 4. *Comparison of HPLP-II and subscale scores according to clinical characteristics (n=267)*

Charecteristics	Health Responsibility Mean±Sd	Physical Activity Mean±Sd	Nutrition Mean±Sd	Spiritual Growth Mean±Sd	Interpersonal Relations Mean±Sd	Stress management Mean±Sd	HPLP-II (Total) Mean±Sd
Type of DM							
Type 1	21,24±5,02	14,95±4,79	19,98±3,62	23,83±5,39	25,12±5,47	19,46±4,02	124,58±22,56
Type 2	22,12±5,33	12,34±4,20	20,34±4,07	23,76±5,77	24,63±6,09	19,32±4,73	122,52±24,46
	p=0,387	**p=0,001**[a]	p=0,503	p=0,784	p=0,486	p=0,795	p=0,535
	MW=4 240,0	MW=3 094,0	MW=4 329,0	MW=4 508,5	MW=4 316,5	MW=4 515,0	MW= 4 351,0
Diabetes education							
Received	22,55±5,53	13,24±4,47	20,28±3,97	24,13±5,30	25,32±5,65	19,59±4,54	125,10±23,37
Non-received	21,35±4,95	12,16±4,24	20,29±4,04	23,35±6,12	24,00±6,32	19,05±4,72	120,22±24,87
	p=0,083	**p=0,023**[a]	p=0,919	p=0,257	p=0,088	p=0,328	p=0,121
	MW=7 778,0	MW=7 448,5	MW=8 802,5	MW=8 154,5	MW=7 794,5	MW=8 252,0	MW=7 891,5
Complication of DM							
Present	22,06±5,42	12,32±4,25	20,20±4,11	23,53±5,74	24,58±6,18	19,26±4,60	121,96±24,57
Absent	21,73±4,76	14,50±4,55	20,59±3,50	24,75±5,49	25,23±5,18	19,65±4,75	126,46±22,22
	p=0,791	**p=0,001**[a]	p=0,739	p=0,221	p=0,652	p=0,748	p=0,322
	MW=5 458,0	MW=3 889,0	MW=5 424,0	MW=4 979,5	MW=5 365,0	MW=5 429,5	MW=5 095,5
Other chronic disease							
Present	20,93±5,36	11,39±4,03	19,47±4,66	22,54±5,95	23,76±5,78	18,91±4,91	117,01±25,56
Absent	22,29±5,24	13,12±4,42	20,51±3,77	24,11±5,59	24,98±6,04	19,46±4,54	124,49±23,54
	p=0,086	**p=0,002**[a]	p=0,167	p=0,056	p=0,180	p=0,487	**p=0,042**[a]
	MW=5 238,5	MW=4 529,0	MW=5 414,5	MW=5 137,0	MW=5 434,5	MW=5 773,0	MW=5 070,5
BMI							
Normal	21,49±5,42	13,97±5,23	20,51±4,51	23,67±5,78	24,88±6,02	19,12±4,42	123,64±25,41
Overweight	22,30±4,97	12,59±4,39	19,82±3,85	23,81±5,85	24,52±5,50	19,25±5,04	122,30±24,07
Obese	22,06±5,44	12,16±3,73	20,46±3,79	23,79±5,60	24,74±6,32	19,52±4,48	122,74±23,68
	p=0,528	p=0,121	p=0,465	p=0,998	p=0,853	p= 0,784	p=0,875
	KW=1,278	KW=4,219	KW=1,530	KW=0,005	KW=0,318	KW=0,486	KW=0,266
Family history of DM							
Present	22,28±5,23	12,92±4,32	20,29±4,09	24,05±5,92	24,96±6,28	19,60±4,61	124,12±24,42
Absent	21,48±5,39	12,43±4,52	20,26±3,83	23,26±5,27	24,26±5,46	18,86±4,63	120,55±23,62
	p=0,213	p=0,192	p=0,997	p=0,177	p=0,245	p=0,165	p=0,151
	MW=7 456,0	MW=7 423,5	MW=8 205,5	MW=7 391,0	MW=7 504,5	MW=7 369,5	MW=7 338,0
Duration of DM (year)							
	r=0,077	r=0,029	r=0,102	r=-0,108	r=-0,079	r=0,013	r=-0,004
	p=0,209	p=0,638	p=0,095	p=0,077	p=0,199	p=0,837	p=0,953

Sd: standard deviation, r: Spearman's correlation analysis, KW: Kruskal Wallis H-Test, aMann Whitney-U Test (MW).

4. DISCUSSION

In the present study, we found that patients with DM moderately practiced healthy lifestyle attitudes, and that the socio-demographic and clinical variables affected the health-promoting attitudes (Table 2). Patients with DM should acquire health-promoting lifestyle attitudes in order to protect their own health and maintain their well-being.

