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Cultural adaptation, validity, and reliability of the Persian version of the Genital Appearance Satisfaction (GAS) Questionnaire for Iranian women

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Cultural adaptation, validity, and reliability of the Persian version of the Genital Appearance Satisfaction (GAS) Questionnaire for Iranian women

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Abstract

Background: In recent years, there has been growing interest in female genital appearance, leading to increased demand for cosmetic procedures such as labiaplasty in Iran. Women's satisfaction with genital appearance is closely associated with sexual health, body image, and psychological well-being. However, no validated Persian instrument was previously available to assess this construct.

Objective: This study aimed to translate, culturally adapt, and evaluate the psychometric properties of the Persian version of the Genital Appearance Satisfaction (GAS) questionnaire among Iranian women.

Methods: This cross-sectional study was conducted on 317 women candidates for labiaplasty. The GAS was translated using the forward-backward technique, expert committee review, and cognitive interviews. Psychometric evaluation included face and content validity (CVI and CVR), construct validity (exploratory and confirmatory factor analysis), internal consistency (Cronbach's alpha), and test-retest reliability.

Results: Exploratory factor analysis supported a three-factor structure (Impact on relationships and self-confidence, Concerns about appearance and everyday discomfort, and Overall satisfaction with appearance) explaining 58% of the total variance (KMO = 0.817). Content validity indices were excellent (average CVI = 0.98, CVR = 0.85). Most subscales showed acceptable internal consistency (Cronbach's alpha 0.65–0.79), and test-retest reliability was strong (Spearman $r > 0.75$ for all items). Sixty-five percent of participants reported a desire for labiaplasty.

Conclusion: The Persian version of the GAS questionnaire demonstrates good validity and reliability and can be used as a reliable tool for assessing genital appearance satisfaction in Iranian women. It is expected to facilitate clinical decision-making, preoperative counseling, and future research in the field of female genital cosmetic surgery.

Keywords: Genital Appearance Satisfaction, Labiaplasty, Psychometric properties, Cultural adaptation, Persian validation

Introduction

Recently, increasing attention has been directed toward the appearance of female genitalia. Women may modify or enhance genital appearance through grooming, piercing, or cosmetic surgery (1). Genital self-image — an individual's perception and evaluation of her genital appearance —is closely linked to sexual health, behavior, and satisfaction (2, 3). Concerns about genital appearance can arise from low self-esteem, poor body image, emotional issues, or history of sexual abuse (4).

Labiaplasty, which reduces protrusion of the labia minora, has become increasingly common for both functional (e.g., discomfort during activity) and cosmetic reasons (e.g., self-consciousness during intimacy) (5, 6). However, its psychosocial benefits remain controversial, with many procedures performed without strong medical indications (7, 8). The American College of Obstetricians and Gynecologists (ACOG) notes that while such surgeries may improve satisfaction, long-term efficacy requires further evidence (9).

Bramwell and Morland developed the GAS to measure genital appearance satisfaction. Their original study identified three dimensions: genital appearance, impact on daily life, and impact on sexual intercourse (10). Veale et al. further validated the scale in women seeking labiaplasty and linked dissatisfaction to psychological and sexual well-being (11). Given the growing demand for labiaplasty in Iran and the lack of a validated Persian instrument, this study aimed to translate, culturally adapt, and evaluate the psychometric properties of the Persian version of the GAS among Iranian women**.**

Methods

This descriptive cross-sectional study was conducted among women candidates for labiaplasty surgery referring to specialized gynecology and plastic surgery clinics in Iran.

Study Population, Sampling Method, and Sample Size

The study population consisted of women who were candidates for labiaplasty surgery. Convenience sampling was utilized for participant recruitment.

The sample size was calculated based on the formula proposed by Bujang et al. (2018) for psychometric studies focusing on instrument reliability (12).

$$n \geq \left[\frac{2k}{k-1} \times \frac{(z_{1-\frac{\alpha}{2}} + z_{1-\beta})^2}{\ln(\delta)^2} \right] + 2$$

$$\delta = \frac{1 - Cronbach\,0}{1 - Cronbach\,1}$$

Where k is the number of items in the questionnaire (= 11), Cronbach's α_0 is the minimum acceptable Cronbach's alpha (= 0.55), and Cronbach's α_1 is the expected Cronbach's alpha in this study (= 0.65). Considering a significance level of 5%, statistical power of 80%, and 10% potential non-response rate, the final sample size was determined to be 317 participants.

