Investigation of psychometric properties of Turkish version of nursing students' attitudes and beliefs towards Childhood Obesity Scale

Remziye Semerci [a,*], Özge Mengi Çelik [b], Aslı Akdeniz Kudubeş [c]

[a] *Koç University, School of Nursing, Department of Child Health and Disease Nursing, İstanbul, Turkey*
[b] *Trakya University, Faculty of Health Science, Department of Nutrition and Dietetics, Edirne, Turkey*
[c] *Bilecik Şeyh Edebali University, Faculty of Health Science, Department of Child Health and Disease Nursing, Bilecik, Turkey*

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ABSTRACT

Aim: This study aimed to evaluate the Turkish psychometric properties of The Attitudes and Beliefs of Nursing Students Towards the Childhood Overweight Scale.
Methods: The study was conducted with 219 nursing students. The data were obtained with the 'Information Form' and the 'Attitudes and Beliefs of Nursing Students Towards Childhood Overweight. Strengthening the Reporting of Observational Studies in Epidemiology guidelines was implemented in the study.
Result: Original scale was created using the Attitudes Towards Obese Person Scale (ATOP) and the Beliefs About Obese Persons Scale (BAOP). ATOP consists of 13 items and two sub-dimensions (self-concept, social relationships) in a 5-point Likert type that evaluates nursing students' attitudes towards childhood obesity. BAOP is 5-point Likert-type and consists of 6 items that evaluate nursing students' beliefs on childhood obesity. When the item-total score correlations were examined in the study, two items showing a negative correlation in the "ATOP" were removed. Cronbach's alpha was 0.80 for the ATOP and 0.83 for the BAOP. In the exploratory EFA and confirmatory CFA factor analyses, the factor loading of all items was >0.40 for both scales.
Conclusion: It was determined that Turkish psychometric properties of the Nursing Students' Attitudes and Beliefs towards Childhood Obesity Scales were valid and reliable.

Introduction

Obesity, which is the conclusion of the negative effects of the new lifestyle and nutritional habits brought by the modern age, has become one of the most common diseases in the World (Azevedo et al., 2022; Mado et al., 2021). At the same time, the incidence of childhood obesity is a significant public health problem with an increasing incidence (Garcia et al., 2016; Gurnani et al., 2015; Haqq et al., 2021). According to the World Health Organization (WHO) report, In 2016, approximately 1.9 billion people aged 18 and older were overweight. Over 650 million of these people were obese. Also, 39 million children under the age of 5 are overweight or obese (World Health Organization, 2021). Considering the worldwide increase in this health crisis and the negative effects of childhood obesity on physical and emotional health, prevention, early diagnosis, and treatment of childhood obesity are important (Azevedo et al., 2022).

Children who are overweight or obese are more likely to be obese than adults and to have noncommunicable diseases (World Health Organization, 2020). The increasing global trend in childhood obesity and its short-term and long-term health problems make it a health problem that concerns nurses worldwide (Ben-Sefer, 2009; World Health Organization, 2020). In this context, nurses have a critical role in managing childhood obesity (Hauff et al., 2019; Whitehead et al., 2021). Therefore, effective communication between nurses and obese individuals is necessary to manage obesity (Whitehead et al., 2021). After nurses accept obesity as a health problem, taking essential nursing interventions plays a crucial role in their success (Thompson et al., 2021). Finally, nurses' beliefs and attitudes that they will benefit from the interventions they will take in the fight against obesity will increase the motivation of the patients and will contribute positively to the prevention and treatment of obesity (Ray et al., 2022; Thompson et al., 2021). Positive attitudes and beliefs towards obesity should be established among nurses during undergraduate education. For this reason, it is essential to include subjects on childhood obesity in undergraduate programs so that nurses can full fill their roles and responsibilities effectively and develop knowledge and skills in this regard (Tsai et al.,

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2018). Considering the importance of this global problem, which has long-term repercussions on child health, nursing students should work with children and families to receive training that will help them identify children in the risk group and produce viable solutions to reduce the risk of obesity in children (Ben-Sefer, 2009; Tsai et al., 2018).

