

Design and psychometric evaluation of the maternal perception of postpartum care in comprehensive health centers

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Abstract

Background: Mothers' perceptions of the quality and quantity of care they have received and their relationship with healthcare personnel significantly impact continuity of care and future referrals. This study evaluated the psychometric dimensions of the Iranian version of the Mothers' Perception of Postpartum Health Care questionnaire in comprehensive health centers. **Methods:** We conducted a cross-sectional study in which the questionnaire was administered to 250 women from different comprehensive health centers. First, the questionnaire was translated verbatim from English to Persian. Then, we evaluated the face, content, structural validity, and reliability of the questionnaire. **Results:** The results showed that this questionnaire's face, content, structural validity, and reliability were adequate. Cronbach's alpha coefficient for the entire questionnaire was 0.668. The interclass correlation coefficient was 0.688, which confirmed divergent validity. **Conclusions:** Mothers' Perception of Postpartum Health Care questionnaire in comprehensive health centers is valid and reliable for measuring maternal perception of these vital services.

Keywords: Mothers. Perception. Psychometrics. Community health centers. Validation studies.

Diseño y evaluación psicométrica de la percepción materna de la atención posparto en centros de salud integral

Resumen

Introducción: La percepción de las madres con respecto a la calidad y cantidad de la atención que han recibido, así como de su relación con el personal de salud impactan significativamente en la continuidad de la atención y sus futuras derivaciones. Este estudio se diseñó para evaluar las dimensiones psicométricas de la versión iraní del Cuestionario de Percepción de las Madres sobre la Atención de la Salud Posparto en los centros integrales de salud. **Métodos:** Se llevó a cabo un estudio transversal en el que se aplicó el cuestionario a 250 mujeres de distintos centros integrales de salud. En primer lugar, el cuestionario se tradujo de forma literal del inglés al persa. Después se evaluó la validez aparente, de contenido y de estructura, así como la confiabilidad del cuestionario. **Resultados:** Los resultados mostraron que la validez aparente, de contenido y de estructura, así como la confiabilidad de este cuestionario son adecuadas. El coeficiente alfa de Cronbach para todo el cuestionario fue 0.668. El coeficiente de correlación intraclase fue 0.688, lo que confirmó una validez divergente. **Conclusiones:** El Cuestionario de Percepción de las Madres sobre la Atención de la Salud Posparto en los centros integrales de salud es válido y confiable para medir la percepción materna sobre estos servicios vitales.

Palabras clave: Madres. Percepción. Psicométrico. Centros comunitarios de salud. Estudios de validación.

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Introduction

Postpartum care is an essential component of women's reproductive health¹. A fundamental part of this care is provided after hospital discharge or home delivery in comprehensive health centers, and by health care providers, especially midwives². Mothers' perception of the quality and quantity of care they have received and their relationship with healthcare providers significantly impact continuity of care and future referrals for care³. Every woman referred to a health-care center has the right to compassionate care, including dignity, respect for her independence and feelings, and respect for her cultural and family preferences¹.

Unfair, distant, and disrespectful care during and after pregnancy has been reported worldwide in health centers⁴. Mothers' satisfaction with postpartum care closely depends on how they are treated by health care professionals². Unsatisfactory experiences and negative perceptions of health care are significant barriers to accessing care⁵. Some studies have examined women's negative experiences with care during and after pregnancy^{6,7}. Unacceptable behavior, misconduct in care management, and communication breakdown between mothers and nurses are significant challenges in antenatal care and aftercare, especially in developing countries, where high maternal mortality rates are observed⁸. Therefore, it is necessary to use appropriate and reliable instruments to measure any subject of study accurately⁹. The questionnaires available to measure mothers' perceptions of postpartum care are designed and used to evaluate postpartum nursing care in the hospital only^{2,5,10}, whereas most postpartum and infant care is provided in health centers. Patient-centered reproductive care has been recognized as essential in improving overall reproductive health. However, the number of studies on how to implement it is scarce¹¹. A valid and reliable tool is needed to assess mothers' perception of health care and encourage them to use existing care services. In addition, such a tool would help care management teams better evaluate their patients' satisfaction and make the necessary changes to meet their needs⁸. It is essential to encourage women to use these services and have a reliable and valid tool to design and evaluate mothers' perceptions of postpartum care to evaluate postpartum services in comprehensive health centers adequately. The overall purpose of this study was to create an instrument and assess its validity and reliability in determining mothers' perceptions of postpartum health care.