Translation and Cultural Adaptation

The process followed international guidelines for cross-cultural adaptation of self-report measures (13). Two independent forward translations from English to Persian were performed: one by a physician familiar with medical terminology and one by a professional non-medical translator. A synthesized Persian version was created by an expert committee comprising two physicians, a medical student, and a linguist.

Back-translation to English was conducted by two independent translators (one native English speaker fluent in Persian). The committee compared the back-translated version with the original to resolve any discrepancies in semantic, idiomatic, experiential, and conceptual equivalence.

Cognitive Interviews

The pre-final Persian version was administered to a small sample of eligible women (aged over 18 years and native Persian speakers) through individual cognitive interviews. Participants' understanding of each item, any ambiguities, and suggestions for improvement were documented. Necessary modifications were made with the approval of the original questionnaire developers.

Validity and Reliability Assessment

Face validity was evaluated qualitatively through interviews with participants and experts regarding item clarity, difficulty, and relevance. Content validity was assessed both qualitatively (expert panel feedback) and quantitatively using Content Validity Ratio (CVR) and Content Validity Index (CVI) (14).

Construct validity was examined using Exploratory Factor Analysis (EFA) with Kaiser-Meyer-Olkin (KMO) and Bartlett's test, followed by Confirmatory Factor Analysis (CFA). Reliability was assessed via internal consistency (Cronbach's alpha) for the whole scale and subscales, and test-retest reliability (Spearman correlation) in a subsample of at least 30 participants over a two-week interval.

Instrument

The Genital Appearance Satisfaction (GAS) questionnaire was originally developed and published by **Bramwell and Morland** to assess women's satisfaction with the appearance of their genitalia and its psychosocial impact (10,11). Permission to translate and use the questionnaire was obtained from the original developers before commencing this study.

The questionnaire consists of 11 items scored on a four-point Likert scale ranging from 0 (Never) to 3 (Always), with a total score ranging from 0 to 33. Higher scores indicate greater dissatisfaction with genital appearance. Items 1 and 4 are reverse-scored (10).

Data Collection

After explaining the study objectives and obtaining informed consent, participants completed the demographic questionnaire and the Persian GAS while waiting for their appointment. No disruption to routine clinical care occurred.

Statistical Analysis

Data were analyzed using SPSS version 24 and AMOS version 24. Descriptive statistics (mean, standard deviation, frequency, and percentage) were used to summarize participant characteristics. Validity and reliability indices were calculated as described. EFA and CFA were performed to evaluate the factor structure. A p-value < 0.05 was considered statistically significant.

Results

Descriptive characteristics of the participants

A total of 317 women candidates for labiaplasty participated in this study. The mean age of participants was 34.1 ± 10.6 years, mean weight 69.7 ± 11.7 kg, and mean height 162.6 ± 7.7 cm. Regarding marital status, 57.4% were married, 20.8% single, and 21.8% divorced. The majority (49.5%) had a high school diploma. Sixty-five percent of participants expressed a desire for labiaplasty surgery. Detailed demographic characteristics are presented in Table 1.

Table 1. Demographic characteristics of study

Variable	Category	N (%)
Marital status	Single	66 (20.8)
	Married	182 (57.4)
	Divorced	69 (21.8)
Education		
	Undergraduate	56 (17.7)
	Diploma	157 (49.5)
	Bachelor's Degree	41 (12.9)
	Master's Degree	25 (7.9)
	Doctorate and above	38 (12)
Desire for surgery	Yes	206 (65)
	No	111 (35)
	Variable	Mean±SD
	Age	34.1±10.6
	Weight	69.7±11.7
	Height	162.6±7.7

SD; standard deviation

Item response distribution

The frequency distribution of responses to the 11 items of the GAS questionnaire showed a wide range of responses, indicating considerable variation in participants' experiences and attitudes toward genital appearance. The item-level distribution is reported in Table 2. The Persian version of GAS questionnaire was attached in supplementary data.

