Progress in Nutrition 2022; Vol. 24, N. 3: e2022050 DOI: 10.23751/pn.v24i3.12379

Original article

A Scale Development Study to Measure Knowledge Levels of Obesity Prevention Methods: Obesity Struggle Knowledge Scale

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Abstract. In this cross-sectional prospective study, it was aimed to develop a scale to measure the knowledge levels of individuals on obesity struggle methods. The study was conducted on a total of 422 participants, 285 (67.5%) women and 137 (32.5%) men, who applied to our clinic with weight complaints between June 2019 and March 2020. A survey including baseline characteristics and Obesity Struggle Knowledge Scale with 15 items was applied to participants. EFA results showed that all items in the scale had factor weights higher than 0.40 with acceptable range. Kaiser-Meyer-Olkin (KMO) level showed that sample is adequate for the Principle Component Analysis (KMO: 0.817). Three factors with five items for each factor were found as "Nutrition Knowledge", "Physical Activity Knowledge", and "Medical Support Knowledge". CFA analysis results showed that the scale had good fit with EFA results (CMIN/DF: 3.355; AGFI: 0.921; CFI: 0.955; IFI: 0.955; RMSEA: 0.075). Medical support knowledge had the highest mean, followed by physical activity and nutrition knowledge. All factors had higher reliability values. There were positive correlations between total obesity knowledge score with nutrition knowledge ($r=0.608$; $p<0.01$), physical activity knowledge ($r=0.399$; $p<0.01$) and medical support knowledge ($r=0.627$; $p<0.01$). There was positive and significant correlation between nutrition knowledge and medical support knowledge ($r=0.141$; $p<0.01$). The scale may apply to large samples, it can be determined which group needs more information in studies such as public service advertisements and education to be carried out to struggle with obesity. By this way, it may be possible to use public resources more efficiently and to reach individuals more effectively in health.

Key words: obesity, nutrition, physical activity, medical treatment.

Introduction

Obesity, which has increased with the spread of urbanization and sedentary life, is an important public health problem that affects both the quality of life and health levels of individuals today (1-3). Obesity can be seen in all segments of society and in all ages. In addition, the serious effects of obesity on health have been demonstrated by studies (4-7). For this reason, the struggle against obesity should be carried out more actively and successfully.

Various classifications have been made to struggle obesity. Among these, the most general classification, three headings as medical methods, individual methods and nutrition come to the fore (8-9). While individual methods include physical activities to prevent weight gain, nutrition methods include individuals' nutritional knowledge level. Medical methods, on the other hand, have spread to a developing area that is discussed under the headings such as medication and surgical intervention (10-12).

Although studies have been conducted on obesity and struggle methods, the contributions of individuals to obesity struggle have not been adequately covered in the literature. Therefore, in this study, it was aimed to develop a scale to measure the knowledge levels of individuals on obesity struggle methods.

Methods

The research was carried out as a prospective cross-sectional study. The study was conducted on a total of 422 participants, 285 (67.5%) women and 137 (32.5%) men, who applied to our clinic with weight complaints between June 2019 and March 2020. Participation in the study was voluntary and a consent form was obtained from each participant. While determining the sample of the study, referring to Cohen et al (13), the minimum number of participants was determined as 384 people, and this number was reached in the study. Also, the Kaiser-Meyer-Olkin sampling adequacy coefficient shows that the research sample is sufficient. Inclusion and exclusion criteria were determined as follows:

- Not having a serious health problem requiring malignancy and drug use
- Having complaints about obesity
- Not having a psychological or psychiatric diagnosis
- Not having any obstacle to participate in research

In the study, nominal and ordinal data were defined by frequency analysis, while scale scores were defined by mean and standard deviation values. Principal Component Analysis was performed for Explanatory Factor Analysis (EFA), varimax rotation and Kaiser-Meyer-Olkin (KMO) test were used. Anti-image correlations of all items were examined and Barlett's Test of Sphericity test was used. The scale structure obtained according to the factor analysis results was also analyzed by Confirmatory Factor Analysis (CFA) in the AMOS program. Cronbach Alpha internal consistency coefficients were calculated for the reliability of the obtained dimensions. Spearman's rho correlation analysis for the relationship between EFA analyzes and scale sizes were performed in SPSS 17.0 for Windows program. CFA is made in AMOS 14.0 for Windows program. All analyzes were carried out at 95% confidence interval and 0.05 significance level.

