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Research Article

The Relationship Between Nutritional Status and Self-Esteem in Adult Women with Type 2 Diabetes: A Cross-Sectional Study

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Abstract

Aim: This study was aimed to determine the relationship between nutritional knowledge level and self-esteem in adult women with type 2 diabetes.

Material and Method: The sample of this descriptive cross-sectional study consisted of 387 participants. Data were collected in an endocrinology outpatient clinic via face-to-face interviews. The data collection form consisted of a 'Personal Information Form', 'Nutrition Habits Section', 'Nutrition Knowledge Level and Food Preference Scale', 'Rosenberg Self-Esteem Scale'. Number and percentage were used in the SPSS package program. Results that were not normally distributed were evaluated according to non-parametric tests.

Results: The mean age of the participants was 42.00±11.35 years and the educational level of 31.2% was primary school. The mean total score of the scales obtained by the participants was average. In the study, no relationship was found between basic nutrition knowledge level and food preference and self-esteem in adult women with type 2 diabetes.

Conclusion: Basic nutrition knowledge and food preferences of women with Type 2 Diabetes were moderate and their self-esteem was adequate. It is important for health professionals to plan individual trainings by determining the nutritional knowledge levels and food preferences of women, and to ensure that diabetes control and self-esteem are increased in the effective management of diabetes and in the promotion of women's health.

Keywords: Diabetes, nutrition, self-esteem, woman

INTRODUCTION

Diabetes Mellitus (DM) is a chronic disease that develops as a result of the absence or insufficiency of insulin secretion and/or insulin resistance. According to the Diabetes Atlas (2021) data, half a million adults worldwide have DM. This number is estimated to increase to 643 million in 2030 and 783 million in 2045 (1). DM has a high prevalence in Türkiye, which increases mortality and morbidity (2). DM increases the risk of heart disease approximately fourfold in women, but only twofold in men (3,4).

Medical nutrition therapy, pharmacologic agents, and insulin therapy can be applied in the treatment of DM (5). In individuals with type 2 diabetes, especially dietary compliance plays an important role in the treatment (6). A healthy diet is an important part of the management of blood glucose levels and also helps prevent DM (4).

Different results have been reported in the literature regarding the nutritional knowledge level of patients with DM. Özkarabulut et al. (2021) found that the nutritional knowledge level of patients with DM was moderate (7). In the study in which participants with DM participated, it was found that most of the patients had a moderate level of nutritional knowledge (8). Thewjitcharoen et al. (2018) found that the nutritional knowledge scores of 213 patients with type 2 diabetes were at a moderate level (9). Han et al. (2020) said that the level of nutritional knowledge in patients with diabetes was inadequate (10).

Nutritional behaviors help manage chronic diseases (such as diabetes and heart disease), increase energy, promote vitality, and improve an individual's mental health by reducing symptoms of anxiety and depression (11).

Nutrition affects the mood and behavior of individuals (12). At the same time, nutritional behaviors play a significant role in self-esteem (13). Because nutrition affects the correct functioning of body functions and indirectly affects body weight.

In a study, the inverse relationship between body mass index (BMI) and self-esteem is more important in women than in men. Among women, higher and increasing BMI is associated with lower and slower increasing self-esteem (14,15). This relationship is not limited to the teenage years but continues into adulthood. However, studies in the literature mostly concern adolescents. There are a limited number of studies conducted on women over a certain age. In our study, the relationship between the nutritional status and self-esteem of women with diabetes, which can cause significant complications, is examined.

Research Questions

- What are the individual characteristics of the participants?
- What are the dietary habits of the participants?
- What are the nutrition knowledge levels of the participants?
- Is there any relationship between participants' level of nutritional knowledge and self-esteem?

MATERIAL AND METHOD

Design

This is a descriptive-cross-sectional study.

Participants and Settings

The population of the study consisted of patients with type 2 DM applied to the Diabetes Education Unit between 15.01.2023 and 15.07.2023. According to the records of the diabetes education unit, an average of 80 women with Type 2 diabetes applied monthly. At the time of the study, a total of 486 women who met the research inclusion criteria applied. All patients were wanted to be reached within the scope of the sample, but 387 people were reached due to reasons such as not wanting to participate in the research and time problems.