Question	Never		Sometimes		Often		Always	
	Frequency	percentage	Frequency	percentage	Frequency	percentage	Frequency	percentage
I feel my genitals look normal	68	21.5	119	37.5	99	31.2	31	9.8
I feel my genitals look unattractive	64	20.2	136	42.9	92	29	25	7.9
I feel my labia are too big	64	20.2	140	44.2	92	29	21	6.6
I am happy with the appearance of my genitals	67	21.1	145	45.7	84	26.5	21	6.6
I feel a burning sensation in my labia when exercising/walking	53	16.7	149	47	85	26.8	30	9.5
I feel self-conscious about the appearance of my genitals in sexual situations	59	18.6	146	46.1	89	28.1	23	7.3
I am embarrassed by the appearance of my genitals; it takes away my sexual pleasure	56	17.7	142	44.8	97	30.6	22	6.9
I feel uncomfortable around my genitals when I wear tight clothes	62	19.6	160	50.5	77	24.3	18	5.7
I feel my genitals are visible under tight clothes	53	16.7	162	51.1	78	24.6	24	7.6
I am concerned about the	68	21.5	137	43.2	97	30.6	15	4.7

appearance of my vagina								
I feel like my genitals look asymmetrical or "crooked"	106	33.4	133	42	67	21.1	11	3.5

Table 2. Frequency of responses to items of GAS questionnaire

Exploratory factor analysis

As shown in Table 3, exploratory factor analysis was conducted to examine the underlying structure of the Persian GAS questionnaire. The results indicated that the data were suitable for factor analysis, with a Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy of 0.817. Additionally, Bartlett's test of sphericity was statistically significant ($p < 0.001$), confirming that the correlation matrix was not an identity matrix and that factor analysis was appropriate.

Table 3. KMO statistic

KMO sampling adequacy criterion	0.817
Bartlett test approximation	895.754
Degrees of freedom	55
Significance level	<0.001

Table 4 presents the extracted communalities for each of the 11 items, indicating the proportion of variance in each item accounted for by the extracted factors. A three-factor structure was identified using Varimax rotation. This model explained approximately 58% of the total variance in genital appearance satisfaction. The three factors were labeled as: (1) Impact on relationships and self-confidence, (2) Concerns about appearance and everyday discomfort, and (3) Overall satisfaction with appearance. The eigenvalues, percentage of variance explained by each factor, and factor loadings after rotation are presented in Tables 5 and 6. The scree plot (Figure 1) further supported the retention of three factors.

Table 4. Communalities (Initial and Extracted) for the 11 Items of the GAS Questionnaire

Extracting	The initial amount	Questions
0.606	1	1
0.672	1	2
0.411	1	3
0.574	1	4
0.604	1	5
0.502	1	6
0.509	1	7
0.620	1	8
0.602	1	9
0.648	1	10
0.570	1	11

In response to the research question, what are the components of the satisfaction with genital appearance questionnaire for Iranian women? The following factors are identified and analyzed in order: Impact on relationships and self-confidence Concerns about appearance and everyday discomfort Overall satisfaction with appearance. The Table 5 shows the eigenvalues of the extracted factors with rotation. In this test, factors 1 to 3 have an eigenvalue greater than one, with the first factor explaining 25.960%, the second factor explaining 18.038%, etc. The sum of the variances shows that this questionnaire is able to explain about 58% of the total variance of satisfaction with genital appearance for Iranian women. In the column of initial values, the initial eigenvalues for each of the factors are estimated in the form of the sum of the explained variance. The explained variance is in terms of a percentage of the total variance and a cumulative

percentage. The eigenvalue of each factor is the proportion of the total variance of the variables explained by that factor. The eigenvalue can be calculated by the sum of the squares of the factor loadings of all the variables in that factor; hence the eigenvalues indicate the exploratory importance of the factors in relation to the variables. A low value for a factor means that the factor has played a small role in explaining the variance of the variables. The sum of squares of factor loadings column shows the explained variance of factors whose eigenvalues are greater than one. The squared loadings extraction value column shows the set of extracted factor values after rotation. As can be seen, three factors are capable of explaining the variances if the obtained factors are rotated using the Varimax method.

