

Reliability and Validity of the Persian Version of the Quality of Life in Autism Questionnaire (QoLA) - Parent Version in Iranian Mothers

Seyed-Sirvan Hosseini

Arak University of Medical Sciences

Seyedeh Zeinab Beheshti

Arak University of Medical Sciences

Valsamma Eapen

University of New South Wales School of Psychiatry

Amir Almasi-Hashiani

Arak University of Medical Sciences

Saman Maroufizadeh (✉ saman.maroufizadeh@gmail.com)

Royan Institute <https://orcid.org/0000-0001-5794-3876>

Research

Keywords: Quality of Life, Quality of Life in Autism Questionnaire, Reliability, Validity, Autism, Mother, Persian

Posted Date: April 13th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-404187/v1>

License:  This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Abstract

Background: Parents of children with autism spectrum disorder (ASD) are known to poorer quality of life. The Quality of Life in Autism Questionnaire (QoLA) is a commonly used instrument for measuring the quality of life in parents of children with ASD. The aim of this study was to evaluate the reliability and validity of the QoLA in Iranian mothers of children with ASD.

Methods: The sample of this methodological study consisted of 88 mothers of children with ASD in Arak, Iran. The data were collected using convenience sampling method between September 2019 and January 2020. A battery of questionnaires was administered to mothers which included the QoLA, Patient Health Questionnaire-9 (PHQ-9), Generalized Anxiety Disorder-7 (GAD-7), and Perceived Stress Scale-4 (PSS-4). Factor structure and internal consistency of the QoLA were examined via confirmatory factor analysis (CFA) and Cronbach's alpha, respectively. Convergent validity was examined by relationship with WHOQOL-BREF, PHQ-9, GAD-7 and PSS-4.

Results: The mean total scores of QoLA Part A and Part B were 86.50 (SD=13.89) and 61.41 (SD=18.21), respectively. Both subscales exhibited good internal validity (with Cronbach's alpha of 0.899 and 0.950 for Part A and Part B, respectively). The convergent validity of both subscales of QoLA was proved via moderate to strong correlations with measure of the WHOQOL-BREF. In addition, both QoLA Part A and Part B scores were negatively correlated with measures of PHQ-9, GAD-7, and PSS-4. The confirmatory factor analyses provided evidence for unidimensionality of both subscales of QoLA.

Conclusion: The Persian version of QoLA displays satisfactory reliability and validity in Iranian mothers of children with ASD.

Background

Autism spectrum disorder (ASD) is a group of neurodevelopmental disorders, including defects in social interactions, verbal and nonverbal communication and the existence of repetitive behaviors and limited interests [1, 2]. ASD is being increasingly recognized and over the past three decades, rates of ASD have increased dramatically [3, 4]. According to the latest estimates from the Centers for Disease Control and Prevention (CDC) in the United States, about 1 in 54 children have been identified with ASD [4]. Since there is no effective treatment, it can leave children with autism and their families for a lifetime facing adverse consequences related to behavioral dysfunction. The economic burden of autism in the U.S. is estimated at \$268,000,000,000 in 2015, which may cost more than \$2,000,000 per person for lifelong individual care [3].

Children with ASD have huge impacts on their families. For example, families of these children have reported significant levels of stress, depression, decreased happiness and decreased family support compared to families with children with other developmental disorders and other disabilities [2, 5]. Recent research, for example, has shown that mothers of children with ASD have lower levels of well-being and higher levels of stress than mothers with Down syndrome, fragile X syndrome, cerebral palsy, attention

deficit hyperactivity disorder and medical conditions such as cystic fibrosis [2, 6]. These levels of stress and depression in families of children with ASD can have a negative impact on their quality of life (QoL) and it is important to assess QoL as part of the comprehensive assessment of families of children with ASD [7]