Although childhood obesity is an increasing problem, there is limited literature examining nurses' knowledge and attitudes towards obese children (Tsai et al., 2019). In addition to this situation, studies dealing with the attitudes and beliefs of student nurses towards childhood obesity are also insufficient (Tsai et al., 2018). According to Ben-Sefer (2009), the inclusion of education programs on childhood obesity in undergraduate programs enables nursing students to approach obese children with the right attitude in their future careers (Ben-Sefer, 2009). In this context, it is essential to determine nursing students' attitudes towards obese children because it is reported that the attitude of nurses who constantly interact with patients can affect interpersonal communication (Tsai et al., 2018). Nursing students' negative attitudes about obesity may cause their interactions with patients to deteriorate (Budd et al., 2011). It is underlined that healthcare providers who deal with obese people are prejudiced towards them and are unwilling to provide them with treatment and education (Brownell &Walsh, 2017). Nursing students' views regarding obese children may develop through clinical and educational experiences, and these attitudes may persist following graduation. Negative attitudes among nursing students can prevent children from receiving quality care (Ozaydin & Tuncbeden, 2022). Additionally, overweight or obese children who are exposed to negative attitudes from nurses/nursing students or other health professionals are more likely to have low self-esteem and a negative body image; all of this, with all the negative effects of being overweight or obese, can be devastating for children and even cause depression and anxiety (Brownell & Walsh, 2017; Puhl & Lessard, 2020). Therefore, assessing nursing students' attitudes and beliefs towards childhood obesity will help nursing faculties develop a curriculum that is targeted and will prepare nursing students to better care for these children. However, there is no measurement tool in our country that evaluates the attitudes and beliefs of nursing students towards childhood obesity. In this context, this study aimed to assess the Turkish psychometric properties of the scale named 'The Attitudes and Beliefs of Nursing Students Towards Childhood Overweight.

Methods

Study design

In this study, a developmental and methodological design includes an evaluation of the construct validity and internal consistency of Turkish psychometric properties of Nursing Students' Attitudes and Beliefs towards the Childhood Overweight/Obesity Scale. The 'Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guideline was followed in the implementation of the research (Von Elm et al., 2007).

Study setting

This study was conducted with nursing students at two Health Sciences Faculties in Turkey between January 2022 and March 2022.

Participants

The participants have completed nursing subjects such as fundamentals of nursing, medical-surgical nursing, and child health and diseases nursing; therefore, have been provided content related to the normal growth, development, and nutritional needs of children. In Turkey, nursing students completed these lessons in third and fourth grade. Therefore, the study population consisted of 3rd and 4th grade nursing students who are students in the nursing program between January 2022 and March 2022.

For scale adaptations, it is recommended to choose a sample of at least 2–20 in the number of scale items (Arafat et al., 2016). Given the number of items on the scale and for taking good results, the researchers planned to include at least 190 students.

The inclusion criteria for participation were being a nursing student, having completed fundamentals nursing and child health and diseases nursing courses, and being willing to participate in the research.

Ethical considerations

To carry out this study, ethical approval was from the Non-Interventional Clinical Research Ethics Committee (TÜFT-GOBAEK 2021/530). Institutional approval was obtained from both universities' deans. Written permission for cultural adaptation was taken from Dr. Lauretta Luck via e-mail. Also, nursing students were informed regarding the study's purpose and their written and verbal consent were obtained before the participation. The students who participated in the research were asked to fill out the informed volunteer consent form, which explained the aim of the study. Students were informed that they could leave the study whenever they wished.

Data collection tools

Data were collected with a Questionnaire Form and Scale for The Attitudes and Beliefs of Nursing Students towards Childhood Overweight/Obesity.

Questionnaire Form

This form which was completed by nursing students includes the descriptive characteristics, and it consists of 6 questions regarding each student's age, gender, class, weight, height, and body mass index.