Methods

Study design

This cross-sectional study was conducted in 2018 to assess the validity and reliability of the Persian version of the Mothers' Perception of Postpartum Health Care questionnaire in comprehensive health centers in Shiraz, southwestern Iran.

Translation

The questionnaire items were initially in English. The questionnaire was translated into Persian and then translated back into English by two persons fluent in both languages. Another expert (independent of these two individuals) reviewed the translation to validate the questionnaire. Finally, two English and Persian experts compared the questionnaire and confirmed the accuracy of the translation.

Questionnaire description

This questionnaire is a part of the 100-item Goldberg Five-Factor Model¹² questionnaire, which was improved based on the characteristics of the original questionnaire. The Goldberg questionnaire is valid and reliable worldwide. The satisfaction scale of this questionnaire was based on the scale designed by Hall et al.¹³ Although the scale was created for the elderly population, it has been modified by DiMatteo and Hays and is used to assess physician satisfaction¹⁴. Due to the nature of the items in these questionnaires and their validity¹⁵, a part of the questionnaires was selected and psychometrically designed in this study to have a valid and reliable instrument to assess mothers' perception of the care provided in comprehensive health centers. The mothers' perception questionnaire (MPQ) consists of 18 main items and two subscales:

- 1) The first section includes six questions on psychological support to mothers and the information they received from midwives, participation in decisions, feeling of freedom to talk with midwives, follow-up of problems, and obtaining sufficient maternal and neonatal care training.
- 2) The second section includes 12 statements on mothers' satisfaction with the care provided, caregiver interactions, communication, behavior, and professional competence in educating patients about anxiety management.

Validity

The validity of the MPQ was evaluated by assessing face validity, content validity, and construct validity (exploratory factor analysis). Quantitative and qualitative methods were used to determine the face validity of the MPQ. To assess the face validity of the Persian version of the MPQ using the qualitative approach, we initially selected some employees of the sampled health centers and mothers attending these centers ($n = 10$) to comment on the questionnaire. Their opinions on the appropriateness and clarity of the items were applied to the questionnaire items. It is essential to consider the judgment of the target group on the relevance and comprehensiveness of the questionnaire items and that these items should assess the areas critical to the target group¹⁶. The impact score was used to determine quantitative face validity. Comprehensive health center staff and reproductive health professionals ($n = 10$) evaluated the importance of each item using the following formula:

$$\text{Impact score} = \text{frequency (\%)} \times \text{importance}$$

A coefficient of 1.5 or more was acceptable¹³. At this stage, the importance of each item was measured using the 5-point Likert scale: fairly important (5 points), somewhat important (4 points), moderately important (3 points), slightly important (2 points), and not at all important (1 point). Items with an effect size of < 1.5 points were modified. In addition to the opinion of several staff members working in comprehensive health centers, the opinions of literature experts on the wording, phrasing, and appearance of the questionnaire items were used.

A quantitative method was used to determine the content validity of the MPQ. For this purpose, the opinions of some faculty members who specialized in maternal care and reproductive health (10 individuals) were used. We performed a content validity index (CVI) based on that of Waltz and Strickland¹⁷. This index evaluates the relevance, clarity, and simplicity of the questions in the questionnaire on a four-point Likert scale.

The CVI score for each sentence was calculated by dividing the number of experts who agreed with rankings 3 and 4 by the total number of experts. CVI greater than 0.79 was considered adequate¹⁶. Exploratory factor analysis (EFA) was used to determine to construct validity. A total of 250 women referred to comprehensive health centers after childbirth were selected by purposive sampling. The results were analyzed using SPSS version 22.0 software.

Reliability

Reliability shows the reproducibility and accuracy of the instrument¹⁴. The reliability of the Persian version of the MPQ was calculated by determining Cronbach's alpha (internal consistency) of the entire questionnaire and its sub-items.

Results

Demographic characteristics

After referral to comprehensive health centers, 250 women participated in this study. The mean age was 30 ± 5.54 years, and most were homemakers (90.4%, 226). Most participants had planned their pregnancy (86%, 215 individuals) and used comprehensive health services during and after pregnancy. [Table 1](#) shows the demographic characteristics of the participants.

