

ORIGINAL PAPER

**EFFECT OF PLANNED HEALTH EDUCATION ON HEALTHY NUTRITION,  
EXERCISE ATTITUDE, AND PERCEIVED STRESS IN VULNERABLE WOMEN**

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## Summary

**Background.** This study aimed to determine the effect of planned health education provided to women in the vulnerable group on healthy nutrition, exercise attitude, and perceived stress.

**Material and methods.** This study employed a one-group pretest-posttest quasi-experimental design. The sample consisted of vulnerable women (n=30). The participants received a health education program. Data was collected using the Sociodemographic Information Form, Attitude Scale for Healthy Nutrition, Health Belief Model Scale for Exercise, and Perceived Stress Scale.

**Results.** Of the participants, 73.3% were married, 63.3% were high school graduates, 73.3% had a moderate income level, the mean age was  $41.27 \pm 9.61$  years. After the education program, participants' scores in the Attitude Scale for Healthy Nutrition subscales, namely nutritional knowledge, positive nutrition, negative nutrition, and the total score, were found to be higher ( $p < 0.005$ ); participants' scores in the Health Belief Model Scale for Exercise subscales, namely health improvement, cognitive health, continuity, and the total score, were found to be higher ( $p < 0.005$ ); and participants' scores in the Perceived Stress Scale subscales, namely perceived insufficient self-efficacy, perceived stress/discomfort, and the total score, were found to be lower ( $p < 0.005$ ).

**Conclusions.** The study indicated that the planned health education provided to women improved their attitudes towards healthy nutrition and their beliefs about exercise, while reducing their perceived stress.

**Keywords:** perceived stress, vulnerable groups, healthy nutrition, exercise, education

## **Introduction**

Vulnerability, from an epidemiological perspective, refers to an individual's likelihood of becoming ill physically, psychologically, or socially. A vulnerable group typically consists of individuals who, due to certain characteristics or conditions, require greater emotional, psychological, and physical care. These individuals may include children, women, older adults, and migrant individuals. In particular, women may be more vulnerable and sensitive due to various factors [1,2].

Women in vulnerable groups are included in this category due to various factors such as biological differences, social roles, being victims of violence, and economic hardships. Compared to the general population, women in this group are more likely to experience neglect, abuse, violence, have lower levels of education and income, and face greater struggles with physical and mental health problems [3,4]. Therefore, the health attitudes and behaviors of women in vulnerable groups are often not at the desired level. Studies in literature also support this finding [5,6].

Currently, nutrition and exercise are among the most important components of health. These two elements are considered part of healthy lifestyle behaviors. Healthy nutrition refers to eating habits that are practiced with attention to health principles [7]. For women, healthy nutrition is particularly important for maintaining general health, controlling body weight, and adopting a healthy lifestyle [8]. Exercise consists of planned, structured, and voluntary activities aimed at improving physical fitness. Regular exercise provides numerous health benefits and helps reduce the risk and prevalence of chronic diseases, thereby assisting in the prevention of new illnesses [8,9]. Physical inactivity has become a major problem among young adults and adults. However, it is known that interventions implemented to address this issue are beneficial [10].

Stress management, like healthy nutrition and exercise, is also one of the key components of healthy lifestyle behaviors. Perceived stress is associated with levels of well-being. For vulnerable groups, the burden of perceived stress may lead to lifelong physical and psychological problems [11]. Generally, healthy individuals tend to have lower levels of perceived stress and better stress management. Compared to the general population, women perceive higher levels of stress [12].

Women in vulnerable groups are more likely to experience health problems related to unhealthy nutrition, physical inactivity, and stress due to reasons such as limited or lack of access to healthcare services, insufficient health education, and deficiencies in basic skills [13]. It is known that planned interventions contribute to the protection and promotion of health among individuals in vulnerable groups and, consequently, to the development of healthy lifestyle behaviors [14,15]. Planned health education programs and awareness-raising initiatives are among the primary types of such interventions [16]. Planned health education is conducted with the aim of providing individuals with the knowledge and skills necessary to protect and improve their health and to prevent diseases. Education plays a critical role in improving the health status of both individuals and communities and is particularly important for vulnerable groups [17].

