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# The Turkish Version of The Laval Quality of Life Questionnaire Reliability and Validity in Obesity

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## ABSTRACT

Obesity is a disease that affects quality of life. This study was planned to evaluate the Turkish validity and reliability of the LAVAL quality of life questionnaire. The study was conducted in Izmir Bayraklı District Health Directorate Healthy Life Center No. 1 (October 1, 2021-November 15, 2021) and Gaziemir Municipality (November 15, 2021-March 15, 2022). Dokuz Eylul University Ethics Committee accepted the study on 22.12.2021, with the decision number 2021/38-08. People with a body mass index  $\geq 30$  kg/m<sup>2</sup> and who met the inclusion/exclusion criteria were included in the study. In addition to the Laval Questionnaire, the SF-12 general health quality of life questionnaire and the Obese Specific Quality of Life Scale were used. For the adaptation of the Turkish version of the questionnaire, language validity was first ensured by the back translation method. The mean age of the 235 volunteer participants was  $49.11 \pm 13.1$  years. The Kaiser-Meyer-Olkin coefficient for exploratory factor analysis was calculated as 0.92. RMSEA was 0.61 (RMSEA<0.80). Cronbach's alpha value, which is an indicator of the internal consistency coefficient of the Laval Questionnaire in obese individuals, was calculated as 0.95. Obesity Specific Quality of Life and SF-12 Quality of Life Scale scores were found to have a statistically significant effect on the Laval Questionnaire score ( $p<0.05$ ). The Laval Questionnaire is a valid and reliable questionnaire to measure the quality of life of individuals with obesity in the Turkish population.

**Keywords:** quality of life, obesity, validity, and reliability

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# Obezitede 'The Laval Quality of Life' Anketi Türkçe Versiyonu Güvenilirlik ve Geçerlilik

## ÖZ

Obezite yaşam kalitesini etkileyen bir hastalıktır. Bu çalışma LAVAL yaşam kalitesi anketinin Türkçe geçerlilik ve güvenilirliğini değerlendirmek amacıyla planlandı. Araştırma İzmir Bayraklı İlçe Sağlık Müdürlüğü 1 No'lu Sağlıklı Hayat Merkezi (1 Ekim 2021-15 Kasım 2021) ve Gaziemir Belediyesi'nde (15 Kasım 2021-15 Mart 2022) yürütülmüştür. Dokuz Eylül Üniversitesi Etik Kurulu 22.12.2021 tarihinde 2021/38-08 karar numarası ile çalışmayı kabul etmiştir. Vücut kitle indeksi  $\geq 30$  kg/m<sup>2</sup> olan ve çalışmaya dahil edilme/dışlanma kriterlerini karşılayan kişiler çalışmaya dahil edilmiştir. Laval Anketi'ne ek olarak SF-12 genel sağlık yaşam kalitesi anketi ve Obezlere Özgü Yaşam Kalitesi Ölçeđi kullanılmıştır. Anketin Türkçe versiyonunun uyarlanması için öncelikle geri çeviri yöntemiyle dil geçerliliđi sağlanmıştır. Gönüllü 235 katılımcının yaş ortalaması  $49,11 \pm 13,1$ 'dir. Açıklayıcı faktör analizi için Kaiser-Meyer-Olkin katsayısı 0.92 olarak hesaplanmıştır. RMSEA 0,61'dir (RMESA<0,80). Obez bireylerde Laval Anketi'nin iç tutarlılık katsayısının bir göstergesi olan Cronbach alfa değeri 0,95 olarak hesaplanmıştır. Obez Özgü Yaşam Kalitesi ve SF-12 Yaşam Kalitesi Ölçeđi puanlarının Laval Anketi puanı üzerinde istatistiksel olarak anlamlı bir etkiye sahip olduđu bulunmuştur ( $p<0,05$ ). Laval Anketi, Türk toplumunda obezite sorunu yaşıyan bireylerin yaşam kalitesini ölçmek için geçerli ve güvenilir bir ankettir.