Scale for the attitudes and beliefs of nursing students towards childhood overweight/obesity

The scale was developed by Tsai et al. in 2018 to evaluate nursing students' attitudes and beliefs towards childhood overweight/obesity (Tsai et al., 2018). The children's version of the scale was adapted from Allison's scale on the Attitudes Towards Obese Persons Scale (ATOP) and Beliefs About Obese Persons Scale (BAOP) (Allison, 1995). The scale includes 19 items and a five-point Likert type (1 = Strongly disagree, 2 = Disagree, 3 = Undecided, 4 = Agree, 5 = Strongly agree). ATOP children's version is divided into two categories; the self-concept category (1, 2, 3, 4, 6, 7th item) and the social relations category (5, 8, 9, 10, 11, 12, 13th item). Reverse items in the scale are items 7, 8, 9, 10, 11, 12, and 13. Higher scores indicate more positive nursing students' attitudes towards obese children. The Cronbach's alpha value for the ATOP children version was 0.76 (Tsai et al., 2018). In this study, Cronbach's alpha was 0.80 for ATOP children version.

BAOP children version consists of 14, 15, 16, 17, 18, and 19 items. Higher scores indicate a stronger nursing students' belief that obesity is not under the control of obese children. The Cronbach's alpha value for the BAOP children version was 0.75 (Tsai et al., 2018). In this study, Cronbach's alpha was 0.83 for the BAOP children version.

Data analysis

The data were analyzed with the IBM SPSS Statistics for Windows (Version 26.0. Armonk, NY: IBM Corp) and AMOS 26 software. Descriptive statistics were obtained, including frequencies, percentages, means, and standard deviations. Polit and Back methods were used for calculated scale-level content validity index (S-CVI) and item–content validity index (I-CVI) (Polit et al., 2007).

Reliability

To determine the reliability of the children's version of the ATOP and BAOP, internal consistency analyses including item-total correlation and Cronbach's α coefficient were calculated. The values ≥0.20 for item-total correlation and ≥ 0.70 for Cronbach's α were considered acceptable (Streiner et al., 2015).

Validity

The internal construct validity of the children's version of the ATOP and BAOP was assessed by exploratory (EFA) and confirmatory factor analysis (CFA). The sufficiency of the sample size and suitability of the data for the EFA were examined by Kaiser Meyer Olkin (KMO) test and Bartlett's test, respectively (Arafat et al., 2016). The KMO value of >0.5 with Bartlett's test *p*-value of <0.05 was considered suitable for factor analysis. The factors were retained based on eigenvalues of >1. To evaluate the factors' goodness of fit, the ratio of the Chi-square test of the model fits the degrees of freedom (x^2/df) [values of 5 or less], the Comparative Fit Index (CFI: > 0.90 acceptable), Goodness of Fit Index (GFI: > 0.90 acceptable), and the Root Mean Square Error of Approximation (RMSEA: < 0.08 acceptable) were used (Streiner et al., 2015).

Procedure

Translation of scale

The authors obtained permission via e-mail from the scale owner to evaluate the Turkish psychometric properties of the scale named 'Attitudes and Beliefs of Nursing Students Towards Childhood Overweight/Obesity. Three health professionals who were familiar with the terminology of the translated scale and had experience in interviewing/data collection took part in the translation process of the scale (World Health Organization, 2017). Three experts translated the scale from English to Turkish. After the translation was finished, the researchers evaluated the semantic, idiomatic, conceptual, linguistic, and contextual differences by comparing different translations to create a single Turkish form (Sousa & Rojjanasrirat, 2011). Also, the researchers ask for some word meaning from the authors of the original scale (for example, worker; children).

Specialist opinions and content validity

It is recommended to get opinions from at least 3–20 experts for content validity. In this study, opinions were obtained from 11 academicians who are experts in childhood obesity for content validity. S-CVI and I-CVI were calculated using Polit and Back's content validity index (Polit et al., 2007). Experts were asked to rate the translated scale in Turkish and the original version between 1 and 4 (1 = very little change required, 2 = little change required, 3 = appropriate and 4 = very convenient) to evaluate the suitability of the items of the scale. Scale content index and item content index were calculated separately for each item of the scale. Items with 1 and 2 points on the scale items were changed according to the experts' recommendation. The item–content validity index (I-CVI) ranged from 0.91 to 0.99, and the scale-level content validity index (S-CVI) was 0.97, which was coherent.

Preliminary test

The World Health Organization recommends that back-translation should be done after taking expert opinion (World Health Organization, 2009). In this study, back translation was carried out by two translators after receiving expert opinions. The Turkish form of the scale was translated into English by two linguists who knew Turkish and English well (Yasir, 2016). After back translation, the scale was compared with its original version, necessary adjustments were made, and the scale was made ready for preliminary test.