Vulnerable women living in underdeveloped or developing regions are also more at risk, and they need to take more responsibility for their health. Türkiye is one of these examples, and literature on the physical and mental health of women in vulnerable groups is limited. For this reason, this study will make important contributions to literature.

## **Aim of the study**

This study aimed to evaluate the changes in healthy nutrition, exercise attitudes, and perceived stress among women in vulnerable groups following the provision of planned health education.

## *Hypotheses*

H<sub>0</sub>: After planned health education, women in the vulnerable group do not change their attitudes to healthy nutrition, exercise beliefs, and perceived stress.

H<sub>1</sub>: After planned health education, women in the vulnerable group change their attitudes to healthy nutrition, exercise beliefs, and perceived stress.

## **Material and methods**

### *Study design, setting, and duration*

This study employed a one-group pretest-posttest quasi-experimental design. The study was conducted between November 2024 and January 2025 with women attending a Family Support Center located in a city center in the Black Sea Region of Türkiye.

### *Population and sample*

The study population consisted of women in the vulnerable group. Women registered at Family Support Centers, which were established under the Ministry of Family, Labor, and

Social Services in Türkiye, are considered among the vulnerable groups. These women are classified as vulnerable due to indicators such as educational attainment, income level, and exposure to violence. For this study, the sample consisted of women registered at the only Family Support Center located in the city center. These women were attending courses at the center to contribute to their economic situation and were invited to participate in the study. Efforts were made to reach the entire population, and the study was completed with women who were actively attending the courses during the study period (n=30). The appropriate sample size of the study was ensured by the OpenEpi program, which is open to public use.

Inclusion criteria: (1) Being registered at the Family Support Center; (2) Having no barriers to attending the education sessions; (3) Volunteering to participate.

Exclusion criteria: (1) Not attending the education sessions; (2) Incomplete, incorrect, or missing posttest responses.

### ***Data collection tools***

The study data was collected by the researcher through face-to-face interviews using a pretest-posttest design. The data collection tools were placed in envelopes for storage, and access to personal data by third parties was prevented.

### ***Height, weight measurement, and body mass index (BMI) calculation***

Height and weight measurements were taken using standard measuring instruments after the introduction of the education program and before administering the pretests. BMI values were calculated according to the World Health Organization classification [18].

### *Sociodemographic Information Form*

This form was prepared based on a literature review to collect sociodemographic data from the participants [15,19].

### *Attitude Scale for Healthy Nutrition*

Developed by Demir and Cicioğlu, this scale measures attitudes toward healthy nutrition. It consists of 21 items and 4 factors: nutritional knowledge, emotional attitude towards nutrition, positive nutrition, and negative nutrition. The scale uses a 5-point Likert format. Negative items included items 6, 7, 8, 9, 10, 11, 17, 18, 19, 20, and 21. The minimum score was 21, and the maximum score was 105. Cronbach's alpha coefficient was reported as 0.90 in the original study [20] and 0.83 in the present study.

### *Health Belief Model Scale for Exercise*

Developed by Caz et al., this scale measures health beliefs related to exercise. It consists of 20 items and 3 factors: health improvement, cognitive health, and continuity. It uses a 7-point Likert format. There are no reverse-scored items. Higher scores indicated stronger health beliefs regarding exercise. Cronbach's alpha coefficient was reported as 0.94 in the original study [21] and 0.88 in the present study.

### *Perceived Stress Scale*

Developed by Eskin et al., this scale measures perceived stress. The scale, available in both long and short forms, consists of 14 items. It is structured with 2 factors: perceived insufficient self-efficacy and perceived stress/discomfort. The scale uses a 5-point Likert format. Some items are reverse scored (items 4, 5, 6, 7, 9, 10, and 13). Cronbach's alpha coefficient was reported as 0.94 in the original study [22] and was found to be 0.91 in the present study.