Inclusion Criteria

- Having type 2 DM
- Aged 18-64 years
- Being female
- Volunteering to participate in the research
- Applying to the diabetes education unit within the study recruitment period
- Being able to communicate and cooperate

Data Collection Form

A data collection tool consisting of 5 sections was used. These sections consisted of 'Introductory Information' including questions (age, income level, marital status), 'Nutrition Habits', 'Level of Nutrition Knowledge Level Scale (LNKAS) and Food Preference Scale', 'Basic Nutrition and Food-Health Knowledge', 'Food Preference Scale (FPS)' and 'Rosenberg Self-Esteem Scale (RSES)'.

Introductory Information Section: This section included characteristics such as age, income level, and marital status.

Nutrition Habits Section: It consists of questions about skipping meals and snack/main meal consumption habits.

LNKAS/Basic Nutrition and Food-Health Knowledge: The scale was developed by Batmaz and Güneş (2019). The scale consists of 20 items assessing food preference and 12 items including Basic Nutrition and Food Health Relationship. Items 1, 3, 6, 8, 13, 16, 19, and 20 of the scale are scored in reverse. The scale is scored on a 5-point Likert scale between 4-significantly agree and 0-significantly disagree. Cronbach's Alpha values for the Basic Nutrition Knowledge scale and the Nutrition Preference scale were .72 and .70, respectively. According to the cut-off points for Basic Nutritional Knowledge, the nutritional knowledge level of those who scored less than 45 points is evaluated as "poor", those who scored between 45-55 points as "moderate", those who scored between 56-65 points as "good", and those who scored above 65 points as "very good". For Food Preference, those who scored below 30 points were considered to have "poor" food preference, those who scored between 30-36 points were considered to have "moderate" food preference, those who scored between 37-42 points were considered to have "good" food preference, and those who scored above 42 points were considered to have "very good" food preference. The minimum score on the Basic Nutrition Knowledge scale is 0 and the maximum score is 80, and the minimum score on the Food Preferences scale is 0 and the maximum score is 48 (16).

Rosenberg Self-Esteem Scale (RSES): 0-1 points are scored as high self-esteem, 2-4 points as moderate self-esteem, and 5-6 points as low self-esteem. The RSES consists of twelve sub-domains and the first ten items measure self-esteem. The positively and negatively loaded items are ordered consecutively. Items 1, 2, 4, 6, and 7 are positively loaded and items 3, 5, 8, 9 and 10 are negatively loaded. In scale scoring, a low score indicates high self-esteem and a high score indicates low self-esteem (17).

Data Collection

Data was collected through face-to-face interviews with participants applied to the Diabetes Education Unit and met the inclusion criteria. The data collection time was approximately 15 minutes.

Ethical Aspects of the Research

Ethics committee permission was obtained from Karamanoğlu Mehmetbey University Scientific Research and Publication Ethics Committee (01-2023/13). Verbal and written consents of the participants were obtained. Permission was obtained via e-mail for the scales used in the study.

Data Analysis

SPSS 21 package program was used. Descriptive measures were used in the analysis. Since the data was not normally distributed, non-parametric groups were used to determine whether there was a difference between more than groups. Characteristics such as marital status, smoking and alcohol use were measured with the Mann Whitney U Test, and characteristics such as physical activity and body mass index were measured with the Kruskall Wallis H Test.

A p value below 0.05 was accepted as significant. The Spearman correlation test (r coefficient) was used to examine the relationship between scale ratings.

r=<0.2-Very weak relationship or no correlation,
r=0.2-0.4-Weak correlation,
r=0.4-0.6-Moderate correlation,
r=0.6-0.8-High correlation,
r=>0.8-Very high correlation (18).

RESULTS

The mean age of the participants was 42.00±11.35 years and 79.6% were married. Having any chronic disease other than DM was found to be 31.9% (Table 1).

