

Psychometric Properties and Factor Structure of the Persian Version of Revised Prenatal Distress Questionnaire in Second and Third Trimesters

Abstract

Background: There are no proper tools for measuring pregnancy-specific stress in Iranian population. The aim of this study was psychometric evaluation of the Persian version of Revised Prenatal Distress Questionnaire (NuPDQ) for the first time in Iranian society. **Materials and Methods:** In a descriptive-analytic study, 269 pregnant women completed the NUPDQ at Obstetrics clinics of Mazandaran Province, Iran. The reliability of the 12-item NuPDQ and 17-item NuPDQ was reevaluated using Cronbach's alpha and internal consistency. Concurrent validity was assessed using the Spielberger state-anxiety Inventory. Moreover, exploratory factor analysis was used to assess the structural factors of the questionnaire. **Results:** Factor analysis revealed that the 12-item NuPDQ consisted of four areas in the second trimester including medical and financial problem, physical symptoms, infant health, and parenting with the explained variance of 64.15%. The Persian version of 17-item NuPDQ consisted of 5 areas in the third trimester, including medical and financial problems, physical symptoms, infant health, parenting, and labor and delivery with an explained variance of 61.94%. In addition, interclass correlation coefficient in all 4 areas and overall scale score exceeded 0.90. Finally, the reliability was high based on Cronbach's alpha of 0.78 for 12-item NuPDQ and 0.79 for 17-item NuPDQ. **Conclusions:** The Persian version of 12-item NuPDQ in the second trimester and 17-item NuPDQ in the third trimester, as well as all the extracted subscales, had a good validity and reliability for assessing pregnancy-specific stress in Iranian society and can be used in clinical practice.

Keywords: Iran, pregnancy, psychometrics, stress disorders, validation study

Introduction

Pregnancy is associated with important physiological and psychological changes that impose emotional distress to women despite the pleasure of motherhood.^[1] Prenatal distress can be due to general stressors or pregnancy-specific stressors. On the other hand, several factors affect the severity of experience of pregnancy-specific distress, including stress coping strategies and women's social support, as well as lifestyle.^[2-4] A number of studies have concluded that the role of pregnancy-specific distress may be more important compared to general stressors. Recent studies have shown that pregnancy-specific distress is a stronger predictor of birth outcomes compared with general stressors.^[5-7] Pregnancy distress is associated with an increased risk of pregnancy complications, including abortion, preeclampsia, and the disease

severity.^[3,8,9] In addition, it increases the risk of premature birth and low-birth weight.^[10]

A serious challenge in pregnancy research is the lack of tools with a sufficient validity and reliability for evaluating pregnancy distress. Most tools used to measure distress in pregnant women such as the State Trait Anxiety Inventory (STAI) and perceived stress scale are merely able to evaluate general stress.^[11] These tools are therefore not sufficient to measure pregnancy-related distress and have shown inconsistent and unstable correlations with birth outcomes.^[12] Paulie and Loble introduced Prenatal Distress Questionnaire (PDQ), which is a special tool for determining stress in pregnancy. PDQ has 12 items,^[13] validated in many societies.^[14,15] The questionnaire consists of 12 questions and 3 subscales including concerns about body weight and image, giving birth and baby, and emotion as well as relationships.

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Thereafter, Loble *et al.* (2000) introduced the Revised Pregnancy Distress Questionnaire (NuPDQ). NuPDQ has an important advantage over PDQ, and its design is able to assess the pregnancy distress in women specifically in each trimester.^[16] A review showed that pregnancy-specific distress assessment tools are well-established for every society, and their validity and reliability are confirmed for each culture. They can provide important findings for research with the objective of reducing the distress experienced in pregnant women.^[17] Also, a systematic review reported psychometric instruments to assess psychological distress during pregnancy. It identified that NuPDQ is the best currently available instrument in measuring pregnancy-related stress.^[18]

Accordingly, considering the lack of proper tools for measuring pregnancy stress in Iran, and regarding the important benefits obtained from a revised form of pregnancy distress, we aimed to assess the psychometrics of the Revised Prenatal Distress Questionnaire (NuPDQ), 12-item NuPDQ in the second trimester and 17-item NuPDQ in the third trimester across the Iranian population.

Materials and Methods

This descriptive-analytic cross-sectional study of the tool assessment type was implemented in public health centers of Babol University of Medical Sciences from June to October 2018. The research tool was a revised pregnancy distress questionnaire (NuPDQ). This self-reporting questionnaire included 17 items evaluating pregnancy distress in women in each trimester of pregnancy. Specifically, 9 questions were dedicated to the first trimester, 12 questions concerned the second trimester, and 17 questions evaluated the third trimester in pregnant women. The respondents would mark each item with zero (not at all), 1 (somewhat), and 2 (very much). Thus, NUPDQ questionnaire for the second trimester contained 12 questions, and NuPDQ for the third trimester consisted of 17 questions. Note that 12 questions of NuPDQ for the third trimester were the same questions of the second-trimester NuPDQ, with 5 questions specifically for the distresses of the third trimester added to them.