### *Planned Health Education*

Content of the education program: (1) Introduction of the participants and overview of the education program; (2) Healthy nutrition; (3) Physical activity and exercise; (4) Perceived stress and stress management; (5) Sharing of participants' experiences.

Duration of the education program: The education program was conducted over four weeks with one session per week. Each session lasted approximately 1.5 hours.

Location and timing of the education sessions: The education sessions were held weekly at the conference hall of the Family Support Center, scheduled according to the times determined by the center's director. The sessions were organized in accordance with community-based education principles. The conference hall was equipped with a projector, a computer, and a smart board necessary for presentations. Additionally, there was a fitness room where women could spend their free time. This room was used for the workshop conducted after the physical activity and exercise session.

Methods and techniques used in the education program: The education sessions, prepared in accordance with the needs of the target audience, were delivered through lectures

accompanied by PowerPoint presentations. Each session began with warm-up exercises. Additionally, at the end of the physical activity and exercise session, a practical exercise workshop was conducted under the supervision of a physiotherapist. At the end of the perceived stress and stress management session, a deep breathing exercise and positive suggestion workshop were organized with the support of a psychologist.

### ***Statistical analysis***

The data was analyzed using the SPSS for Windows 22 software package. In the data analysis, frequencies, percentages, minimum and maximum values, means, and standard deviations were calculated; the paired samples t-test and the Wilcoxon signed-rank test were also applied. The normality assumptions of the data were evaluated based on kurtosis and skewness coefficients ( $\pm 2$ ). The internal consistency of the scales was assessed by calculating Cronbach's alpha coefficients [23].

### **Results**

As shown in Table 1, 73.3% of the participants were married, 63.3% were high school graduates, 73.3% had a moderate income level, and all were housewives. Among the participants, 60% had no diagnosed disease, 63.3% did not use any medication regularly, 76.7% did not follow a special diet program, and 93.3% did not participate in any special exercise program. In addition, 96.7% of the participants reported having a stressful life, all of them believed that healthy nutrition and exercise would have a positive impact on stress, and none of them had previously received any health education. The mean age of the participants was

41.27±9.61 years, and the mean BMI was 28.96±5.04. Based on the BMI mean value, the majority of the participants were classified as "overweight".

**Table 1.** Sociodemographic characteristics of the participants

Sociodemographic characteristics				n	%
Marital status	Married			22	73.3
	Single			8	26.7
Education level	Primary school graduate			3	10.0
	Middle school graduate			8	26.7
	High school graduate			19	63.3
Income level	Good			1	3.3
	Moderate			22	73.3
	Poor			7	23.3
Occupation	Housewife			30	100
Presence of disease	Yes			12	40.0
	No			18	60.0
Regular medication use	Yes			11	36.7
	No			19	63.3
Following a special diet program	Yes			7	23.3
	No			23	76.7
Following a special exercise program	Yes			2	6.7
	No			28	93.3
Perceiving life as stressful	Yes			29	96.7
	No			1	3.3
Belief that healthy nutrition and exercise relieve stress	Yes			30	100
Previous health education	No			30	100
Descriptive characteristics	n	Min.	Max.	Mean	SD
Age (years)	30	23.00	58.00	41.27	9.61
BMI (kg/m <sup>2</sup> )	30	18.74	40.88	28.96	5.04

As shown in Table 2, participants scored 18.80±3.94 points in the “Nutritional Knowledge” subdimension at pretest and 23.33±2.11 points at posttest, and the difference between the two scores was statistically significant ( $p<0.005$ ). In the “Positive Nutrition” subdimension, the pretest score was 19.27±3.88, and the posttest score was 21.47±3.70, with the difference being statistically significant ( $p<0.005$ ). In the “Negative Nutrition” subdimension, the pretest score was 19.60±4.61, and the posttest score was 22.27±3.30, and

again the difference was statistically significant ( $p<0.005$ ). The total score of the scale increased from  $75.07\pm 12.29$  at pretest to  $86.07\pm 9.98$  at posttest, showing a statistically significant difference ( $p<0.005$ ).