**Anahtar Kelimeler:** yaşam kalitesi, obezite, geçerlilik ve güvenilirlik

## 1 Introduction

Obesity is a chronic, recurrent, and progressive public health problem (Brown et al. 2021). As a common noncommunicable disease, it seriously threatens human life and public health and impairs quality of life (Aldubikhi 2023; Wharton et al. 2020). Today, health professionals agree that medical parameters will be insufficient for evaluating individuals as healthy. For this purpose, quality of life scales are increasingly used to measure and evaluate the results of medical interventions (Shah, Keerthi, and Gali 2023). Obesity can cause physical, mental, and economic problems. Treatment strategies include diet, physical activity, behavioural therapy, pharmacotherapy, and surgery (Alqunai et al. 2022; Donini et al. 2017; Therrien et al. 2011). It is important to evaluate quality of life in terms of a holistic approach. In Turkey, studies on scales that evaluate culturally adapted obesity-specific improved quality of life are rare. Therefore, the aim of this study was to evaluate the validity and reliability of the Laval Questionnaire developed for obese individuals.

## 2 Methodology

In this study, in which we investigated the validity and reliability of the Laval questionnaire, which measures quality of life in obese individuals in the Turkish language, 235 participants were included. This study was conducted in primary health care units and in the health unit of the district municipality. The translation method was "back translation". After the three-step translation, a questionnaire was administered to the participants. The Turkish version of the Laval Questionnaire, Short Form-12 and Obese Specific Quality of Life Scale questionnaires were administered.

The Ethics Committee approval of the Dokuz Eylül University Research Ethics Committee was discussed, and the study was accepted with the date 10/06/2021 and the decision number 2021/27-21. Research was conducted at the Bayraklı District Health Directorate No. 1 Healthy Life Centre (1 October 2021-15 November 2021) and Gaziemir Municipality (15 November 2021-15 March 2022).

**Participants:** Inclusion criteria: Patients who volunteered, were literate, aged  $\geq 18$  years, and aged  $\leq 75$  years, had a body mass index (BMI)  $\geq 30$  kg/m<sup>2</sup>, or were able to follow instructions to complete the questionnaires. Individuals affected by psychiatric illness were considered to constitute an exclusion criterion.

**Translation Method:** The language validity of the Laval Questionnaire was assessed using the "back translation" method. A linguist who is proficient in both culture and language translated into Turkish (V1). Later, a second linguistics expert translated the questionnaire back into French. A third linguistics expert checked all translations and compared them with the original version (V2). To identify incomprehensible questions and to obtain information about the comprehensibility of the questionnaire, 11 questions about the Turkish version were administered to ten people with obesity. The third linguistics expert re-examined the translation, and the final Turkish version was used.

**Assessment:** Patient demographic information was recorded. The Turkish version of the Laval Questionnaire, SF-12, and Obese-Specific Quality of Life Scale were used to assess quality of life. All the questionnaires were read and answered individually by the participants. The Laval Questionnaire was developed in French by Therrien F. et al.(Therrien et al. 2011). Each item was calculated on a 7-point Likert scale. The total score is obtained by summing the sub parameter scores. The Laval Questionnaire has no cut-off value, and a high score corresponds to good quality of life(Therrien et al. 2011).

Patrick et al. developed the Obese-Specific Quality of Life Scale (Patrick, Bushnell, and Rothman 2004). It is a 6-point Likert-type scale consisting of 17 items. This scale is one-dimensional and has no subdimensions. The raw scores determined were converted into standardized scores between 0 and 100 using the formula. A high score is indicative of good quality of life (Patrick et al. 2004).

Soylu et al. performed a reliability and validity study of the Turkish version of the SF-12 Quality of Life Scale that assesses activity and role limitations resulting from physical or emotional problems (Soylu and Kütük 2022).

**Study size:** The sample size was determined based on a 5:1 ratio, where the sample size is expected to be at least five times the total number of items in the questionnaire (Kwon and Kim 2021).

**Statistical analysis:** Explanatory factor analysis and confirmatory factor analysis (CFA) were performed. Reliability analyses and test-retest analyses of the questionnaire were also performed. All analyses were performed with IBM SPSS 26. The AMOS 24 package was used for confirmatory factor analysis. The final version of the model, the goodness-of-fit index (GFI), was interpreted. The significance level ( $\alpha$ ) was set to 0.05 for all the analyses. The Shapiro–Wilk test was used to check whether the Laval Questionnaire scores were normally distributed between the groups. The descriptive values of the continuous variables in the study are presented as the mean, median and standard deviation. The descriptive values of the discrete variables are presented as numbers and percentages. Since the variables were not normally distributed ( $p < 0.05$ ), analyses were performed with nonparametric test methods. The Spearman correlation coefficient was calculated in the analysis of the relationships between the scales.