Face and content validity

The impact coefficient of all the items was higher than 1.5, and the questionnaire presented adequate and acceptable face validity. The minimum CVI value accepted was 0.79, which was higher than all the items in this questionnaire. The results showed that the CVI of all the items was 0.8-0.9, with a scale level index (S-CVI) of 0.73. The questionnaire items had an S-CVI of 0.73, and the content validity ratio (CVR) ranged from 0.62 to 0.9. The CVR value of the two items was < 0.62 , so these items were modified and reevaluated. After revising the CVR values, they reached an acceptable level. To refine the writing and wording of each sentence, a literary expert edited the items.

Construct validity

EFA was performed with 250 completed questionnaires. The Kaiser-Meyer-Olkin (KMO) index value at the first output was 0.825. Both the positive and negative skewness of the data were within an acceptable range. Therefore, the sample size selected was sufficient for factor analysis. According to Bartlett's test, the factor analysis was significant in identifying the structure of the factor model at $p < 0.001$, indicating detectable relationships among the variables analyzed.

The second EFA output, consisting of two parts, the initial eigenvalue and the extraction sums of squared or rotation loadings, are listed in [table 2](#). The rotational correlation matrix showed that 18 items related to

Table 1. Demographic and characteristics of the study participants

| Variable | Characteristic | Frequency (n) | Percentage (%) |
|--------------------------------------|----------------------|---------------|----------------|
| Age | Minimum 18 years old | 3 | 1.2 |
| | Maximum 46 years old | 2 | 0.8 |
| Occupation | Housewife | 226 | 90.4 |
| | Government employee | 23 | 9.2 |
| | Worker | 1 | 0.4 |
| Spouse occupation | Self-employed | 129 | 65.9 |
| | Government employee | 57 | 22.8 |
| | Laborer | 29 | 11.6 |
| Education | Illiterate | 4 | 1.6 |
| | Up to high school | 62 | 24.8 |
| | Bachelor's degree | 175 | 70 |
| | Masters or above | 9 | 30.6 |
| Spouse education | Illiterate | 5 | 2 |
| | Up to high school | 62 | 24.8 |
| | Bachelor's degree | 167 | 66.8 |
| | Masters or above | 16 | 6.4 |
| Pregnancy | Planned | 215 | 86 |
| | Unplanned | 34 | 13.6 |
| Delivery method | Normal delivery | 111 | 44.4 |
| | Cesarean section | 138 | 55.2 |
| | Assisted | 1 | 4 |
| Type of gestation | Single | 246 | 98.4 |
| | Twins | 4 | 1.6 |
| Weeks of gestation | < 37 weeks | 41 | 16.4 |
| | > 37 weeks | 209 | 83.6 |
| Delivery location | Health center | 148 | 59.2 |
| | Gynecologist clinic | 98 | 39.2 |
| | Others | 4 | 1.6 |
| Center for health care post delivery | Health center | 201 | 80.4 |
| | Gynecologist | 43 | 17.2 |
| | Others | 24 | 6 |

maternal perception of postpartum care measured two main factors. The first factor consisted of six items whose factor loadings ranged from a minimum of 0.254 to a maximum of 0.698. The second factor consisted of 12 items that were investigated in three dimensions. The first dimension consisted of seven items with a loading factor ranging from 0.626 to 0.732. The second dimension consisted of three items with a minimum operational load of 0.612 and a maximum of 0.675. Lastly, the third dimension consisted of two items with a minimum operational loading of 0.532 and a maximum of 0.637. [Figure 1](#) describes the factor analysis to determine the correlation between items. The first factor had six items, one of which had a weak correlation coefficient concerning the other items, and its reliability was low; thus, the item was eliminated, and Cronbach's alpha reliability coefficient increased from 0.717 to 0.84. Other items with sufficient correlation coefficients for the final 17-question model are listed in [table 3](#). The estimate of all factor loadings was significant. The internal consistency coefficient was used to determine the internal validity of the questionnaire.

Reliability

Cronbach's alpha values for each item and the entire questionnaire after factor analysis are presented in [table 4](#). The intraclass correlation coefficient (ICC) was 0.688, confirming divergent validity. The cross-correlations of the structures were lower than the mean square of the variances extracted, indicating a divergent validity model. The results showed sufficient reliability of the questionnaire ([Table 4](#)).

Discussion

In this study, we evaluated the psychometric properties of mothers' perception of postpartum care in comprehensive health centers in Iran. The validity and reliability of each questionnaire instrument ensured its accuracy and precision. Based on the findings of this study, the MPQ has adequate face, content, and construct validity. The factor loading of all questionnaire items was significant at $\alpha = 0.05$. Since this questionnaire was designed and validated for the first time, no similar study was found. All other published studies have assessed satisfaction, perception, or misconduct of postpartum care in hospitals. All items in this questionnaire have an impact coefficient over 1.5, CVI over 0.79, and the questionnaire has face and content validity.