When the mean scores of the patients with DM from healthy lifestyle attitudes were examined based on the socio-demographic characteristics, the age, educational status, occupation groups and the economic status were observed to affect the healthy lifestyle attitudes (Table 3). With regard to clinical characteristics, the presence of a chronic disease other than DM was found to affect the healthy lifestyle attitudes. Furthermore, variables such as BMI, duration of diabetes and a history of diabetes in the family were not found to affect healthy lifestyle attitudes (Table 4).

There are a number of studies in the literature assessing the health-promoting lifestyle attitudes in various groups. Vahedi reported that patients with DM "moderately" practiced health-promoting lifestyle attitudes. The highest scores were noted in the health responsibility subscale (33.68±7.14) and the lowest score was found in the physical activity subscale (10.08±3.57) in patients with DM. (16). In their study with young black women at risk of Type 2 DM, Jefferson et al. found that these women practiced health attitudes at a "moderate" level. Young black women at risk of Type 2 DM were found to have the highest score from the spiritual growth subscale and the lowest score from the physical activity subscale (22). In another study by Sutherland et al. evaluating health-promoting lifestyle attitudes based on the risk status for DM, patients with DM were found to obtain the lowest score from the physical activity subscale (18).

In their study comparing the healthy lifestyle behaviors of people with and without diabetes, Vahedi et al. observed that patients with DM practiced healthy attitudes at a moderate level and that both the diabetic and non-diabetic groups received the lowest score from the physical activity subscale, which is consistent with our results (16). Thus, we may conclude that patients with DM practice health-promoting lifestyle attitudes moderately.

When the healthy lifestyle attitudes of patients with DM were examined based on age groups, significant differences were found between the subscales of health responsibility, physical activity, spiritual growth, interpersonal relations and the total mean score of HPLP-II. The total HPLP-II scores of the 18-44 and 45-64 years age groups were found to be higher than the score of the 65 years and older age group (Table 3). It was observed that the level of practicing healthy lifestyle attitudes decreased as age increased in patients with DM. Age is a demographic feature affecting the health-promoting attitudes. The decrease in the functional competence with aging prevents the free actualization of health behaviors (23). A decrease in the level of practicing health-promoting lifestyle attitudes is expected with aging. Tol et al. found that the "age" variable affected the health-promoting lifestyle attitudes in their study with Type 2 DM patients and reported that these attitudes were better in patients under the age of 50 years (15).

When the health-promoting lifestyle attitudes were evaluated according to gender, the mean scores in the physical activity and spiritual growth subscales of male patients were found to be higher than those of female patients. The HPLP-II total score of male patients also tended to be higher than female patients, although not statistically significant (Table 3). In their study on patients with heart disease, Kucukberber et al. found that psychological development, the physical activity subscale scores and the total HPLP-II scores of male patients were higher than female patients (24). Moreover, Sutherland et al. determined that the overall HPLP-II score of males having a higher risk of DM was higher than the score of females (18). Our results were also consistent with the previous studies mentioned above. Considering the facts that educational level of men is higher than women, that women are further away from working life and that many women do not have the freedom of making decisions on their own health, it may be stated that women are away from health-promoting activities and programs, and they practice healthy lifestyle attitudes to a lower extent than men.

In Turkish society, marriage brings along a regular lifestyle. For this reason, it is thought that married patients with DM may adapt to disease more easily and they can practice healthy lifestyle attitudes more than single individuals. In our study, we found that the health-promoting lifestyle attitude scores of married patients were higher than those of single patients (Table 3). Chen and Lin reported that marital status did not affect the health-promoting lifestyle attitudes in their study on pre-diabetic adults (25). This difference may arise from the difference in cultural characteristics of the study samples.

Patients with a primary school, high school and higher education degree were found to have higher scores from health-promoting lifestyle attitudes compared to patients with DM who were illiterate or only literate (Table 3). Tol et al. found that patients with higher education level had a higher total score of health-promoting lifestyle attitudes (15). In another study, it was determined that the level of diabetes knowledge increased as the level of education increased (26). These results show that as the educational level increases, the healthy lifestyle attitudes also increase in a positive manner. Accordingly, we may suggest that education increases the awareness on healthy lifestyle and provides an increase in practicing health attitudes.