It was suggested that the scale be applied to 10 to 40 participants who had similarities with the sample population but were not included

Table 1

The characteristics of the participants (*n* = 219).

ATOP children's version.

Item-total correlation analysis showed items 6 and 7 have negative values, therefore these two items were removed from the scale. The corrected item-total correlation values of the items ranged from 0.26 to 0.62. The Cronbach alpha value was 0.81 for the remaining 11 items (Table 2). Cronbach's alpha value for factor 1 was 0.71, and it was 0.77 for factor 2.

Variables	$\tilde{x}\pm$SS
Age (years)	21.3 ± 1.8
Gender (n, %)	
Female	169 (77.2)
Male	50 (22.8)
Class	
Third class	162 (74)
Fourth class	57 (26)
Body mass index (kg/m²)	22.2 ± 3.6
Underweight (<18.5 kg/m²)	23 (10.5)
Healthy weight (18.5–24.99 kg/m²)	160 (73.1)
Overweight (≥25.00–29.99 kg/m²)	32 (14.6)
Obese (≥30.0 kg/m²)	4 (1.8)

Table 2

Item-total correlation and Cronbach's α coefficient values of ATOP children's version.

KMO and Bartlett's sphericity test results revealed that the sample size was sufficient (KMO = 0.807), and the items were appropriate (Bartlett's test: χ² = 659.70, *p* < 0.001) for the factor analysis. EFA indicated that the ATOP children version had two factorial structures with eigenvalues exceeding 1 which accounted for 49.3 % of the total variance. Factor 1 consisted of 5 items (items 1, 2, 3, 9, 10) which accounted for 25.7 % of the total variance. Factor 2 (which accounted for 23.6 % of the total variance) consisted of five items (items 4, 5, 8, 11, 12, 13) (Table 3).

Items	Corrected item-total correlation coefficients	Cronbach's alpha value when the item is eliminated
Item 1	0.26	0.81
Item 2	0.38	0.80
Item 3	0.42	0.79
Item 4	0.48	0.79
Item 5	0.57	0.78
Item 8	0.48	0.79
Item 9	0.47	0.79
Item 10	0.62	0.77
Item 11	0.38	0.80
Item 12	0.61	0.77
Item 13	0.45	0.79

in the study sample (Beaton et al., 2000). In this context, the scale was applied to 30 nursing students. As a result of the pilot application, the comprehensibility of each item was evaluated. There was no negative feedback from students. The 30 students who were involved in the pilot study were excluded from the main sample, and the study was conducted with 219 students. Reliability and validity analyses of the scale were performed.

Results

Participant characteristics

A total of 219 participants (169 female, 50 male) with a mean age of 21.3 ± 1.8 years were enrolled in the study. 74 % of them were third

Table 3

Factor Loadings for the items of the ATOP children's version.

CFA controlled the dimensional structure of the ATOP children version obtained in the EFA. Modifications were made to optimize the dimensional structure of the scale according to the modification indices, which suggested adding a covariance between error items. The two-factor model (Fig. 1) showed acceptable goodness-of-fit indices. (X^2/df = 2.151, RMSEA = 0.073, GFI = 0. 932, CFI = 0.924).

	Factor 1	Factor 2
1. Overweight/obese children are as happy as non-overweight/obese children.		0.458
2. Most overweight/obese children feel that they are not as good as other children.		0.711
3. Most overweight/obese children are more self-conscious than other children.		0.756
4. Overweight/obese children cannot be as successful as other workers.	0.737	
5. Severely overweight/obese children are usually untidy.	0.754	
8. Most overweight/obese children have different personalities than non-overweight/obese children.	0.458	
9. Most overweight/obese children resent normal-weight children.		0.660
10. Overweight/obese children are more emotional than non-overweight/obese children.		0.669
11. Overweight/obese children should not expect to lead normal lives.	0.760	
12. Overweight/obese children tend to have family problems.	0.573	
13. One of the worst things that could happen to a person would be for him/her to become overweight/obese.	0.618	

class. The mean body mass index (BMI) was 22.2 ± 3.6 kg/m². According to the body mass index classification, most individuals (73.1 %) have healthy body weight. 14.6 % of individuals are overweight, and 1.8 % are obese. The characteristics of the participants are presented in Table 1.