Table 5. Identifying the contribution of each factor in explaining the total variance of all items

Factors	Initial values			Sum of squares of factor loadings			Sum of squares of factor loadings after rotation		
	factor load	% of variance	Cumulative %	factor load	% of variance	Cumulative %	factor load	% of variance	Cumulative %
Impact on relationships and self-confidence	3.793	34.481	34.481	3.793	34.481	34.481	2.258	25.960	25.960
Appearance concerns and everyday discomfort	1.427	12.974	47.456	1.427	12.974	47.456	1.984	18.038	43.988
Overall satisfaction with appearance	1.148	10.433	57.889	1.148	10.433	57.889	1.528	31.891	57.889

Table 6 shows the contribution of items to the factors after rotation. Each variable is placed in the factor with which it has a significant high correlation .Figure 1 (pebble diagram) is used to determine the optimal number of factors. According to this diagram, it can be seen that from the third factor onwards, the changes in the eigenvalue decrease, so three factors can be extracted as important factors that play the most role in explaining the variance of the data

Table 6. Correlation coefficient matrix between factors after rotation

	1	2	3
Question 8	0.770		
Question 9	0.762		
Question 11	0.753		
Question 10	0.739		
Question 6	0.483		
Question 2		0.810	
Question 5		0.742	
Question 7		0.594	
Question 3		0.400	
Question 1			0.771
Question 4			0.691

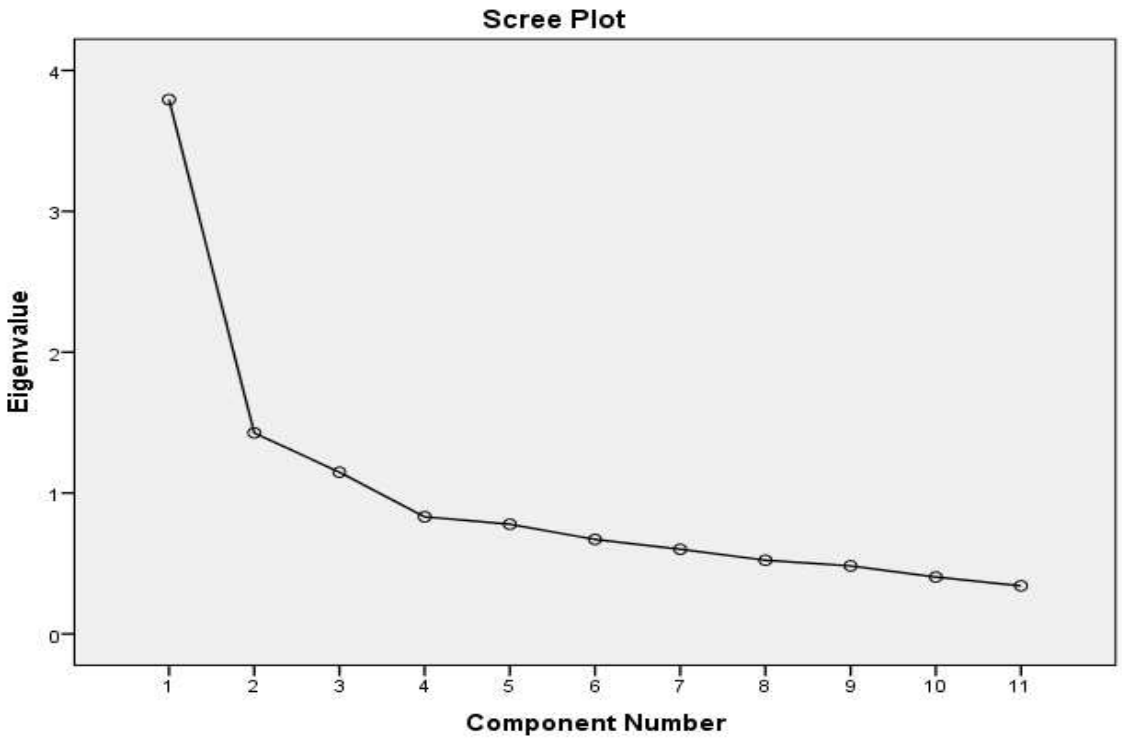


Figure 1. Pebble diagram for determining the number of factors

Reliability and validity

In order to determine the external reliability of the genital appearance satisfaction questionnaire, the correlation rate was used in the test-retest method, the results of which are given in the Table 7. Content validity was evaluated by five specialists using Content validity index (CVI) and Content validity ratio (CVR), as shown in Table 8.