Table 2. Primary and extractive sharing of exploratory factor analysis of mothers' perceptions of postpartum care

| Component | Total variance explained | | | | | | | | |
|-----------|--------------------------|----------------------------|----------------|-------------------------------------|----------------------------|----------------|-----------------------------------|----------------------------|----------------|
| | Initial eigenvalues | | | Extraction sums of squared loadings | | | Rotation sums of squared loadings | | |
| | Total | Percentage of variance (%) | Cumulative (%) | Total | Percentage of variance (%) | Cumulative (%) | Total | Percentage of variance (%) | Cumulative (%) |
| < 1 | 5.174 | 28.747 | 28.747 | 5.174 | 28.747 | 28.747 | 3.643 | 20.237 | 20.237 |
| 2 | 1.981 | 11.006 | 39.753 | 1.981 | 11.006 | 39.753 | 3.202 | 17.791 | 38.028 |
| 3 | 1.910 | 10.614 | 50.367 | 1.910 | 10.614 | 50.367 | 2.166 | 12.032 | 50.060 |
| 4 | 1.112 | 6.176 | 56.543 | 1.112 | 6.176 | 56.543 | 1.167 | 6.482 | 56.543 |
| 5 | 0.983 | 5.462 | 62.005 | | | | | | |
| 6 | 0.930 | 5.167 | 67.172 | | | | | | |
| 7 | 0.891 | 4.952 | 72.124 | | | | | | |
| 8 | 0.775 | 4.308 | 76.432 | | | | | | |
| 9 | 0.672 | 3.736 | 80.168 | | | | | | |
| 10 | 0.567 | 3.149 | 83.317 | | | | | | |
| 11 | 0.527 | 2.929 | 86.246 | | | | | | |
| 12 | 0.465 | 2.585 | 88.831 | | | | | | |
| 13 | 0.427 | 2.371 | 91.203 | | | | | | |
| 14 | 0.404 | 2.245 | 93.447 | | | | | | |
| 15 | 0.396 | 2.200 | 95.648 | | | | | | |
| 16 | 0.322 | 1.788 | 97.436 | | | | | | |
| 17 | 0.256 | 1.424 | 98.860 | | | | | | |
| 18 | 0.205 | 1.140 | 100.000 | | | | | | |

The study by Taavoni et al. aimed to design and test a Respectful Maternity Care Questionnaire. The results of their research showed that all items had an impact coefficient over 1.5 and that the CVR of the questionnaire was 0.74, which was acceptable⁶. Their results were similar to those of the present study. The CVI, CVR, and S-CVR were all acceptable items for the MPQ. Another study by Sheferaw et al. in Ethiopia to validate a 15-item questionnaire assessing mothers' perception of respectful antenatal care in health centers showed that the questionnaire items had a construct validity of 0.76 to 0.82, and the entire questionnaire had acceptable construct validity. The findings of this study confirmed the structural validity of the two factors of perception of postpartum midwifery care and postpartum care¹¹. In addition, the study published by Afulani et al. aimed to develop a person-based maternal care assessment tool. This questionnaire has four

factors and 38 items. The results of the EFA confirmed the validity of 30 items in three factors for urban and rural communities¹⁸.

Confirmatory factor analysis of the study by Taavoni et al. revealed that the Respectful Maternity Care Questionnaire related to mothers' satisfaction with postpartum nursing care had a good relationship between items and an acceptable value⁶. This research is similar to the present one, but as the questionnaire is already available in some languages, including English, and has been validated, confirmatory factor analysis was used. Cronbach's alpha for the questionnaire is 0.668, and the internal consistency and reliability of this questionnaire are adequate and demonstrate its high reliability. In the study by Afulani et al., Cronbach's alpha was 0.8, and all factors had a good value for reliability and applicability¹⁸. Overall, the modified 12 main items and two subitems questionnaire of