Discussion

Cronbach's alpha is a measure of internal consistency, that is, how closely related a set of items is as a group. It is considered to be a measure of scale reliability. A reliability coefficient of 0.70 or higher is considered "acceptable" in most health science research situations (Çapık et al., 2018; Tavakol & Dennick, 2011). In this study, the α values of the ATOP and BAOP children's versions were more significant than 0.70 (Table 2). It was determined that the items adequately measured nursing students' attitudes and beliefs towards childhood overweight/obesity, and the scale had high reliability. In the original Tsai et al. (2018) study, α values were >0.70 (Tsai et al., 2018). The results show that the scale is similar to its original structure and has a strong internal consistency.

The item-total correlation is provided in the reliability procedure. To prove whether the items in the scale measure the variable to be measured, it is recommended to perform an item-total score analysis (Field, 2013). The acceptable value should be >0.20, as close to 1 as possible, and in the positive direction (Field, 2013). In this study, two items with ATOP children's version were excluded from the scale because their value was <0.20 and was negative direction. After removing the two items found in ATOP children's version, the values were >0.20, and there was a positive direction also for ATOP and BAOP children's versions (Tables 2 and 4). The item correlation values of this study are similar to the original scale study (Tsai et al., 2018).

The Kaiser-Meyer-Olkin (KMO) analysis and Bartlett Sphericity test measure how suited your data is for Factor Analysis. The test measures sampling adequacy for each variable in the model and the complete model. KMO values between 0.8 and 1 indicate that the sampling is adequate. The Bartlett Sphericity test result should be statistically significant (Boateng et al., 2018). The analysis results presented in Tables 3 and 5 in this study show that the study database and sample size are

Table 4

Item-total correlation and Cronbach's α coefficient values of BAOP children version.

KMO and Bartlett's test results revealed that the sample size was sufficient (KMO = 0.864), and the items were appropriate (Bartlett's test: χ^2 = 460.75, $p <$ 0.001) for the factor analysis. EFA indicated that the BAOP had one factorial structure that accounted for 55.92 % of the total variance (Table 5).

Items	Corrected item-total correlation coefficients	Cronbach's alpha value when the item is eliminated
Item 1	0.58	0.82
Item 2	0.60	0.82
Item 3	0.54	0.83
Item 4	0.72	0.79
Item 5	0.61	0.81
Item 6	0.66	0.80

Table 5

Factor Loadings for the items of the BAOP children's version.

The dimensional structure of the ATOP children's version obtained in the EFA was controlled by CFA. The One-factor model (Fig. 2) showed acceptable goodness-of-fit indices. (X^2/df = 2.190, RMSEA = 0.074, GFI = 0. 969, CFI = 0.976).

	Factor 1
1. Overweight/obesity often occurs when eating is used as a form of compensation for lack of love or attention.	0.708
2. Overweight/obesity is usually caused by overeating.	0.728
3. Most overweight/obese children cause their problems by not getting enough exercise.	0.677
4. Most overweight/obese children eat more than non-overweight/obese children.	0.831
5. The majority of overweight/obese children have poor eating habits that lead to their overweight/obesity.	0.744
6. Children can be addicted to food, just as others are addicted to drugs, and these children usually become overweight/obese.	0.788

sufficient for factor analysis. Tsai et al. (2018), the sample size is less than in this study. However, factor analysis results show similarities with this study (Tsai et al., 2018).

Explained variance refers to the variance explained by each of the principal components. It is an essential indicator of construct validity. The explained variance ratio should be above 40 %. The higher the explained variance ratio, the stronger the construct validity of the scale (Finch, 2019). The variance explained for ATOP and BAOP children's versions in this study was over 40 %, indicating a strong construct validity (Tables 3 and 5). In this study, the explained variance ratio was similar to the original scale's value (Tsai et al., 2018).