After receiving permission from Dr. Lobel, the questionnaire was translated to Persian using the forward-backward method. Initially, two native Persian language translators, expert in the translation of English texts, translated the English questionnaire into Persian. The two translations were then reviewed by the researchers of the project, and a final version was prepared. In the next stage, two other translators, expert in English and Persian, were asked to translate the Persian version back into English. Then, the English translated paper was compared with the original English version by two experts of English language. Finally, the final Persian version the pregnancy distress questionnaire was approved. After verifying the correctness of the concepts, the 17-item questionnaire

was qualitatively given to 10 pregnant women who met the criteria for entering the study. Then, the simplicity, clearance, and understandability of the terms used in the questionnaire were evaluated. In addition, in order to assess the content validity, 5 experts in the field of pregnancy and psychology provided the necessary feedback qualitatively. The results were: Content Validity Index (CVI) 0.91 and Content Validity Ratio (CVR) 0.94.

In order to assess the concurrent validity of the NuPDQ, a simultaneous assessment was performed via the Spielberger state-anxiety. The Spielberger State-Trait anxiety questionnaire is a tool widely used in studies to measure general anxiety. The questionnaire consists of 40 questions, 20 of which concern state anxiety, and 20 other questions evaluate trait anxiety.^[14] In this study, the 20 questions capturing state anxiety were used.

In order to use this questionnaire in pregnant women, 2 rural and urban health centers, as well as one university hospital in Babol and Amol cities were randomly selected. Of the 2 teaching hospitals of Babol city which had an obstetrics clinic, one hospital was selected randomly. Further, of all of the 15 rural health centers in Baol city, one center was included randomly in the study. One center out of 17 urban health centers of Amol city was selected randomly. The inclusion criteria were pregnant women with a gestational age of 14 weeks and more, willingness to participate in the study, and age of 18 years or more. Women with less than elementary school education level, as well as mentally retarded people, and patients with severe physical or mental illnesses were excluded from the study. In each health center, a midwife assessed the participants in terms of meeting the criteria for entering the study, recorded the demographic data, and distributed questionnaires among participants. The sample size was calculated as 15 samples per question of NuPDQ. Thus, with the sample drop of 5%, 269 pregnant women entered the study through available sampling method. Of that number, 122 pregnant women in the second trimester (13 to 26 weeks), and 147 pregnant women in the third trimester (27 to 41 weeks) completed the NuPDQ and Spielberger state anxiety questionnaires. The distribution of samples in the second and third trimesters was based on the number of items in each questionnaire – the second trimester (NuPDQ-12) had 12 questions and the third trimester had 17 questions (NuPDQ-17).

All stages of confirming the validity and reliability for the NuPDQ questionnaire were performed separately for the second trimester (12-item NuPDQ) and the third trimester (17-item NuPDQ). In order to assess the reliability of these questionnaires in terms of internal consistency, Cronbach's alpha coefficient was used. The concurrent validity was assessed based on the correlation between NuPDQ tool and Spielberger state-anxiety inventory. In the next step, exploratory factor analysis was used to

determine the areas of the pregnancy distress-specific questionnaires. Statistical analysis was performed using SPSS software (version 24.0, IBM, Chicago, IL, USA).

Ethical considerations

This study was approved by the ethics committee of Babol University of Medical Sciences (MUBABOL.HRI.REC.1396.61). The study was conducted in compliance with the requirements of the Declaration of Helsinki. The participants' names were not recorded to assure confidentiality. Also, all patients signed an informed consent before entering the study.

Results

Regarding gestational age, 122 participants were in the second trimester (45.50%) and 147 (54.60%) were in the third trimester of pregnancy. The demographic characteristics of women including education level, number of pregnancies, age, gestational age, number of births given, number of abortions, duration of marriage and occupation are presented in Table 1. A total of 269 pregnant women completed the questionnaires. Considering the 17-item NuPDQ in the third trimester, the final internal consistency of the Persian version of 17-item NuPDQ for the third trimester showed that the entire tool had an appropriate Cronbach's alpha of 0.78. Cronbach's alpha for subscales of the medical and financial problem

was 0.79, for physical symptoms 0.64, infant health 0.60, parenting 0.62, and labor and delivery 0.76. In order to investigate the validity of the 17-item NuPDQ, exploratory factor analysis was used. The KMO index in exploratory factor analysis indicated the adequacy of data for conducting factor analysis (KMO = 0.63). Bartlett test of sphericity test also indicated that the matrix of data correlation in the population was not zero; thus, seeking for factors was justifiable (Bartlett $X^2 = 953.72$ df = 120 $p < 0.001$).