When the health-promoting lifestyle attitudes were examined based on job/occupation status, there was a statistically significant difference between the occupational groups in terms of the physical activity, nutrition, spiritual growth subscales and the mean total HPLP-II scores (Table 3). In a study by Kuru and Piyal, a significant difference was determined in the total score of HPLP-II scores between occupational groups in patients with coronary artery disease

(17). Tol et al. found that patients with DM who worked as an officer had a higher total HPLP-II score compared to other occupational groups (15). Working individuals can organize their meals and social lives according to working hours. We may suggest that the regular lifestyle rendered by this process has a positive influence on healthy lifestyle attitudes, and that working individuals place a higher emphasis on healthy lifestyle attitudes, and they are physically more active.

According to our results, the economic status was found to affect the health-promoting lifestyle attitudes (Table 3). Softa et al. found in their study that elderly individuals with low economic status had lower scores from health-promoting lifestyle behaviors, consistent with our results (27). Individuals with a good economic status can meet their health expenses more comfortably. The results suggest that improvement in the economic status of patients will affect their healthy lifestyle attitudes in a positive way.

Chilton et al. conducted a study to investigate the relationship between the demographic characteristics and the health-promoting lifestyle attitudes and diabetes awareness, and a high-income level was found to positively affect the health attitudes in the physical activity subscale (28). In our study, there was no significant difference in the physical activity subscale based on the income level; however, the mean score of the patients having "a higher income than expenses" was found to be higher (Table 3). This result suggests that societies in developed countries pay more attention to physical activity compared to Turkish society.

We found that BMI and the duration of diabetes did not affect the health-promoting lifestyle attitudes in our study (Table 4). Chen and Lin also reported that BMI did not affect the health-promoting lifestyle attitudes in pre-diabetic adults (25). In a study by Tol et al., patients with a duration of disease of more than 10 years had the highest score in the health responsibility subscale, and this result suggests that long time ago diagnosed patients pay more attention to their health (15).

Patients with a family history of diabetes were expected to practice health-promoting lifestyle attitudes at a higher level than those without a family history of diabetes. We hypothesized that if the individual witnessed a family member suffering from a complication of diabetes due to poor diabetes management, it would encourage the individual to practice a higher level of positive health attitudes. However, no significant relationship was determined between the family history of diabetes and health-promoting lifestyle attitudes (Table 4).

In our study, the mean physical activity subscale score of patients with Type 1 DM was determined to be higher than those of patients with Type 2 DM (Table 4). Compared to Type 2 DM, Type 1 DM starts at an early age when patients can be physically more easily active. In this respect, it is thought that patients with Type 1 DM practice more physical activity attitudes.

The mean physical activity subscale scores of patients who received diabetes education were found to be higher than those without education (Table 4). According to the study by Kucukberber et al. on patients with heart disease, patients who received education about the disease were found to have higher physical activity, health responsibility, stress management and HPLP-II total scores than those who were not educated about the disease (24). In their study with patients with pre-diabetes, Chen and Lin found that knowledge on pre-diabetes affected the health-promoting lifestyle attitudes in all subscales and that the scores from the scales increased as the level of knowledge increased (25). Our results were in parallel with the previous studies mentioned above in terms of the higher physical activity subscale scores in educated patients.

Patients with DM who had complications had lower physical activity subscale scores than those who were free of complications (Table 4). This finding reflects an expected situation. It is considered that inclusion of more physical activities in the education of patients with DM will affect their healthy lifestyle attitudes more positively.

Patients who did not have any additional chronic disease scored higher in the scale, and the difference was found to be statistically significant in the physical activity subscale and the total score of the HPLP-II (Table 4). The low score of health-promoting lifestyle attitudes of patients with an additional chronic illness suggests that they are challenged in diabetes management. It may be useful to keep the existing additional chronic disease under control with health attitudes and treatment methods.

According to the Turkey Diabetes Epidemiology Study (TURDEP-I), which was carried out during 1997-1998, the rate of diabetes was 7.2% and the rate of impaired glucose tolerance was 6.7% (29). The rate of diabetes was found to have increased up to 13.7% in Turkey Diabetes, Hypertension, Obesity and Endocrinological Diseases Prevalence Study (TURDEP-II) in 2010 (30). The studies performed in our country show that the incidence of diabetes is increasing steadily despite some regional variations. This study was conducted in one centre and its outcomes should be evaluated in line with this limitation.

Limitations

The most important limitation of our study was its cross-sectional design and the fact that it was conducted at a single center. It is recommended to carry out similar studies with larger sample groups.

5. CONCLUSION

Our findings show that healthy lifestyle attitudes are affected by various variables and that physical activity is the healthy lifestyle attitude that is practiced at the lowest level. In this context, it is important to determine the socio-demographic and clinical characteristics that affect the attainment of

health-promoting lifestyle attitudes in patients with DM in order to ensure effective diabetes management in clinical practice.

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