Exploratory factor analysis is a statistical technique used to reduce data to a smaller set of summary variables and explore the phenomena' underlying theoretical structure. It is used to determine under which sub-dimension the scale items will be placed. It is recommended that the minimum factor load be 0.30 and above. Items below 0.30 should be excluded from the scale (Finch, 2019). In the original form of the scale, the factor loads of the items in the ATOP children's version ranged from 0.39 to 0.85, and the factor loads of the items in the BAOP children's version ranged from 0.42 to 0.81 (Tsai et al., 2018). In this study, it was determined that the factor loads of the ATOP and BAOP children's versions items were above 0.30, they were similar to the original study and had a strong factor structure (Tables 3 and 5). In this study, two subdimensions were formed, similar to the original scale.

The literature emphasizes that the scale structure revealed by EFA should be examined by confirmatory factor analysis (CFA) (Brown,
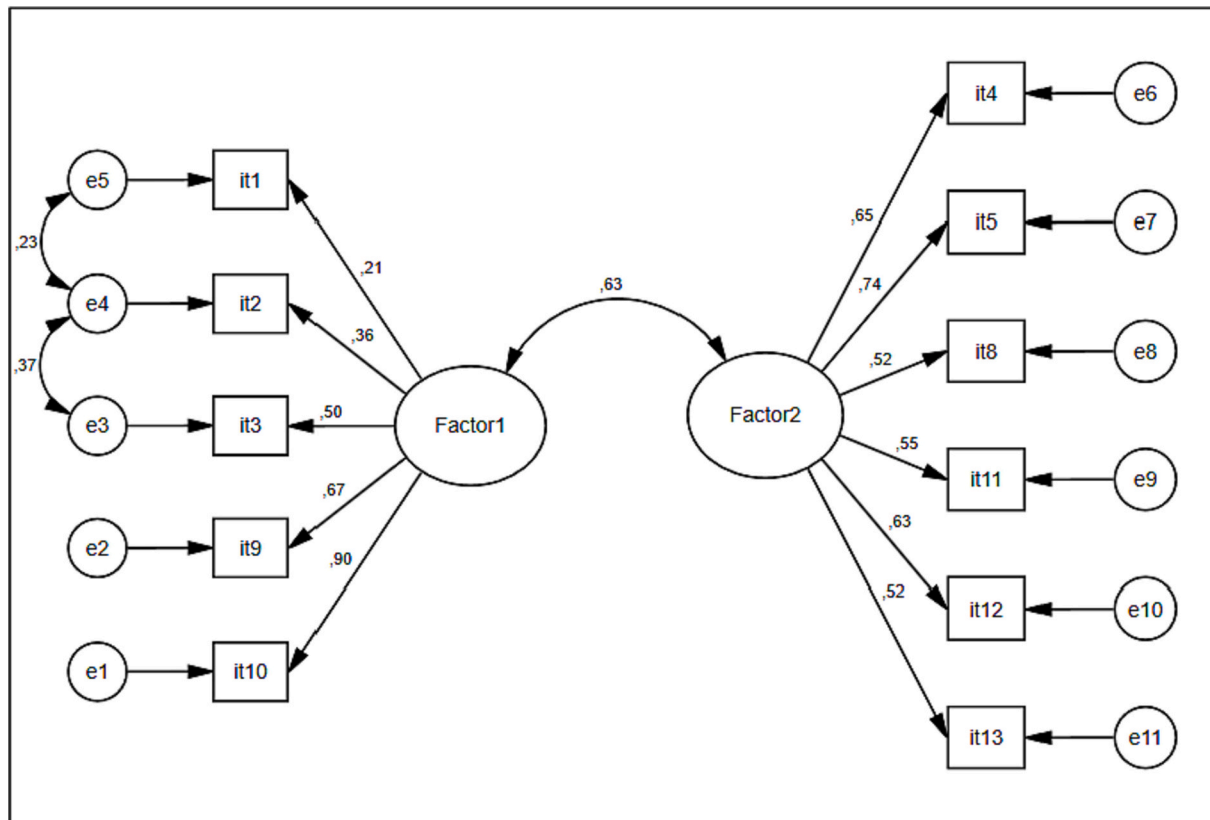
Fig. 1. A two-factor model of the ATOP children's version.