Table 1. Descriptive characteristics of the participants		Number (n=387)	Percent
Age Minimum: 18, Maximum: 82, 42.00±11.35 years			
Marital status	Single	79	20.4
	Married	308	79.6
Education status	Primary school	121	31.2
	Middle school	42	10.9
	High school	117	27.7
	University	107	30.2
Income status	Income less than expense	134	34.6
	Good income	253	65.4
Smoking	Yes	113	25.3
	No	274	74.7
Alcohol use	Yes	31	9.3
	No	356	90.7
Regular physical activity status	Yes	73	18.9
	No	193	49.9
	Partially	121	31.2
Having a chronic disease other than type 2 diabetes	Yes	128	31.9
	No	259	68.1
Chronic diseases	Kidney failure	6	4.7
	Heart failure	18	14.0
	Asthma	28	21.8
	Hypertension	67	52.3
	Other (such as depression and goiter)	9	7,.2
Drug use	Yes (such as oral antidiabetics, antihypertensives, and anticoagulants)	184	47.5
	No	203	52.5
Body mass index	Normal overweight	59	15.2
	Overweight	135	34.9
	Fat	193	49.9
Vitamin-mineral use	Yes	132	34.1
	No	255	65.9
Size: Minimum: 52, Maximum: 150, 83.44±17.759			
Height (cm): Minimum: 140, Maximum: 196, 162.21±8.543			
Body mass index	Normal	81	20.9
	Slightly overweight	121	31.3
	Fat	185	47.8

According to the dietary habits of the participants, the frequency of milk and milk group consumption was 59.4% and the frequency of vegetable consumption was 34.4%. The mean relationship between nutrition and health was determined as 7.00±1.48 and the total mean score of food preference was 5.98±1.80 (Table 2).

The mean total score of the participants on the LNKAS was 48.35±6.26, the mean total score on the FPS was 31.06±8.47, and the mean total score on the RSES was 18.60±5.84 (Table 3).

Table 2. Distribution of participants' dietary habits		Number (n=387)	Percent
Frequency of main meal consumption	One	23	5.9
	Two	142	36.7
	Three	222	57.4
Frequency of snack consumption	One	120	31.0
	Two	124	31.9
	Three	143	37.1
Meal skipping status	Yes	256	66.1
	No	131	33.9
Distribution of meals skipped	Morning meal	41	16.1
	Lunch	64	25.0
	Evening meal	22	8.5
	Snacks	129	50.4
Milk and milk group consumption status	Yes	230	59.4
	No	157	40.6
Walnut consumption status	Yes	148	38.2
	No	239	61.8
Fruit consumption status	Yes	201	51.9
	No	186	48.1
Bread consumption status	Yes	292	75.5
	No	95	24.5
Vegetable consumption	Yes	133	34.4
	No	254	65.6
Cheese consumption status	Yes	77	19.9
	No	310	80.1
Coffee consumption status	Yes	51	13.2
	No	336	86.8
Consumption of carbonated drinks	Yes	22	5.7
	No	365	94.3
Chips consumption status	Yes	13	3.4
	No	374	96.6
Chocolate consumption status	Yes	28	7.2
	No	359	92.8
Consumption of sweet biscuits	Yes	26	6.7
	No	361	93.3
Consumption of salty biscuits	Yes	30	7.8
	No	357	92.2
Consumption of dietary products	Yes	13	3.4
	No	374	96.6
Nutrition Health Relationship Minimum (Min): 2, Maxium (Max): 10, 7.00±1.48			
Food Preference Min: 1, Max: 10, 5.98±1.80			

Table 3. Total mean scores, standard deviations, and minimum and maximum values of the scales				
Scale	n	Mean±SD	Min.	Max.
LNKAS	387	48.35±6.26	11.00	78.00
FPS	387	31.06±8.47	2.00	48.00
RSES	387	18.60±5.84	10.00	36.00
SD: standard deviation				

According to income status, those who expressed their income status as good had a higher mean total score on the LNKAS and RSES than those who expressed their income status as low. It was found that those who had any chronic disease other than DM had higher mean scores on the LNKAS than those who did not. It was determined that those who had any chronic disease other than DM had a higher mean total score on the RSES than those who did not have any chronic disease. The mean total score of those who performed regular physical activity was found to be higher than those who never or partially performed physical activity. There was a statistically significant difference according to variables such as BMI, frequency of main meal consumption, and marital status (p≥0.05) (Table 4).