The term “QoL” first appeared in around 1920, but it was not until the middle of the century that the concept became a part of universal discourse [2]. QoL is a multidimensional construct and involve health and non-health-related domains of functioning. Different models of QoL are available with differing foci, including some that concentrate on health-related aspects of QoL and comprising eight main areas including personal development, self-determination, interpersonal relations, social inclusion, rights, emotional wellbeing, physical wellbeing, and material wellbeing [2]. Therefore, QoL is a useful indicator of adaptation of parents of children with ASD and also an important part of their experiences [2]. Recent studies have used measurements of general quality of life to assess the QoL of parents of children with ASD, including the World Health Organization Quality Of Life (WHOQOL)(2), Family Quality of Life (FQOL) [4] Short-Form Health Surveys [8, 9]; and EuroQol Five Dimensional Questionnaire (EQ-5D-3L) [10]. However, in order to provide appropriate support services for parents of ASD children, it is essential to understand the unique impacts of ASD related symptoms on parental QoL using an ASD specific measure such as the Quality of Life in Autism (QoLA) [2]. Most evaluation scales however are designed in developed countries and since there is no suitable tool in Iran, this study was designed to investigate the following two objectives: translating the parental version of QoLA into Persian and evaluating its psychometric properties.

Methods

Participants and study design

The sample of this cross-sectional study consisted of mothers of children with ASD who were resident in Arak, Iran. The data were collected using convenience sampling method between September 2019 and January 2020. The eligibility criteria for the present study included (1) mother having a child with ASD; (2) age over 18 years; (3) ability to read and write in Persian; and (4) willingness to participate in the study. Mothers were asked to complete the questionnaire following informed consent and a total of 88 mothers agreed to take part and returned the completed questionnaire.

Translation of the QoLA into Persian

The standard “forward-backward” translation method was used to translate the QoLA from English into Persian and back into English.

Questionnaires

Demographic variables

Participants provided demographic information including mother's age, child's age, child's sex, mother's education, mother's occupation, and marital duration.

Quality of Life in Autism Questionnaire (QoLA)

The QoLA is a self-administered instrument that measures the QoL of parents of children with ASD [2]. The QoLA is composed of two modules: the QoLA Part A and the QoLA Part B. The QoLA Part A consists of 28 items that measures parents' overall perception of their QoL. The items are rated on 5-point Likert scale ranging from 1 (not very much) to 5 (very much). The total QoLA Part A scores can range from 28 to 140; higher scores indicate better QoL. The QoLA Part B consists of 20 items that measures parents' perception of how problematic their child's autism-specific difficulties are for them. In this part, parent rate items on a 5-point Likert scale, ranging from 5 (not much of a problem for me) to 1 (very much of a problem for me). The total QoLA Part B scores can range from 20 to 100; higher scores indicate fewer problems for parents regarding their child's ASD-related behaviors.

The World Health Organization Quality of Life-brief version (WHOQOL-BREF)

The WHOQOL-BREF is an abbreviated version of the WHOQOL-100 which contains 26 of the original 100 items [11]. This scale yields four domains of QOL (i.e., Physical Health, Psychological, Social Relationship and Environment). Respondents rate items on a 5-point Likert scale, ranging from 1 to 5. Raw domain scores were scaled to range from 0 to 20, with higher score representing better QoL. The Persian version of the WHOQOL-BREF has been proven to be a reliable and valid instrument to assess QoL [12]. In this study, Cronbach alpha of the WHOQOL-BREF subscales were ranging from 0.627 to 0.805.

Patient Health Questionnaire-9 (PHQ-9)

The PHQ-9 is a 9-item self-report instrument designed to measure depression based on the DSM-IV criteria for major depressive episode [13]. Respondents rate items on a 4-point Likert scale, ranging from 0 (not at all) to 3 (nearly every day). Total scores can range from 0 to 27; higher scores indicate worse depressive symptoms. The Persian version of the PHQ-9 has been proven to be a reliable instrument to assess depression in different population [14, 15]. In the present study, the Cronbach's alpha was 0.862.

Generalized Anxiety Disorder-7 (GAD-7)

The GAD-7 is a 7-item self-report instrument designed to measure anxiety based on the DSM-IV criteria [16]. Respondents rate items on a 4-point Likert scale, ranging from 0 (not at all) to 3 (nearly every day). Total scores can range from 0 to 21; higher scores indicate more anxiety symptoms. The Persian version of the GAD-7 has been proven to be a reliable instrument to assess anxiety [17]. In the present study, the Cronbach's alpha was 0.877.