BAOP children's version

The corrected item-total correlation values of the items ranged from 0.58 to 0.72. The Cronbach alpha value was 0.84 for the scale (Table 4).
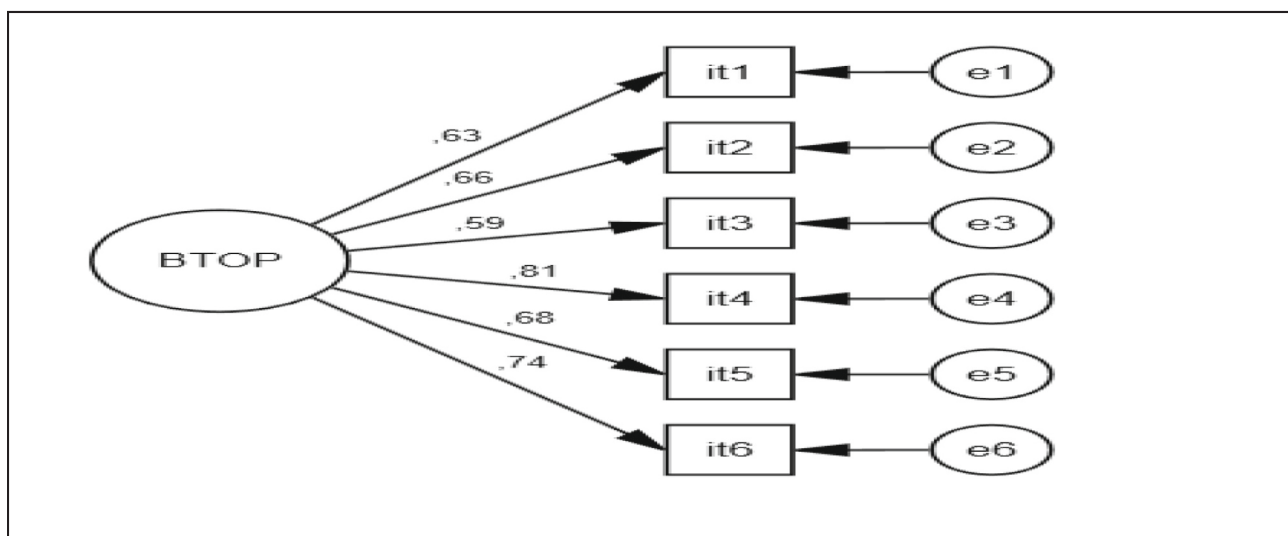

Fig. 2. One-factor model of the BAOP children's version.

2015). In the validity and reliability studies of the scale, the chi-square value divided by the degrees of freedom as a result of the CFA analysis (X^2/df) should be <5. It was also emphasized that the root mean square approximation (RMSEA) value should be <0.08. Model fit indices >0.90 are accepted as an indicator of good fit (Brown, 2015; Marsh et al., 2020; Xia & Yang, 2019). This study determined that the DFA results of ATOP and BAOP children's versions met the criteria specified in the literature (Figs. 1 and 2). A comparison could not be made because DFA results

were not presented in the original scale (Tsai et al., 2018).

Limitations

The study's main limitation was the small sample size. Scale development studies have been recommended as sample size: excellent, up to 1000; very good, up to 500; good, up to 300; fair, up to 200; and poor, up to 100. While there are different disagreements over what constitutes a

suitable sample size, for the validation sample, future studies should be conducted the studies with substantial sample sizes.

Conclusion

These results showed that ATOP and BAOP children's version is a valid and reliable tool for evaluating Turkish nursing students' attitudes and beliefs towards childhood obesity. Health professionals, especially nurses who provide regular care to childhood obese patients and are in constant interaction with them, have important responsibilities in the prevention, treatment, and care of the disease at all stages of healthcare services (protective, therapeutic, and rehabilitative). Nurses are in an essential position as educators and role models for children, families, and society in promoting healthy nutrition and physical activity that will reduce the risk of obesity or being overweight. Nurses' attitudes and beliefs towards obese children should be evaluated with appropriate measurement tools for these reasons. Considering the negative attitudes of nurses/nursing students towards childhood obesity, it should not be forgotten that these negative attitudes can have devastating effects on the child and trigger stress in the child. In line with this information, studies are needed to determine the impact of nursing students'/nurses' attitudes towards childhood obesity on children's self-concept/self-esteem and their possible effects on child depression.

Declaration of competing interest

The authors declare no known conflict of interest.

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