Table 3. Rotated matrix factor analysis of components of mothers' perception

| Maternal perception questionnaire in the postpartum period | Load factor |
|---|-------------|
| Factor one: Mothers' perception in post-delivery by midwives' period | |
| 1. Did you get enough psychological support? | 0.824 |
| 2. Did you receive the necessary information from the staff? | 0.883 |
| 3. Did you participate in meetings and communicating with your midwife? | 0.812 |
| 4. Did you feel comfortable talking to your midwife about your problems? | 0.805 |
| 5. Have you received enough education about caring for yourself and your baby after delivery? | 0.578 |
| Factor two: Understanding postpartum care | |
| First dimension: Positive understanding of care | |
| 6. I am completely satisfied with the care received | 0.68 |
| 7. The time spent with the health staff was adequate | 0.626 |
| 8. The health staff thoroughly and reasonably explained all the care, medications, and work they did for me | 0.634 |
| 9. The health workers listened carefully to what I was saying | 0.708 |
| 10. Health workers provided care for me with the utmost respect | 0.732 |
| 11. The health workers were kind and attentive to my feelings | 0.628 |
| 12. The health care that I received eliminated all the uncertainty and worry | 0.798 |
| Second dimension: Negative perception of care | |
| 13. I think the time spent with the health staff was not adequate | 0.675 |
| 14. I had some doubts about the ability of the health workers | 0.66 |
| 15. I feel that in some aspects, the health workers were not paying enough attention to me | 0.612 |
| Third dimension: | |
| 16. There were some areas in the care I received that could have been better | 0.842 |
| 17. I noticed some healthcare staff were arrogant | 0.533 |

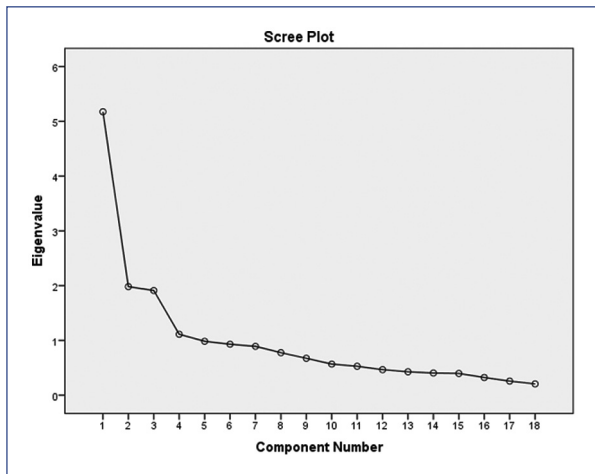


Figure 1. Screen plot based on factor analysis to determine the correlation between items.

mothers' perception of postpartum care in comprehensive health centers is a valid and reliable questionnaire to measure mothers' perceptions of these vital and valuable services.

This questionnaire can identify strengths and weaknesses in the care provided by midwives and health care providers. Many studies on maternal satisfaction, maternal perception, and malnutrition in prenatal or

postnatal care have been conducted in different hospitals around the world, leading to the development of reliable and valid tools, especially in developing countries where health care is poorer. The development of these tools has conducted to the design or confirmation of their validity and reliability^{8,10}, providing essential inputs to care teams and healthcare providers.

Relevance to clinical practice

This study was designed to prepare a unique tool to assess the maternal perception of the care provided at comprehensive outpatient health centers. The limited number of factors and the total number of items in this questionnaire, considering the little time mothers spend in health centers, would allow participants to concentrate and avoid fatigue while answering the questions. The low number of sub-items (two factors) may cause some aspects mothers need to understand for better continuity of care to go unnoticed. Moreover, according to our review, this questionnaire has been designed for the first time. However, considering other aspects that may not have been well addressed in this tool, if validated in other countries, it can be used as a universal tool to investigate possible harmful effects on maternal perception of postpartum care.

Table 4. Correlation, validity, and homogeneity of perceptions

| Variables | Cronbach's alpha | Intraclass correlation | 95% CI | Questions (n) |
|------------------|------------------|------------------------|-------------|---------------|
| Factor one | 0.690 | 0.680 | 0.614-0.738 | 5 |
| Factor two | | | | |
| First dimension | 0.740 | 0.737 | 0.684-0.784 | 7 |
| Second dimension | 0.758 | 0.757 | 0.699-0.805 | 3 |
| Third dimension | 0.162 | 0.144 | 0.098-0.332 | 2 |

95% CI: 95% confidence interval.

Ethical disclosures

Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this study.

Confidentiality of data. The authors declare that they have followed the protocols of their work center on the publication of patient data.

Right to privacy and informed consent. The authors have obtained the written informed consent of the patients or subjects mentioned in the article. The corresponding author has this document.

Conflicts of interest

The authors declare no conflicts of interest.

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