Perceived Stress Scale-4 item (PSS-4)

The PSS-4 is an ultra-brief version of the PSS-14 which contains 4 of the original 14 items. This scale measures the "degree to which situations in one's life over the last month are appraised as unpredictable,

uncontrollable, and overloaded". Respondents rate items on a 5-point Likert-type scale ranging from 0 (never) to 4 (very often). The total score can range from 0 to 16, higher scores indicate more stress. The Persian version of the PSS has been proven to be a reliable instrument to assess stress in different population [18, 19]. In the present study, the Cronbach's alpha was 0.565.

Statistical analysis

The confirmatory factor analysis (CFA), with maximum likelihood estimation method, was carried out in order to investigate the factor structure of the QoLA Part A and Part B. Overall model fit was examined using multiple fit criteria, as suggested in the literature. Specifically, four goodness-of-fit indices were used, including chi-square/degree of freedom (χ^2/df), comparative fit index (CFI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR). Values of $\chi^2/df < 3$, CFI > 0.90 , and RMSEA and SRMR < 0.08 are indicative of a good fit with the data [20–23]. In order to evaluate the internal consistency of the QoLA, Cronbach's alpha and the corrected-item total correlation were calculated. The convergent validity of the scale was assessed by examining the relationship between QoLA scores and scores on the WHOQOL-BREF domains. Statistical analyses were undertaken using SPSS for windows, version 16.0 (SPSS Inc., Chicago, IL, USA) and LISREL 8.80 (Scientific Software International, Inc., Lincolnwood, IL, USA).

Results

Participant characteristics

The demographic characteristics of the mothers and their children are summarized in Table 1. The mean age and marital duration of the mothers were 35.00 (SD = 5.34) and 12.89 (SD = 5.10) years, respectively. Of the mothers, 79.5% were housewives and 44.3% had university education. The mean age of their children was 6.44 (SD = 2.81) years, and 69.3% of children were male.

Table 1
Demographic characteristics of the mothers of children with ASD (n = 88).

	Mean (SD) or n (%)
Mother's age (y), mean (SD)	35.00 (5.34)
Child's age (y), mean (SD)	6.44 (2.81)
Child's sex	
Boy	27 (30.7)
Girl	61 (69.3)
Level of education	
Primary	12 (13.6)
Secondary	37 (42.0)
University	39 (44.3)
Occupation	
Housewife	70 (79.5)
Employed	18 (20.5)
Marital duration (y), mean (SD)	12.89 (5.10)

Descriptive statistics and internal consistency of the QoLA

The descriptive statistics and internal consistency of the QoLA-Part A and QoLA-Part B are displayed in Table 2. The mean total score for QoLA Part A and QoLA Part B were 86.50 (SD = 13.89) and 61.41 (SD = 18.21), respectively. For QoLA Part A, item 22 ("I feel guilty") achieved the highest mean scores of 3.76 and items 23 ("I am part of a community") and 24 ("I can get the support that I need from the community") had the lowest mean scores of 1.83 and 1.89, respectively (Table 2). For QoLA Part B, item 18 ("Engaging in reckless or tactless behaviours") recorded the highest mean score (3.53), followed by item 7 ("Saying things that are socially embarrassing"; mean, 3.48). The lowest score was for item 4 ("Holding a conversation"; mean, 2.72) (Table 3).

Table 2
Items, means, standard deviations and internal consistency for QoLA Part A.