### 3 Results

Our study included 172 women and 48 men, for a total of 235 volunteer participants, who received routine counselling due to obesity at the Bayraklı District Health Directorate Healthy Life Center and Gaziemir Municipality (Table 1).

**Table 1:** Demographic and clinical information of participants

	Mean ± SD
Age (years)	49,11 ± 13,1
Sex (f/m)	172/48 (78,2%/21,8%)
Body weight (kg)	91,96 ± 15,26
Height (cm)	162,58 ± 8,75
BMI (kg/m <sup>2</sup> )	34,76 ± 5,05
Waist circumference (cm)	107,1 ± 11,51
SD: standard deviation, BMI: body mass index, f:female, m:male, kg:kilogram, cm: centimeter, m:meter	

Validity and Reliability of the Laval Questionnaire: In the application, first, the Kaiser–Meyer–Olkin (KMO) test was used to check the suitability of the sample number for analysis, and then Bartlett's test of sphericity was applied to test the statistical significance of the model. The percentage of variance explained for the dimension was determined to be 6.22. The percentage of the total variance explained by the Laval Questionnaire model, which was adapted into Turkish and consists of 44 items and 6 dimensions, was calculated as 57% (Table 2).

**Table 2:** Item factor values and descriptive statistical values of items

Question Number	Activity/Mobility (Mean±SD)	Symptoms (Mean±SD)	Hygiene (Mean±SD)	Emotions (Mean±SD)	Social Interaction (Mean±SD)	Sexual Life (Mean±SD)	Factor Items (Mean±SD)
6	4,12±1,57						0,41
7	4,02±1,59						0,51
26	3,89±1,98						0,69
27	3,55±1,92						0,78
28	4,75±1,97						0,74
29	4,5±1,93						0,70
30	4,23±1,92						0,76
31	5±1,78						0,51
32	3,67±2,16						0,54
1		4,77±1,71					0,53
2		3,5±1,39					0,55
3		3,16±1,85					0,44
4		4,27±1,87					0,61
20		3,61±1,89					0,54
21		4,59±1,69					0,62
22		3,33±1,85					0,68
23		5,86±1,53					0,61
24		4,67±2,01					0,60
25		4,38±2,09					0,47
14			3,86±1,91				0,66
41			5,9±1,67				0,65
42			5,93±1,65				0,60
43			4,6±2,26				0,63
44			4,35±1,93				0,57
5				3,58±1,52			0,56
13				5,16±1,94			0,56
15				3,81±1,51			0,45
16				4,4±1,60			0,38
17				4,28±1,60			0,64
18				4,77±1,81			0,49
19				4,14±1,34			0,42
35				4,37±1,57			0,69
36				4,22±1,49			0,75
38				5,06±1,71			0,45
39				4,23±2,02			0,69
8					4,82±2,16		0,47
9					5,57±1,61		0,69
10					5,67±1,58		0,71
11					5,2±1,75		0,73
33					5,38±1,89		0,52
34					5,32±1,74		0,53
40					5,41±1,80		0,44
12						4,45±1,93	0,60
37						5,11±1,65	0,45
Variance explanation percentage	<b>17,83</b>	<b>9,09</b>	<b>7,89</b>	<b>8,35</b>	<b>7,40</b>	<b>6,42</b>	<b>57,00</b>

Laval Questionnaire Confirmatory Factor Analysis (CFA): CFA was applied to control the scale model established with AFA. The  $\chi^2$  value was 1993.48. The degree of freedom of the second model was 873. The  $\chi^2/SD$  ratio, which was calculated to test the significance of the model, also decreased to 2.28. A  $\chi^2/SD$  value less than 3 is the most basic GFI that reflects the statistical significance of the model. The RMSEA of the newly established model decreased to 0.06. A GFI of 0.90, an NFI of 0.90, an IFI of 0.94 and a CFI of 0.94 were calculated.