**Table 2.** Distribution of scores from the Attitude Scale for Healthy Nutrition and subdimensions

Attitude Scale for Healthy Nutrition		n	Mean	SD	Test	Significance	Cohen's d
Nutritional Knowledge	Pretest	30	18.60	3.94	-6.830*	0.000	-1.247
	Posttest	30	23.33	2.11			
Emotional Attitude Towards Nutrition	Pretest	30	17.60	6.26	-1.417*	0.167	-0.259
	Posttest	30	19.00	5.66			
Positive Nutrition	Pretest	30	19.27	3.88	-3.040**	0.002	-0.631
	Posttest	30	21.47	3.70			
Negative Nutrition	Pretest	30	19.60	4.61	-3.395*	0.002	-0.620
	Posttest	30	22.27	3.30			
Total score	Pretest	30	75.07	12.29	-5.596*	0.000	-1.022
	Posttest	30	86.07	9.98			

Notes: \* Paired samples t-test, \*\* Wilcoxon signed-rank test.

The participants scored  $47.30\pm 10.33$  points in the “Health Improvement” subdimension at pretest and  $57.03\pm 7.57$  points at posttest, and the difference between the two scores was statistically significant ( $p<0.005$ ). In the “Cognitive Health” subdimension, the pretest score was  $34.97\pm 4.18$ , and the posttest score was  $39.27\pm 3.20$ , with a statistically significant difference ( $p<0.005$ ). In the “Continuity” subdimension, the pretest score was  $21.03\pm 7.70$ , and the posttest score was  $27.03\pm 5.39$ , and the difference was statistically significant ( $p<0.005$ ). The total scale score increased from  $103.30\pm 16.31$  at pretest to  $123.33\pm 11.05$  at posttest, showing a statistically significant difference ( $p<0.005$ ) (Table 3).

**Table 3.** Distribution of scores from the Health Belief Model Scale for Exercise and subdimensions

Health Belief Model Scale for Exercise		n	Mean	SD	Test	Significance	Cohen's d
Health Improvement	Pretest	30	47.30	10.33	-8.166	0.000	-1.491
	Posttest	30	57.03	7.57			
Cognitive Health	Pretest	30	34.97	4.18	-6.355	0.000	-1.160
	Posttest	30	39.27	3.20			
Continuity	Pretest	30	21.03	7.70	-5.174	0.000	-0.945
	Posttest	30	27.03	5.39			
Total score	Pretest	30	103.30	16.31	-9.708	0.000	-1.772
	Posttest	30	123.33	11.05			

Notes: \* Paired samples t-test.

The participants scored  $16.77 \pm 5.39$  points in the “Perceived Insufficient Self-Efficacy” subdimension at pretest and  $12.03 \pm 3.69$  points at posttest, with a statistically significant difference between the two scores ( $p < 0.005$ ). In the “Perceived Stress/Discomfort” subdimension, the pretest score was  $16.60 \pm 4.51$ , and the posttest score was  $11.63 \pm 3.44$ , and the difference was statistically significant ( $p < 0.005$ ). The total scale score decreased from  $33.37 \pm 9.02$  at pretest to  $23.67 \pm 6.88$  at posttest, showing a statistically significant difference ( $p < 0.005$ ) (Table 4).

**Table 4.** Distribution of scores from the Perceived Stress Scale and subdimensions

Perceived Stress Scale		n	Mean	SD	Test	Significance	Cohen's d
Perceived Insufficient Self-Efficacy	Pretest	30	16.77	5.39	-4.346**	0.000	1.275
	Posttest	30	12.03	3.69			
Perceived Stress/Discomfort	Pretest	30	16.60	4.51	8.281*	0.000	1.512
	Posttest	30	11.63	3.44			
Total score	Pretest	30	33.37	9.02	-4.600**	0.000	1.658
	Posttest	30	23.67	6.88			

Notes: \* Paired samples t-test, \*\* Wilcoxon signed-rank test.