	Mean	SD	Corrected item total correlation	Alpha if item deleted
1. I am satisfied with my life.	3.42	0.96	0.479	0.895
2. I feel stressed. (R)	2.65	1.05	0.260	0.900
3. I feel happy and content.	3.02	0.76	0.545	0.894
4. I feel depressed or anxious. (R)	3.24	1.13	0.467	0.896
5. I feel good about myself as a person.	3.32	0.90	0.645	0.892
6. I am satisfied with my close relationships.	3.30	0.90	0.467	0.895
7. People are there for me when I need them.	2.92	1.02	0.383	0.897
8. I am satisfied with my social life.	3.16	0.90	0.664	0.892
9. I am satisfied with my family life.	3.48	0.96	0.493	0.895
10. I am satisfied with my financial situation.	2.85	0.89	0.689	0.891
11. I am satisfied with where I live.	3.00	1.03	0.587	0.893
12. I have enough money to meet my needs.	2.73	0.94	0.591	0.893
13. I am satisfied with my achievements.	2.91	0.77	0.443	0.896
14. I am satisfied with my general health.	3.26	0.86	0.549	0.894
15. I have a healthy lifestyle.	3.44	0.90	0.558	0.894
16. I am satisfied with my leisure activities.	2.57	0.96	0.551	0.894
17. Health problems stop me doing things that I want to. (R)	3.66	1.07	0.165	0.902
18. I feel in control of my life.	3.30	0.91	0.405	0.897
19. I set and achieve goals in my life.	3.23	0.91	0.563	0.894
20. I can make a plan of action and follow it.	3.31	0.86	0.396	0.897
21. I make my own decisions.	3.50	0.82	0.366	0.897
22. I feel guilty. (R)	3.76	1.10	0.391	0.897
23. I am part of a community.	1.83	1.18	0.244	0.901

SD: Standard Deviation

	Mean	SD	Corrected item total correlation	Alpha if item deleted
24. I can get the support that I need from the community.	1.89	1.15	0.374	0.898
25. I am able to get to where I need to.	2.66	0.95	0.565	0.894
26. I feel safe in my everyday life.	3.33	0.91	0.574	0.893
27. I feel respected in my everyday life.	3.52	0.96	0.509	0.895
28. I am satisfied with the availability of health services.	3.26	0.94	0.370	0.897
SD: Standard Deviation				

Table 3
Items, means, standard deviations and internal consistency for QoLA Part B.

	Mean	SD	Corrected item total correlation	Alpha if item deleted
1. Socialising with people	3.17	1.23	0.781	0.946
2. Having friends	2.95	1.22	0.765	0.947
3. Understanding other's feelings	3.08	1.19	0.793	0.946
4. Holding a conversation	2.72	1.27	0.751	0.947
5. Communicating needs	2.91	1.20	0.761	0.947
6. Taking a literal meaning of comments	2.93	1.14	0.649	0.948
7. Saying things that are socially embarrassing	3.48	1.33	0.615	0.949
8. Needing to stick to a routine	3.30	1.31	0.726	0.947
9. Being overly interested in a particular topic	3.02	1.31	0.672	0.948
10. Getting anxious in a specific situation or during changes	2.77	1.27	0.592	0.949
11. Sensitivity to certain sensations	2.97	1.21	0.610	0.949
12. Understanding the rules of social interaction	2.78	1.23	0.632	0.948
13. Managing emotional responses	3.18	1.22	0.668	0.948
14. Needing to do things a certain way	3.24	1.22	0.754	0.947
15. Destructive behaviours including anger & aggression	3.02	1.41	0.622	0.949
16. Showing inappropriate emotional reactions	3.14	1.27	0.740	0.947
17. Unusual repetitive behaviours or body movements	3.38	1.34	0.616	0.949
18. Engaging in reckless or tactless behaviours	3.53	1.31	0.641	0.948
19. Doing daily living tasks independently	3.07	1.40	0.567	0.950
20. Responding when approached socially	2.77	1.29	0.713	0.947
SD: Standard Deviation				

The Cronbach's alpha coefficients for the QoLA Part A and QoLA Part B were 0.899 and 0.950, respectively. All corrected item-total correlations were within the acceptable range (greater than 0.3),

expect for items 2, 17, and 23 in QoLA Part A.

Convergent validity

As presented in Table 3, QoLA Part A scores were positively correlated with the WHOQOL-BREF domains. The magnitude of all correlations were strong except for the Social Relationships domain. QoLA Part B scores were positively and moderately correlated with the Physical Health and Psychological domains. There were also positive but non-significant correlation between QoLA Part B and Social Relationships and Environment domains.