Results

Minimum age of participants was 29 and maximum age was 58 with 46.60±6.06 mean. 67.5% of participants were females, 32.5% were males. Weight mean was 103.14±11.88 with 81.3-165.0 kg range. Height mean was 1.71±0.04 with 1.58-1.78 cm range. BMI mean was 35.19±4.44 and range was 27.14-60.61. 4.3% of patients had family obesity history, and 11.1% had one or more chronic diseases (Table 1).

EFA results showed that all items in the scale had factor weights higher than 0.40 with acceptable range. Kaiser-Meyer-Olkin (KMO) level showed that sample is adequate for the Principle Component Analysis. EFA results were in accordance with initially formatted structure of the form. Thus, three factors with five items for each factor were found as "Nutrition Knowledge", "Physical Activity Knowledge", and "Medical Support Knowledge" (Table 2).

CFA analysis results showed that the scale had good fit with EFA results (CMIN/DF: 3.355; AGFI: 0.921; CFI: 0.955; IFI: 0.955; RMSEA: 0.075) (Figure 1).

Table 1. Some baseline characteristics of participants

Parameter	Value
Age, mean ±SD	46.60±6.06
Gender, n (%)	
Female	285 (67.5)
Male	137 (32.5)
Weight, mean ±SD	103.14±11.88
Height, mean ±SD	1.71±0.04
BMI, mean ±SD	35.19±4.44
Family history, n (%)	18 (4.3)
Chronic disease, n (%)	47 (11.1)

SD: Standard Deviation, BMI: Body Mass Index.

Table 2. Explanatory Factor Analysis (EFA) results

No	Factors/Items	Factors		
		1	2	3
	Factor 1: Nutrition knowledge			
1	I pay attention to the calories of the products I eat.	0.897		
2	I learn from professional sources about nutrition.	0.887		
3	I pay attention to nutrition according to my physical activity level.	0.804		
4	I pay attention to nutrition in proportion to my body weight.	0.782		
5	I stay away from foods that cause weight.	0.786		
	Factor 2: Physical activity knowledge			
6	I exercise regularly.		0.864	
7	I do physical activity outside of my job to avoid gaining weight.		0.867	
8	I do physical activity according to my body weight and daily work.		0.883	
9	I follow a specific physical activity schedule.		0.863	
10	I learn from professional sources about physical activity.		0.520	
	Factor 3: Medical support knowledge			
11	Not all methods are reliable to lose weight.			0.895
12	I get information about weight loss from professional sources.			0.785
13	It is essential to get expert support in the fight against obesity.			0.904
14	Not all weight loss drugs available in the market are safe.			0.868
15	Surgical intervention may be advantageous at a certain stage in the fight against obesity.			0.897
KMO: 0.817; X^2: 4481.920; p<0.001; total variance explained: 71.311%				

KMO: Kaiser-Meyer Olkin Statisticts.

Medical support knowledge had the highest mean, followed by physical activity and nutrition knowledge. All factors had higher reliability values (Table 3).

Spearman's correlation analysis results showed that there were positive correlations between total obesity knowledge score with nutrition knowledge (r=0.608; p<0.01), physical activity knowledge (r=0.399; p<0.01) and medical support knowledge (r=0.627; p<0.01). There was positive and significant correlation between nutrition knowledge and medical support knowledge (r=0.141; p<0.01) (Table 4).

Discussion

In this study, it is aimed to develop a scale for measuring the knowledge levels of individuals in combating obesity (14-15). Obesity is an important issue affecting public health with its increasing incidence and prevalence rates. Obesity is a public health problem that decreases the quality of life of individuals, also causes other health problems and negatively affects the treatment processes (16-18).

Individual and public measures should be taken regarding obesity and struggle methods. The increase in the number of obese individuals in the society increases the burden on the health system (19-21). In the process of combating obesity, medical methods, nutritional methods and measures to increase physical activities of individuals are taken (22-25). Among these, which one is more effective or which is necessary is determined by case.