Reliability analysis: The Cronbach's alpha ( $\alpha$ ) coefficients for mobility, symptoms, personal hygiene, emotions, social interactions, and sexual life subdimensions were calculated as 0.89, 0.80, 0.81, 0.87, 0.80 and 0.70, respectively. The correlation coefficient values between the items on the Laval Questionnaire ranged from 0.28 to 0.70. Due to the low item correlation total coefficient values, item extraction was not performed, and the 44-item scale was continued.

Test-retest Reliability: The test-retest analysis process was performed in two stages. A significance test of the difference between the two tests and whether the averages changed according to time was applied to 20 participants with an interval of 15 days.

Correlation analysis between variables: In our study, the correlations between the Laval Questionnaire total score and subdimensions and between the Obese-Specific Quality of Life Scale and SF-12 Quality of Life Scale scores were tested using Pearson correlation analysis (Table 3).

**Table 3:** Evaluation of the Relationship Between the Laval Questionnaire and Other Quality of Life Scales

The Laval Questionnaire		Activity mobility	Symptoms	Hygiene	Emotions	Social interactions	Sexual life	Total laval score
Obese-specific QoL	r	-0,58	-0,61	-0,62	-0,66	-0,57	-0,55	-0,70
	p	<0,001*	<0,001*	<0,001*	<0,001*	<0,001*	<0,001*	<0,001*
SF-12 QoL	r	0,52	0,48	0,51	0,47	0,39	0,33	0,54
	p	<0,001*	<0,001*	<0,001*	<0,001*	<0,001*	<0,001*	<0,001*
<i>r: Pearson correlation analysis; QoL: quality of life, *p&lt;0,05</i>								

#### 4 Discussion

Disease-specific quality of life studies have started to attract increased amounts of attention in recent years (Haraldstad et al. 2019). The aim of this study was to evaluate the validity and reliability of the Laval Questionnaire, which was translated from French to Turkish, and to determine whether it is a valid and reliable scale for Turkish obese individuals.

It was reported that during the initial development of the Laval Questionnaire, the questionnaire was a useful tool for research and clinical use (Therrien et al. 2011). The questionnaire was also translated into Italian (Donini et al. 2017). As in these two studies, the average age of the participants was in line with that of our study. The participants had a BMI of 52.6 kg/m<sup>2</sup> (Therrien et al. 2011). In an Italian study, participants' BMIs were approximately 40.4 kg/m<sup>2</sup> and above (Donini et al. 2017). The average BMI of the participants in our study was 34.76 kg/m<sup>2</sup>. Since the sample in our study consisted of individuals

who applied to primary health care services, this value was found to be lower than that reported in other studies. In this case, we showed that the questionnaire can be applied to all obese individuals regardless of the severity of obesity.

The Cronbach's alpha coefficient, in our study, indicated that the scale had excellent reliability (Kang and Ahn 2021). The Laval questionnaire has six sub parameters. Problems that may be caused by obesity are considered in the symptom parameter. Participants received half of the maximum score. According to the European Obesity Study Society 2022 report, as BMI increases, individual physical activity levels decrease (WHO 2023 report). Obesity progresses in individuals whose physical activity level decreases and whose risk of developing other chronic diseases, especially coronary heart disease, diabetes mellitus and cancer, increases (Elagizi et al. 2020). In addition, obesity affects musculoskeletal health and reduces mobility (Jakicic and Davis 2011). The average score of our study participants was 43. Personal hygiene and clothing sub parameters are used to measure the effect of obesity. Backholer et al. reported that people with level 1 or 2 obesity have limitations in their daily living activities (Backholer et al. 2012). It has been emphasized that this picture is getting worse, especially in the elderly population, and they may need care due to disability (Haraldstad et al. 2019). We calculated the symptom score of the people in the study to be 27 on average. Emotions and social interaction sub parameters provide information about the psychological effects of obesity on individuals. Obesity is a disease associated with many psychiatric diseases (Ralph et al. 2022). It has been reported that obese individuals are more likely to be diagnosed with anxiety and depression than are normal weight individuals (Amiri and Behnezhad 2019; Braiji, Abduljawad, and Alrasheedi 2022). In our study, we calculated the participants' score as 51. While the social interaction score reached a maximum of 49 points, we calculated the score of the participants in this study as 40. The relationship between sexual activity and obesity can be discussed in many ways. In a review by Sarwer et al. it was reported that sexual activity is affected by changes in hormonal structure (Sarwer, Lavery, and Spitzer 2012). Weight gain in women is associated with many diseases, such as infertility, amenorrhea, irregular menstrual periods, and polycystic ovary syndrome. In men, it has been emphasized that weight gain can cause sexual dysfunction by causing irregularities in testosterone and other hormones (Sarwer et al. 2012). We calculated the population score for this study as 9. The global score of the entire survey is a maximum of 308. In our study, we calculated the total score as 210. We think that the scores of these parameters will be advantageous in terms of their use in the clinic, especially during patient follow-up. We predict that, whichever parameter is associated with a decrease or increase in the score, the management programme for obesity will be shaped accordingly.