Table 7. Results of the correlation coefficient of questions in the retest method

Questions	Spearman correlation coefficient	P-value
I feel my genitals look normal	<0.001	0.764
I feel my genitals look unattractive	<0.001	0.881
I feel my labia are too big	<0.001	0.899
I am happy with the appearance of my genitals	<0.001	0.771
I feel a burning sensation in my labia when exercising/walking	<0.001	0.753
I feel self-conscious about the appearance of my genitals in sexual situations	<0.001	0.832
I am embarrassed by the appearance of my genitals; it takes away my sexual pleasure	<0.001	0.618
I feel uncomfortable around my genitals when I wear tight clothes	<0.001	0.904
I feel my genitals are visible under tight clothes	<0.001	0.940
I am concerned about the appearance of my vagina	<0.001	0.911
I feel like my genitals look asymmetrical or "crooked"	<0.001	1.000

Table 8. Results of determining content validity using the two CVI and CVR indices

Questions	CVI	CVR
I feel my genitals look normal	1	1
I feel my genitals look unattractive	1	0.6
I feel my labia are too big	0.93	0.6
I am happy with the appearance of my genitals	1	1
I feel a burning sensation in my labia when exercising/walking	0.87	0.6
I feel self-conscious about the appearance of my genitals in sexual situations	1	1
I am embarrassed by the appearance of my genitals; it takes away my sexual pleasure	1	1
I feel uncomfortable around my genitals when I wear tight clothes	1	1
I feel my genitals are visible under tight clothes	0.93	1
I am concerned about the appearance of my vagina	1	1
I feel like my genitals look asymmetrical or "crooked"	1	0.6
Average	0.98	0.85

To evaluate the construct validity of the GAS Questionnaire, confirmatory factor analysis was performed. Reliability refers to the consistency of a measurement instrument in producing stable results under similar conditions. In this study, reliability was assessed using Cronbach's alpha and composite reliability, while convergent validity was evaluated using the average variance extracted (AVE).

Cronbach's alpha and composite reliability values above 0.70 indicate acceptable internal consistency and one-dimensionality of the constructs. Because composite reliability provides a more accurate estimate of latent variable reliability in structural equation modeling, it was also examined alongside Cronbach's alpha. Convergent validity reflects the extent to which questionnaire items adequately represent the intended construct. According to Fornell and Larcker , an AVE value of 0.50 or higher indicates satisfactory convergent validity, meaning that the construct explains more than half of the variance of its indicators (13). These findings are showed in Table 9.

Table 9. Cronbach's alpha of factors, composite reliability coefficient of factors, average variance extracted (AVE)

Factors	Cronbach's alpha of factors	composite reliability coefficient of factors	AVE
Impact on relationships and self-confidence	0.794	0.861	0.554
Appearance concerns and everyday discomfort	0.649	0.790	0.486
Overall satisfaction with appearance	0.389	0.733	0.595

Predictive model and structural findings

After confirming the reliability and validity of the measurement model, the structural model was evaluated using the coefficient of determination (R^2). R^2 values of 0.35, 0.15, and 0.02 are interpreted as substantial, moderate, and weak, respectively. As can be seen in Table 10, the results show that there is a significance between the components except for the component of satisfaction with overall appearance, and according to the results obtained, it can be concluded that there is a relationship between other factors and satisfaction with genital appearance.