The scale developed in the research shows these three areas of struggle. The general obesity knowledge level of the participants is high. The highest score that can be obtained from each dimension of the scales is 25, the lowest score is 5. In all scale sizes, an average of over 18 was seen. In order, medical support

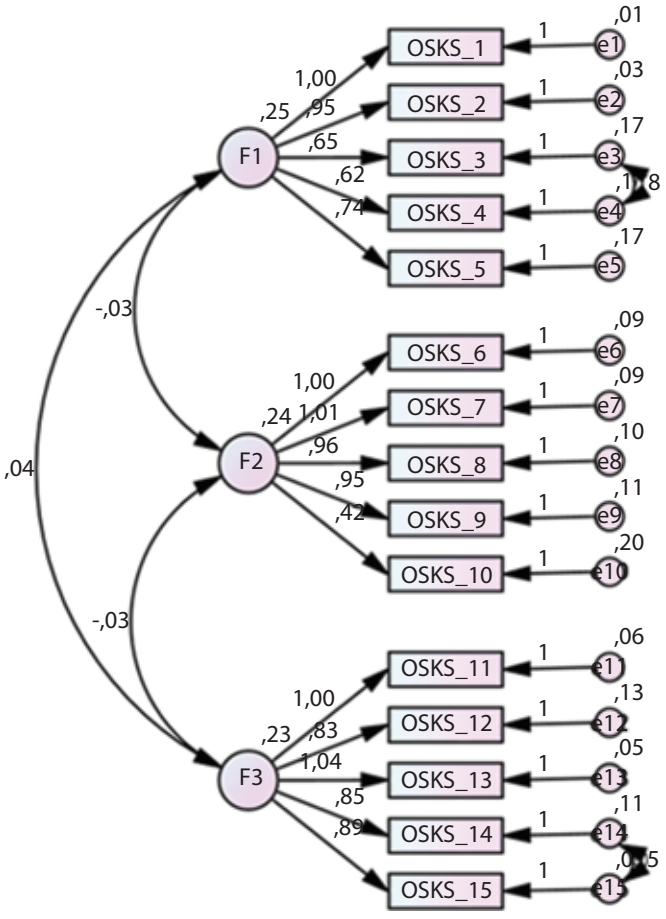

Figure 1. CFA results for OSKS

Table 3. Cronbach Alpha and mean values of scale factors

	Cronbach alpha	Mean ±SD
Nutrition Knowledge	0.889	18.71±2.17
Physical Activity Knowledge	0.868	18.91±2.24
Medical Support Knowledge	0.922	18.97±2.32
Total Obesity Struggle Knowledge	0.758	56.59±3.84

SD: Standard Deviation.

Table 4. Spearman's rho correlation analysis results between factors and total score

	Nutrition Knowledge	Physical Activity Knowledge	Medical Support Knowledge
Physical Activity Knowledge	-0.058		
Medical Support Knowledge	0.141**	-0064	
Total Obesity Struggle Knowledge	0.608**	0.399**	0.627**

**p<0.01

information is the highest dimension, followed by physical activity and nutrition information.

According to correlations between the OSKS dimensions the highest relation between the total knowledge levels is with the medical support dimension, followed by nutrition and physical activity. A statistically significant and positive correlation was found between the level of nutritional knowledge and medical support knowledge. These results show that it is more common to seek nutritional and medical support in general to combat obesity. Here, the research points out that while the society sees dietician or bariatric surgery areas as a solution, people having obesity problem do not see physical activity as a part of the solution.

Although participation to the survey is adequate for sampling according to statistical methods, single centered nature of the research is the main limitation of the study. Mutli-centered studies may give more sophisticated results to understand knowledge levels of OSKS.

Conclusion

The results obtained in the study revealed that OSKS is an adequate and reliable tool for measuring the knowledge levels of individuals in the fight against obesity. Although it is accepted that invasive and surgical methods are mandatory after some stage in the fight against obesity, with the increase in the knowledge level of the individuals, the scale can play an important role in the success of the treatment after the intervention. Also, measuring the level of knowledge of individuals in the process of drug treatment and determining the treatment process can contribute to the prevention of more serious interventions or surgical processes.

In terms of public health, the scale that can be applied to large samples, it can be determined which group needs more information in studies such as public service advertisements and education to be carried out to struggle with obesity. By this way, it may be possible to use public resources more efficiently and to reach individuals more effectively in health. Cross comparisons can be made by applying scale sizes on different demographic structures and samples.

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