Relationship of QoLA with measures of depression, anxiety, and stress

As presented in Table 3, QoLA Part A scores were negatively correlated with measures of PHQ-9, GAD-7, and PSS-4. The magnitude of these correlations were strong. QoLA Part B scores were positively and moderately correlated with measures of PHQ-9, GAD-7, and PSS-4.

Table 4
Correlations between QoLA and measures of WHOQOL-BREF, PHQ-9, GAD-7 and PSS-4.

	QoLA Part A		QoLA Part B	
	<i>r</i>	<i>P</i>	<i>r</i>	<i>P</i>
Quality of Life (WHOQOL-BREF)				
Physical Health	0.543	< 0.001	0.391	< 0.001
Psychological	0.651	< 0.001	0.337	0.001
Social Relationships	0.465	< 0.001	0.194	0.070
Environment	0.626	< 0.001	0.206	0.054
Depression (PHQ-9)	-0.513	< 0.001	-0.411	< 0.001
Anxiety (GAD-7)	-0.594	< 0.001	-0.400	< 0.001
Stress (PSS-4)	-0.533	< 0.001	-0.436	< 0.001

PHQ-9: Patient Health Questionnaire-9; GAD-7: Generalized Anxiety Disorder-7; PSS-4: Perceived Stress Scale-4.

Factor structure of the QoLA Part A and Part B

The CFA was used for testing the unidimensionality of the QoLA Part A. Based on the goodness of fit indices, the fitness of the model was not good ($\chi^2/df = 2.01$; CFI = 0.83; RMSEA = 0.108 and SRMR = 0.110). Examination of the modification indices recommended allowing covariance between Item 23 and 24 as well as between Item 19 and 20, Item 10 and 12, and Item 27 and 28.

A superior fit was obtained after allowing for these covariance ($\chi^2/df = 1.54$; CFI = 0.90; RMSEA = 0.079 and SRMR = 0.096).

The CFA was also performed for testing the unidimensionality of the QoLA Part B. The fit of the model was not good according to the fit indices ($\chi^2/df = 3.29$; CFI = 0.89; RMSEA = 0.162 and SRMR = 0.090). Examination of the modification indices recommended allowing covariance between Item 15 and 16. A superior fit was obtained after allowing for this covariance ($\chi^2/df = 2.94$; CFI = 0.91; RMSEA = 0.150 and SRMR = 0.086).

Discussion

The aim of the present study was to translate the QoLA into Persian and examine its psychometric properties in mothers of children with ASD. Improving the QoL of parents of children with ASD is one of the main goals in rehabilitation of these children. For this purpose, having a validated disease-specific scale is essential to assess the QoL of parents of ASD children. The great advantage of using QoLA in clinical practice is that it measures more precisely the true impact of ASD—and not of other stressful life events—on parents' QoL, which cannot be achieved via generic scales. Our results demonstrate the same pattern of mean scores on both Parts of QoLA as was found in the development study of QoLA by Eapen et al. [2], although QoLA Part B scores in our Iranian population tended to be slightly lower. The internal consistency of both Parts of QoLA was found to be good as the Cronbach's alpha values were above the recommended value of 0.7 [24]. Similar findings have been observed in previous studies validating both parts of the QoLA [2, 25, 26]. However, according to the corrected item-total correlations, some modifications for items 2, 17, and 23 in QoLA Part A might be needed in the scale to yield better internal consistency. In Turkish version of QoLA Part B, corrected item-total correlations for items 2, 17, and 22 was lower than 0.2 [25]. It is likely that cross-cultural differences might explain these findings.

The convergent validity was examined by looking at whether self-reported WHOQOL correlated with QoLA scores. In addition, this study confirms the expected negative relationship between QoLA Part A and measures of anxiety, depression, and stress. Mothers of ASD children with a high QoLA had lower levels of anxiety, depression or stress, and vice versa. This negative relationship is in line with the results of Eapen et al. study [2] and other studies assessing QoL for parents of ASD children [27, 28].

Also, findings indicated that the convergent validity was stronger between the QoLA Part A scores and Psychological and Environment domains of the WHOQOL-BREF compared to the correlations with Physical Health and Social Relationships domains of the WHOQOL-BREF.