The analysis of the main components was carried out using the Varimax method of the 17-item NuPDQ. In other words, several experimental rotations were performed to determine the most appropriate factors. Considering the special values and the percentage of explained variance (61.94), first, extraction of 6 factors was performed. Analysis of the results showed that after eliminating Question 6, the mean Cronbach's alpha and total correlation increased for the 17-item NuPDQ in the third trimester. Accordingly, 5 relevant factors, i.e., 5 distress factors were extracted. Indeed, analysis of the exploratory factor of the Persian version of the 17-item NuPDQ of the third trimester resulted in extraction of 5 factors: i) medical and financial problem (questions 1,3,12), ii) parenting (questions 11,13,16,17), iii) infant's health (questions 7,9,10), iv) physical symptoms (questions 2,4,5,8), and v) labor and delivery (14,15). Table 2 reports the mean and standard deviation of the 17-item NuPDQ in the five extracted areas in the third trimester.

The concurrent validity of the Spielberger state-anxiety with 12-item NuPDQ in the second showed that the 12-item NuPDQ had a significant relationship with the Spielberger state-anxiety inventory ($r = 0.43$, $p < 0.001$). In addition, 17-item NuPDQ for the third trimester had a significant relationship with Spielberger's anxiety inventory ($r = 0.41$, $p < 0.001$).

The final consensus on the Persian version of 12-item NuPDQ in the second trimester showed that the entire tool had a suitable Cronbach's alpha which was equal to 0.79. In addition, Cronbach's alpha for the sub-branch of the medical and financial problem was 0.99, physical symptoms 0.64, infant health 0.58, and parenting 0.51. In order to evaluate the validity of the 12-item NuPDQ in the second trimester, the exploratory factor analysis was implemented. The KMO index in exploratory factor analysis revealed the adequacy of data for factor analysis. Bartlett test of sphericity test also showed that the matrix of data correlation in the population was not zero, and thus, seeking for factors was justifiable (Bartlett $x^2 = 3842.10$ df = 276 $p < 0.001$). Analysis of the main components was done using the Varimax method on 12 questions of the questionnaire. Table 3 reports the results of factor analysis of 12-item NuPDQ in four areas in the second trimester.

Table 1: characteristics of population study

| Variables | n (%) | | |
|----------------------|------------------|-----------------|-------------|
| | Second trimester | Third trimester | Total |
| Age | | | |
| 18-30 | 75 (62.50) | 100 (68.02) | 175 (65.54) |
| ≥ 30 | 45 (37.50) | 47 (31.98) | 92 (34.46) |
| Education | | | |
| Under diploma | 23 (19.32) | 23 (16.31) | 46 (18.40) |
| Diploma | 66 (55.47) | 72 (51.06) | 128 (51.20) |
| University | 30 (25.21) | 46 (32.63) | 76 (3.40) |
| Job | | | |
| Employee | 31 (26.05) | 49 (34.75) | 80 (30.76) |
| Unemployed | 88 (73.95) | 92 (65.25) | 180 (69.24) |
| Parity | | | |
| 0 | 55 (45.83) | 73 (50.69) | 128 (48.49) |
| 1 | 55 (45.83) | 56 (38.89) | 111 (42.04) |
| ≥ 2 | 10 (8.34) | 15 (10.42) | 25 (9.47) |
| Number of Abortions | | | |
| 0 | 98 (81.00) | 124 (84.93) | 222 (83.45) |
| 1 | 17 (14.05) | 16 (10.96) | 33 (12.35) |
| ≥ 2 | 6 (4.95) | 6 (4.11) | 12 (4.50) |
| Duration of marriage | | | |
| <5 years | 44 (40.00) | 56 (43.41) | 100 (41.84) |
| ≥ 5 years | 66 (60.00) | 73 (56.59) | 139 (58.16) |