Table 4. Comparison of the mean total scale scores according to the socio-demographic characteristics of the participants		LNKAS	FPS	RSES
Income level	Less than expenditure	154.50	187.28	185.92
	Good income	199.48	194.23	211.13
	U	11097.000	15410.000	14182.000
		p=.000	p=.565	p=.018
Marital status	Single	191.26	201.84	204.22
	Married	184.06	189.44	191.38
	U	10525.500	11231.000	11359.000
		p=.603	p=.374	p=.362
Smoking status	Yes	184.76	184.46	203.28
	No	185.79	210.25	190.17
	U	13674.000	13132.000	14432.000
		p=.934	p=.038	p=.293
Having a chronic disease other than type 2 diabetes	Yes	193.57	190.86	184.16
	No	166.43	194.77	216.99
	U	1222.500	14866.000	13051.500
		p=.025	p=.752	p=.008
Frequency of main meal consumption	One	169.31	240.43	196.50
	Two	180.81	193.40	204.88
	Three	190.27	186.04	186.78
	KW	1.171	5.092	2.291
		p=.557	p=.078	p=.318
Vitamin-mineral use	Yes	195.87	194.76	174.78
	No	180.15	190.58	203.95
	U	14065.500	16086.000	14293.500
		p=.179	p=.726	p=.015
Body mass index	Normal	164.85	194.46	172.17
	Slightly overweight	199.46	180.85	195.12
	Overweight	185.80	198.26	202.82
	KW	4.897	1.850	4.272
		p=.086	P=.397	p=.118
Physical activity	Yes	179.49	197.15	223.41
	No	190.37	189.70	165.45
	Partially	181.27	192.54	186.36
	KW	0.793	0.245	14.104
		p=.673	p=.885	p=.001
Mann Whitney U test= U; Kruskal Wallis test: KW				

It was observed that there was very weak or no correlation between the scales ($p \geq 0.05$) (Table 5).

Table 5. The relationship between the scales		
	2. FBS	**3. RSES**
1. LNKAS	r=.214	
2. FBS		r=-.145
3. RSES		
r=correlation		

Multiple linear regression analysis method was used to determine the effect of nutrition knowledge level and food preference on women's self-esteem. There are assumptions in this parametric method. The predicted (dependent) variable should be continuous and normally distributed, and the continuous predictive (independent) variables should also be normally distributed. In addition, there should be no multicollinearity problem among the independent variables in the multiple regression equation (19). This assumption is an important one and is examined with tolerance and VIF values. If VIF values are less than 10 and tolerance values are greater than 0.10, there is no multicollinearity (20). The tolerance value obtained between nutritional knowledge level and food preference is 0.984, which is greater than 0.10, and the VIF value is 1.016, which is less than 10. Therefore, there is no multicolinearity. The regression model examined according to the effect of nutrition knowledge level and food preference on women's self-esteem is significant (F (2,363)=3.111, p<.05). R square value is a statistic that shows how much of the variability in the predicted variable is explained by the independent variables (Pallant, 2017). 2.7% of the variability in self-esteem scores is explained by nutritional knowledge level and food preference scores. LNKAS (B=-0.08, t=-2.689, p<.05) significantly predicts the self-esteem levels of women's children in a negative direction. Since there is a 1 unit increase in LNKAS scores, there is a 0.08 unit decrease in women's self-esteem scores. In this regression model examined, food preference (FBT) is not a significant predictor for women's self-esteem (p>.05). The established regression equation is; Self Esteem=24.195-0.08* LNKAS (Table 6).

Table 6. Reggession table					
IV	**B**	**S.E.**	**β**	**t**	**p**
Constant	24.195	2.434		9.939	0
FPS	-0.057	0.035	-0.085	-1.611	0.108
LNKAS	-0.08	0.047	-0.089	-2.689	**0.042**
Mod. statistics	$F_{(2.363)}$=3.111; p<.05 R^2=0.027				
IV: independent variable, S.E.: standard error					

DISCUSSION

Women are the most affected by nutritional problems in society due to their various physiological periods of major hormonal changes such as pregnancy, breastfeeding and menopause (21). In addition, the nutrition of the children and family is generally the accountability of women and they have an important role in decisions related to nutrition in the society (22,23). The findings obtained from the study conducted to determine whether there is any relationship between nutritional knowledge level and self-esteem in adult women with type 2 DM were discussed in line with the literature.