In this study, statistically significant correlations were found between the Obese-Specific Quality of Life and SF-12 Quality of Life scores, which were selected as parallel questionnaires, and between the subdimensions and total score of the Laval Questionnaire. According to the results of the multivariate linear regression model, a one-point increase in the obesity-specific quality of life score resulted in a 1.18-point decrease in the Laval Questionnaire total score. An increase in the score obtained from the SF-12 Quality of Life Scale by 1 point resulted in an increase of 4.14 points in the Laval Questionnaire score. Accordingly, 58% of the Laval Questionnaire scores can be explained by the Obese-Specific Quality of Life and SF-12 quality of life questionnaire scores.

The epidemiology and pathophysiology of obesity have changed, and accordingly, quality of life is affected in many ways (Lin and Li 2021; The Lancet Gastroenterology & Hepatology 2021). Grave et al. reported that the quality of life of obese individuals is affected by the level of physical activity (Kolotkin, Meter, and Williams 2001). Other parameters, such as eating behaviour and the presence of chronic diseases, also affect quality of life in different dimensions (Donini et al. 2020; Osborne,

Costello, and Kellow 2008). It has been observed that eating behaviours are affected during the COVID-19 pandemic (Aldubikhi 2023; Costa et al. 2021). The Laval Quality of Life Questionnaire can inform clinicians about individuals by measuring different parameters. In clinical trials evaluating specific therapeutic interventions for specific diseases, the use of disease-specific tools is recommended for assessing overall quality of life (Wee et al. 2008). The different dimensions of quality of life associated with the different elements that characterize the obesity phenotype can be analysed through the Laval Questionnaire (Kang and Ahn 2021). This study can inform clinicians about the quality of life of people with obesity according to both the sub parameters and the results of the total score on the Laval questionnaire.

## **5 Conclusions**

Obesity, which is seen at a high rate and whose frequency is increasing; It is an important public health problem that is the precursor of many fatal diseases and that seriously affects the quality of life in terms of physical, social, economic, and mental aspects, and it is a situation that cannot be ignored for clinicians. In conclusion, the Laval Questionnaire, which has been shown to be reliable and valid, is a scale that can be used by both clinicians and researchers to evaluate the quality of life of obese individuals in the Turkish population. In future studies, it is thought that it would be appropriate to examine the psychometric properties of the scale, which were not examined in this study, such as sensitivity to change.

## **6 Declarations**

### **6.1 Study Limitations**

Limitations of this study include the fact that we completed our study without considering the size of chronic diseases or categorizing them.

### **6.2 Acknowledgements**

We would like to acknowledge and give thanks to academics G.E., EK and S.S. helped and guided all the translations.

### **6.3 Funding Source**

No financial support was received for this research.

### **6.4 Competing Interests**

There is no conflict of interest in this study.

### **6.5 Authors' Contributions**

AKV and DK conceptualized the overall design. ASV, DK and FH SS analyzed the data and prepared the original draft. DK and FH participated in data interpretation and refining of the article. All authors reviewed and approved the final version of the article.

## 7 Human and Animal Related Study

### 7.1 Ethical Approval

The study was conducted at Bayraklı District Health Directorate No. 1 Healthy Life Centre (1 October 2021-15 November 2021) and Gazıemir Municipality (15 November 2021-15 March 2022). This study was performed in line with the principles of the Declaration of Helsinki. The Ethics Committee approval of the Dokuz Eylul University Research Ethics Committee was discussed, and the study was accepted with the date 10/06/2021 and the decision number 2021/27-21.

### 7.2 Informed Consent

Informed consent form was obtained from all participants for the study that they agreed to participate in the study.

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