Table 10. Digital library prediction model and native pattern design and model quality index evaluation

Factors	Path coefficients	Sample mean	Standard deviation	T-value	P-value	R^2	Subscription Index (f^2)
Impact on relationships and self-confidence	0.897	0.897	0.160	56.580	<0.001	0.804	4.11
Appearance concerns and everyday discomfort	0.789	0.792	0.320	24.545	<0.001	0.623	1.652
Overall satisfaction with appearance	-0.556	-0.388	0.424	1.334	0.183	0.320	0.471

To examine the quality of the measurement model, the coefficient of correlation CV com or f^2 was used. If the coefficient of correlation of latent variables is 0.35, it means that the measurement model has appropriate quality. As can be seen from the values in Table 10, the measurement model has appropriated quality. The path coefficients and corresponding t-values are presented in Figures 2 and 3.

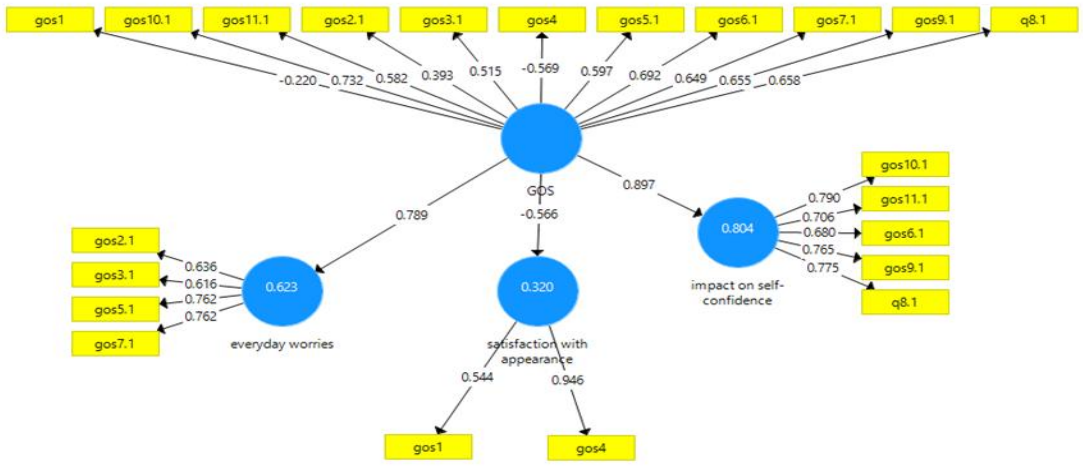


Figure 2. Path coefficient

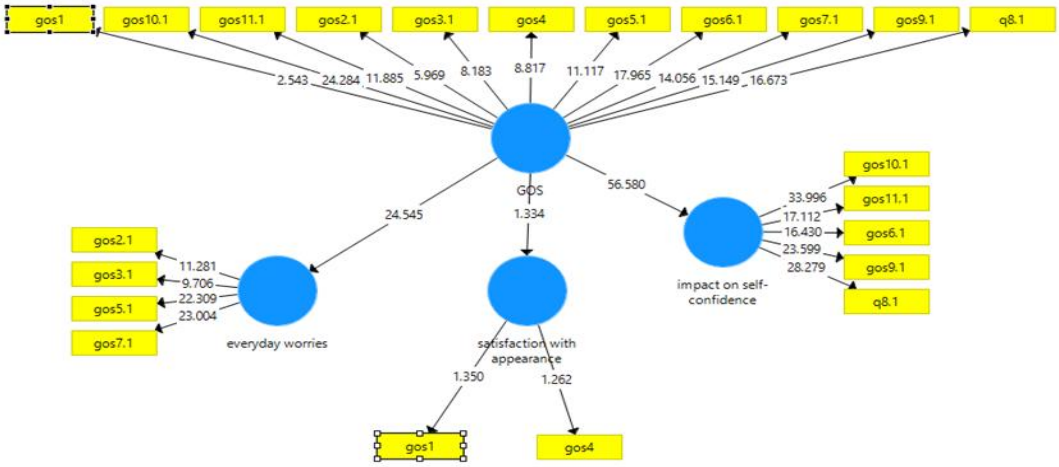


Figure 3. T-value

Discussion

The present study successfully translated, culturally adapted, and validated the Persian version of the Genital Appearance Satisfaction (GAS) questionnaire among Iranian women candidates for labiaplasty. The results demonstrated acceptable psychometric properties, supporting its use in clinical and research settings in Iran (10, 11).