This is the first study, to the best of our knowledge, examining the factor structure of QoLA by CFI. The CFA results indicated that one-factor model of both parts of QoLA in mothers of ASD children had relatively adequate fit to the data. However, after allowing for covariances between several items, a better fit was achieved.

The findings of this study should be considered in the light of several limitations. First, the sample size was relatively small. Second, because of practical reasons, we only asked mothers to complete the QoLA questionnaire. Third, we did not evaluate test-retest reliability in this research. Fourth, the present results are based on a cross-sectional design that prevents inferences regarding the direction of causality.

Conclusion

In summary, despite some limitations, this study has replicated the findings of the original study. It has also indicated that the psychometric properties of the Persian version of QoLA are comparable to those of the original English version. The findings suggest that it is a valid and reliable instrument for measuring the QoL in mothers of children with ASD but requires further psychometric studies (including test-retest reliability) in the Iranian population, especially in fathers of children with ASD.

Abbreviations

ASD: Autism Spectrum Disorder **QoL:** Quality of Life; **QoLA:** Quality of Life in Autism Questionnaire; **CFA:** Confirmatory Factor Analysis; **CFI:** Comparative Fit Index; **RMSEA:** Root Mean Square Error of Approximation; **SRMR:** Standardized Root Mean Square Residual.

Declarations

Ethics approval and consent to participate

The Ethics Committee of Arak University of Medical Sciences, Arak, Iran, approved this study (Ethics Code: IR.ARAKMU.REC.1399.034), and all mothers gave informed consent to participate in the present study prior to the commencement of data collection.

Consent for publication

Not applicable.

Availability of data and materials

The datasets used 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.

Funding

This study did not receive any specific grant from any agency in the public, commercial, or not-for-profit sector.

Authors' contributions

Study concept and design: **SSH, SZB, AAH, SM.**

Acquisition, analysis, or interpretation of data: **SSH, SZB, VE, AAH, SM.**

Drafting of the manuscript: **SSH, SZB, VE, AAH, SM.**

Critical revision of the manuscript for important intellectual content: **SSH, SZB, VE, AAH, SM.**

Statistical analysis: **SM.**

Obtained funding: **Not Applicable.**

Administrative, technical, or material support: **SSH, SZB.**

Study supervision: **SZB.**

Acknowledgements

We thank all mothers for participating in this study and the Arak University of Medical Sciences, Arak, Iran for cooperation in data collection.

References

1. Liu J, Yao L, Zhang W, Xiao Y, Liu L, Gao X, Shah C, Li S, Tao B, Gong Q. Gray matter abnormalities in pediatric autism spectrum disorder: a meta-analysis with signed differential mapping. *Eur Child Adolesc Psychiatry*. 2017;26(8):933–45.
2. Eapen V, Črnčec R, Walter A, Tay KP: **Conceptualisation and development of a quality of life measure for parents of children with autism spectrum disorder**. *Autism Research and Treatment* 2014, **2014**.
3. Wu J, Jackson L. Inverse relationship between urban green space and childhood autism in California elementary school districts. *Environment international*. 2017;107:140–6.
4. Lei X, Kantor J. **Social support and family quality of life in Chinese families of children with autism spectrum disorder: the mediating role of family cohesion and adaptability**. *International Journal of Developmental Disabilities* 2020:1–8.
5. Garrido D, Carballo G, Garcia-Retamero R. **Siblings of children with autism spectrum disorders: social support and family quality of life**. *Quality of Life Research* 2020:1–10.
6. Bohadana G, Morrissey S, Paynter J. Self-compassion: a novel predictor of stress and quality of life in parents of children with autism spectrum disorder. *J Autism Dev Disord*. 2019;49(10):4039–52.
7. Eapen V, Guan J. Parental quality of life in autism spectrum disorder: Current status and future directions. *Acta psychopathologica*. 2016;2(1):1–14.