## Discussion

The results of the study indicated that the planned health education provided to women in the vulnerable group improved their attitudes toward healthy nutrition and their health beliefs regarding exercise while reducing their perceived stress, thereby confirming the H<sub>1</sub> hypothesis.

According to this study, the participants' attitudes toward healthy nutrition improved positively after the education program. Literature emphasizes that comprehensive educational interventions have positive effects on both nutrition and exercise behaviors and contribute to the development of health-related behaviors [17,24]. In a study conducted with women in Türkiye, it was found that participants' scores for healthy lifestyle behaviors, including nutrition and physical activity, increased significantly following the education program [25]. Similarly, in a study conducted with pregnant women living in rural areas in Indonesia, a significant improvement was observed in participants' nutritional knowledge, attitudes, and practices after receiving nutrition and reproductive health education [26]. In a study conducted with overweight individuals, it was reported that theory-based education successfully promoted behaviors related to healthy nutrition and adequate physical activity, and that the education program was effective [27]. In the present study, however, the observed increase in the "Negative Nutrition" subdimension, one of the healthy nutrition attitudes, was an unexpected result. Literature emphasizes that despite interventions targeting the education, knowledge, and practices of vulnerable groups, unforeseen outcomes may still occur in nutritional behaviors [28]. This finding is also considered an unexpected outcome, and it is suggested that future studies should further investigate and interpret the underlying reasons for such occurrences.

According to the study, participants' health beliefs regarding exercise improved positively after the education program. One of the greatest health problems facing adults today is overweight and the inability to manage weight effectively. When examining the BMI values

of the women who participated in this study, it was found that they were classified as overweight. Considering that physical activity and exercise play a key role in maintaining health and preventing chronic diseases, the effectiveness of educational programs becomes evident [29]. The findings of this study support this notion. It has been shown that while most studies on physical activity education focus on physiological changes, there is a limited number of studies examining exercise-related beliefs and attitudes [30,31]. In one study, an increase in exercise scores was observed among university students following a 12-week health education program [32]. The results of another study evaluating education programs conducted by nutrition and exercise practitioners indicated that physical activity interventions could enhance exercise levels by changing individual attitudes [33]. Similarly, another study demonstrated that exercise interventions delivered by healthcare professionals in primary care settings improved exercise attitudes [10]. Although the findings of the present study are consistent with literature, it is suggested that more evidence-based exercise interventions are needed.

According to the results of this study, participants' perceived stress levels decreased after the education program. While an increase in perceived stress is considered a mental health problem, it has been reported that women experience higher levels of perceived stress and that specialized interventions are needed [12]. Furthermore, literature often associates mental health problems with exercise and nutrition, emphasizing that multi-component interventions may help reduce stress [34]. Similarly, in a study where stress management education was provided, participants' perceived stress levels significantly decreased [35]. In another study, stress management education was provided to pregnant women, and participants' perceived stress levels decreased after the education [36]. In a study conducted with university students, it was reported that a healthy lifestyle education program positively influenced healthy lifestyle behaviors. Moreover, while stress management skills were low due to perceived stress before the education program, an improvement in stress management was observed after the program

[37]. Both the findings of the present study and those of previous studies provide evidence that education-focused interventions can be effective in reducing perceived stress.

### *Strengths and limitations*

Women in the vulnerable group are known to experience many health-related challenges. Planned health education provided by health professionals can support health attitudes and behaviors. This study indicated the benefits of planned education programs for women in vulnerable groups. However, this study can only be generalized to women in the vulnerable group. For similar future studies, the educational content could be more innovative and could be expanded to cover a broader range of topics.

### **Conclusions**

The study indicated that the planned health education program provided to women in the vulnerable group improved their attitudes toward healthy nutrition and their health beliefs regarding exercise, while also reducing their perceived stress. Based on these results, it is recommended to promote similar educational interventions. Community professionals should effectively utilize their advocacy roles for vulnerable groups and select appropriate approaches by identifying specific objectives. Interdisciplinary collaborations are also suggested to be more beneficial in planned health interventions targeting vulnerable groups.

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Artificial intelligence (AI) was not used in the creation of the manuscript.

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