Exploratory factor analysis revealed a three-factor structure—Impact on relationships and self-confidence, Concerns about appearance and everyday discomfort, and Overall satisfaction with appearance—that explained approximately 58% of the total variance. This structure is largely consistent with the original English version developed by Bramwell and Morland, which identified three similar dimensions: genital appearance, impact on daily life, and impact on sexual intercourse (10). The slight differences observed in factor labeling may reflect cultural nuances in how Iranian women perceive and express concerns about genital appearance, particularly regarding intimate relationships and self-confidence in a more conservative sociocultural context (4, 5).

These findings align with previous validation studies. Veale et al. reported strong associations between genital dissatisfaction and psychological factors such as body image, anxiety, and sexual functioning in women seeking labiaplasty (11). Similarly, our study showed high levels of dissatisfaction, with 65% of participants expressing a desire for surgery. This corroborates reports of increasing demand for female genital cosmetic procedures in both Western and non-Western populations (5, 7).

The availability of a validated Persian GAS fills an important gap in the Iranian context, where cultural, religious, and social factors may uniquely influence genital self-image and decisions regarding cosmetic procedures (2, 4). Clinicians can utilize this instrument to better assess patient candidacy for labiaplasty, evaluate psychosocial outcomes, and enhance preoperative counseling. It will also facilitate cross-cultural comparisons and future epidemiological research on genital dissatisfaction in Middle Eastern populations (2).

Limitations

This study has several limitations that should be considered when interpreting the results. First, the sample was restricted to women seeking labiaplasty in a specific clinical setting, which may

limit the generalizability of the findings to the broader Iranian female population. Second, as with all self-report measures, responses may be influenced by social desirability bias, especially given the sensitive nature of the topic in Iranian culture. Third, although the three-factor model demonstrated adequate fit, one subscale showed a relatively low Cronbach's alpha (0.389), indicating the need for potential item revision in future studies. Finally, the cross-sectional design prevents any causal inferences regarding the relationships observed.

Future directions

Future research should employ longitudinal designs to evaluate the responsiveness of the Persian GAS to surgical interventions such as labiaplasty and to assess its predictive validity for sexual satisfaction and mental health outcomes. Additional validation across diverse subgroups (e.g., different age groups, marital statuses, and urban/rural settings) is also recommended. Comparative studies with other translated versions of the scale would help elucidate cultural differences in genital self-perception.

Conclusion

In conclusion, the Persian version of the GAS questionnaire demonstrates acceptable validity and reliability and represents a reliable and culturally appropriate instrument for assessing genital appearance satisfaction among Iranian women. Its routine use in clinical practice can support more informed decision-making for labiaplasty candidates, improve preoperative counseling, and contribute meaningfully to the scientific literature on female genital cosmetic surgery in Iran and other similar sociocultural contexts.

Declarations

Abbreviations

GAS: Genital Appearance Satisfaction

CVI: Content Validity Index

CVR: Content Validity Ratio

EFA: Exploratory Factor Analysis

CFA: Confirmatory Factor Analysis

KMO: Kaiser–Meyer–Olkin

AVE: Average Variance Extracted

Ethics approval and consent to participate

The study protocol was approved by the Ethics Committee of Lorestan University of Medical Sciences (IR.LUMS.REC.1403.390). Written informed consent was obtained from all participants before enrollment.

Consent for publication

Not applicable.

Availability of data and materials

The datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

A.K. R and S.T. Gh contributed equally to this work and share first authorship. A.K.R conceptualized and designed the study. S.T. Gh coordinated the data collection process, participated in the translation and cross-cultural adaptation of the questionnaire, and prepared the initial draft of the manuscript. Kh.N. Gh contributed to the psychometric analyses and

interpretation of the findings. O.B contributed to the manuscript writing. B.A and Sh.H. R contributed to data collection and expert review of the manuscript. M.S. Sh contributed to data collection and revision of the initial manuscript draft. F.Y as the corresponding author, contributed to scientific supervision, final manuscript review, correspondence with the journal, and approval of the final version. All authors read and approved the final manuscript and agreed to be accountable for all aspects of the work.

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