In the study, it was found that the average scores of primary nourishment and food option of women were both at an intermediate level. In previous studies, it has been found that the nutritional wont and knowledge levels of teachers were inadequate (24,25) and Akgöz et al. (2021) found that the nutritional knowledge equalitys of students in the faculty of sport sciences were poor, unlike our study (26). In Karakuş Kayalı et al.'s (2023) with physical education teachers, similar to our study, it was found that the mean scores of basic nutrition and food preference sub-dimensions of nutrition knowledge levels of teachers were at a moderate level (27). In Önen and Güngör's (2023) study, nutritional knowledge and food preference knowledge of women were at an intermediate level. Although the nutritional knowledge of the women was at an intermediate level in the present study, it was determined that half of them were obese, they did not perform regular physical activity and the majority of them skipped their meals. Inadequate and unbalanced nutrition leads to many chronic diseases, especially obesity (23,27). Nutritional knowledge also influences the nutritional status and habits of families, especially women (28). It is important that women are given practical trainings on adequate and balanced nutrition by health professionals. On the other hand, the fact that women stated that there was a relationship between nutrition and health above the average can be seen as a positive finding of the study.

Studies have shown that individuals with higher income levels have higher BMI (29-31). The basic nutrition knowledge levels and self-esteem of those with good income status are higher than those with low-income status. However, the majority of the women were in the study were in the overweight and obese group according to BMI. It can be thought that higher income leads to obesity by causing more food consumption and calorie intake with increased purchasing power of individuals. Socioeconomic status is one of the factors affecting an individual's self-esteem (32). Döğücü and Başer

(2021) found that self-esteem increased as income level increased in women. It is thought that a person's high financial income level, meeting their needs, changes in their eating and drinking habits may lead to an increase in self-confidence and self-esteem (33).

In the development of healthy lifestyle behaviors in women, it is important to indicate the negative effect of smoking on diabetes (34). In a study, it was found that smokers had more inadequate and unbalanced eating habits than non-smokers (35). Smoking affects adequate and balanced nutrition and nutritional knowledge (36). In this study, food preferences of non-smokers were better than those of smokers. It can be considered as a natural finding of the study that non-smoking women have better food preferences than smokers due to their better healthy lifestyle behaviors.

Those with any chronic disease other than type 2 diabetes had better basic nutrition knowledge. In the study, hypertension was found to be the most common chronic disease in addition to diabetes in women. Chronic diseases such as diabetes and hypertension are closely related to the weight and nutrition of individuals (37). Having both diseases may have increased women's search for information about nutrition, thus increasing their level of basic nutritional knowledge.

In the study, it was observed that those who had any chronic disease other than DM had lower self-esteem than those who did not. Self-esteem is the state of liking and respecting the characteristics that the individual uses to define themselves. Self-esteem is also closely related to how satisfied the individual is with themselves and how much they value themselves. Self-esteem is affected by many conditions such as physical appearance, health status, and illness (38).

Herring et al. (2014) found that participation in physical activity had positive effects on physical self-concept and self-esteem in young women. In the study conducted with Ouyang et al. (2020) with students, it was observed that participation in sports had a positive effect on self-esteem (39). The study found that women who regular physical activity had higher self-esteem than those who did no or partial physical activity. Our study findings were similar to the literature. Physical activity is thought to have positive effects on women's self-esteem.

In the study, it was determined that there was no relationship between the basic nutrition knowledge level of adult women with type 2 DM and their food preferences and self-esteem. No relevant study was found in the literature. Unlike our study, Durak and Yılmaz (2022) determined that there was a relationship between nutritional literacy and self-efficacy and self-care behaviors in their study where the majority of the participants were women (40). Basic nutritional knowledge and food preference may be an important variable for women to manage their medical nutrition treatments correctly, develop healthy eating behaviors, make decisions for their own health, develop self-confidence, and use health services effectively, especially in diseases such as DM.

The current study has several limitations. The data was based on parcipitants's self-reports. It was studied on a limited sample.

CONCLUSION

It was found that basic nutrition knowledge and food preferences of women with DM were at a moderate level and their self-esteem was adequate. Women's basic nutritional knowledge levels were affected by income status and having another disease; their food preferences were affected by smoking status; and their self-esteem was affected by income status, having another disease, vitamin and mineral use, and performing regular physical activity. The main finding of the study was that there was no relationship between basic nutrition knowledge, food preferences, and self-esteem in adult women with DM.

For this purpose, diabetes schools and trainings are organized for patients in health institutions. It is important for health professionals to plan individual trainings by determining the nutritional knowledge levels and food preferences of women and to ensure that their self-esteem is increased with diabetes control in the effective management of diabetes and in the promotion of women's health.

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