8. Kheir N, Ghoneim O, Sandridge AL, Al-Ismaïl M, Hayder S, Al-Rawi F. Quality of life of caregivers of children with autism in Qatar. *Autism*. 2012;16(3):293–8.
9. Rizk S, Pizur-Barnekow K, Darragh AR. Leisure and social participation and health-related quality of life in caregivers of children with autism. *OTJR: Occupation Participation Health*. 2011;31(4):164–71.
10. Khanna R, Jariwala K, Bentley JP. Psychometric properties of the EuroQol Five Dimensional Questionnaire (EQ-5D-3L) in caregivers of autistic children. *Qual Life Res*. 2013;22(10):2909–20.
11. Group W. Development of the World Health Organization WHOQOL-BREF quality of life assessment. *Psychological medicine*. 1998;28(3):551–8.
12. Nedjat S, Montazeri A, Holakouie K, Mohammad K, Majdzadeh R. Psychometric properties of the Iranian interview-administered version of the World Health Organization's Quality of Life Questionnaire (WHOQOL-BREF): a population-based study. *BMC Health Serv Res*. 2008;8(1):61.
13. Kroenke K, Spitzer RL. The PHQ-9: a new depression diagnostic and severity measure. *Psychiatr Ann*. 2002;32(9):509–15.
14. Maroufizadeh S, Omani-Samani R, Almasi-Hashiani A, Amini P, Sepidarkish M. The reliability and validity of the Patient Health Questionnaire-9 (PHQ-9) and PHQ-2 in patients with infertility. *Reprod Health*. 2019;16(1):137.
15. Gholizadeh L, Shahmansouri N, Heydari M, Davidson PM: **Assessment and detection of depression in patients with coronary artery disease: validation of the Persian version of the PHQ-9.** *Contemporary nurse* 2019, **55**(2–3):185–194.
16. Spitzer RL, Kroenke K, Williams JB, Löwe B: **A brief measure for assessing generalized anxiety disorder: the GAD-7.** *Archives of internal medicine* 2006, **166**(10):1092–1097.
17. Omani-Samani R, Maroufizadeh S, Ghaheri A, Navid B. **Generalized Anxiety Disorder-7 (GAD-7) in people with infertility: A reliability and validity study.** *Middle East Fertility Society Journal* 2018.
18. Maroufizadeh S, Zareiyan A, Sigari N. Reliability and validity of Persian version of perceived stress scale (PSS-10) in adults with asthma. *Arch Iran Med*. 2014;17(5):0–0.
19. Maroufizadeh S, Foroudifard F, Navid B, Ezabadi Z, Sobati B, Omani-Samani R. The Perceived Stress Scale (PSS-10) in women experiencing infertility: A reliability and validity study. *Middle East Fertility Society Journal*. 2018;23(4):456–9.
20. Bentler PM. Comparative fit indexes in structural models. *Psychological bulletin*. 1990;107(2):238.
21. Byrne BM. Structural equation modeling with EQS and EQS/Windows: Basic concepts, applications, and programming. Thousand Oaks: Sage Publications; 1994.
22. McDonald RP, Ho M-HR. Principles and practice in reporting structural equation analyses. *Psychol Methods*. 2002;7(1):64.
23. Kline RB. Principles and practice of structural equation modeling. New York: Guilford Publications; 2015.
24. Nunally JC, Bernstein IH. Psychometric theory. 3rd ed. New York: McGraw-Hill; 1994.

25. Gürbüz Özgür B, Aksu H, Eser E. Turkish validity and reliability of quality of life in autism questionnaire-parent version. *Anadolu Psikiyatri Derg.* 2017;18:344–52.
26. Azad SAK, Shilvy NEN, Rabby AA. Adaptation of the Quality of Life in Autism Scale for use in Bangladesh. *BioResearch Communications-(BRC).* 2021;7(1):960–6.
27. Kousha M, Attar HA, Shoar Z. Anxiety, depression, and quality of life in Iranian mothers of children with autism spectrum disorder. *J Child Health Care.* 2016;20(3):405–14.
28. Lee GK, Lopata C, Volker MA, Thomeer ML, Nida RE, Toomey JA, Chow SY, Smerbeck AM. Health-related quality of life of parents of children with high-functioning autism spectrum disorders. *Focus on Autism other developmental disabilities.* 2009;24(4):227–39.