Table 2: Factor analysis of Persian version of NUPDQ-17*in the third trimester

| Question number | Questions | Mean (SD) | Factor 1 | Factor 2 | Factor 3 | Factor 4 | Factor 5 |
|-----------------|---|-------------|----------|----------|----------|----------|----------|
| 3 | Are you feeling bothered, upset, or worried at this point in your pregnancy about Paying - for your medical care during pregnancy? | 0.94 (0.65) | 0.92 | | | | |
| 12 | Paying for the baby's clothes, food, or medical care? | 0.94 (0.64) | 0.92 | | | | |
| 1 | Effect of ongoing health problems such as high blood pressure or diabetes on your pregnancy? | 0.57 (0.57) | 0.49 | 0.75 | | | |
| 16 | Working at a job after the baby comes? | 0.32 (0.53) | | 0.71 | | | |
| 11 | Changes in your relationships with other people due to having a baby? | 0.43 (0.54) | | 0.71 | | | |
| 13 | Taking care of a newborn baby? | 0.53 (0.62) | | 0.41 | | | |
| 17 | Getting day care, babysitters, or other help to watch the baby after it comes? | 0.23 (0.48) | | | | | |
| 10 | Whether the baby might come too early? | 0.84 (0.65) | | | 0.72 | | |
| 7 | Whether you might have an unhealthy baby? | 1.02 (0.63) | | | 0.66 | | |
| 9 | Whether the baby might be affected by alcohol, cigarettes, or drugs that you have taken? | 0.24 (0.52) | | | 0.61 | | |
| 2 | Feeling tired and having low energy during your pregnancy? | 0.82 (0.56) | | | | 0.70 | |
| 5 | Physical symptoms of pregnancy such as vomiting, swollen feet, or backaches? | 0.90 (0.60) | | | | 0.68 | |
| 4 | Changes in your weight and body shape during pregnancy? | 0.65 (0.62) | | | | 0.63 | |
| 8 | Working or caring for your family during your pregnancy? | 0.53 (0.55) | | | | 0.54 | 0.86 |
| 14 | Pain during labor and delivery? | 1.17 (0.64) | | | | | 0.85 |
| 15 | What will happen during labor and delivery? | 1.26 (0.59) | | | | | |

NUPDQ-17*: 17-item Revised Prenatal Distress Questionnaire

Table 3: Factor analysis of Persian version of NUPDQ-12*in the second trimester

| Question Number | Mean (SD) | Factor 1 | Factor 2 | Factor 3 | Factor 4 |
|-----------------|--------------|----------|----------|----------|----------|
| 3 | 0.80 (0.66) | 0.95 | | | |
| 12 | 0.80 (0.66) | | | | |
| 5 | 0.85 (0.66) | 0.95 | | | |
| 2 | 0.80 (0.60) | | 0.75 | | |
| 4 | 0.66 (0.70) | | 0.74 | | |
| 1 | 0.56 (0.59) | | 0.62 | | |
| 6 | 0.46 (0.56) | | 0.55 | 0.64 | |
| 9 | 0.22 (0.50) | | | 0.63 | |
| 7 | 1.016 (0.69) | | | 0.61 | |
| 10 | 0.669 (0.69) | | | 0.61 | 0.75 |
| 8 | 0.504 (0.63) | | | | |
| 11 | 0.37 (0.66) | | | | 0.705 |

NUPDQ-12*: 12-item Revised Prenatal Distress Questionnaire

It was found that the mean Cronbach's alpha and the total correlation of NuPDQ for the second trimester were appropriate. Accordingly, four factors or subscales were extracted in exploratory factor analysis of the second trimester of NuPDQ. They included: i) the medical and financial problem (questions 3,12), ii) physical symptoms (questions 1,2,4,5), iii) the infant's health (questions 6,9,7,10), and iv) parenting (questions

8,11). These four factors explained 64.15% of the variance. In addition, Table 3 shows the structure of the factors and their loading rate, the specific value, and the percentage of variance explained by each factor, along with the value for Cronbach's alpha.

Discussion

In this study, we evaluated the psychometric properties of the pregnancy-specific distress (NuPDQ) in Persian language and in line with the social status of Iran. The variance explained by the extracted factors (61.94%) showed a proper construct validity of the 17-item NuPDQ for the third trimester. In addition, analysis of homogeneity of areas using an index of Cronbach's alpha showed that this tool was appropriate in all 5 areas.

The variance explained by the extracted factors (15.64%) indicates an appropriate construct validity of the 12 item-NuPDQ in the second trimester. The review of the databases showed that the validity of this questionnaire and the pertained sub-components have been reported in three studies. Justin *et al.* (2018) tested 120 pregnant adolescents with the age range of 15-19 years old using the NuPDQ pregnancy stress questionnaire in the third trimester. Questions 2 and 17 had a lower correlation coefficient than normal, and a questionnaire with 15 questions was designed which had a Cronbach's alpha of 0.736.^[19] In another study, 4 areas were found in factor analysis, including concern about physical and social changes,

medical care, child care, and substance abuse. Cronbach's alpha in this questionnaire was 0.85, with 98 participants out of 522 being in the second trimester of pregnancy.^[20] Staneva *et al.* (2015) reported the validity of this tool in their study to be 0.79. They also reported 6 areas in their research including medical and financial problems, physical symptoms, infant health, parenting, labor and delivery, and maternal health.^[21] Lobel working on 163 women of 10 to 34 weeks of gestational age reported the reliability of NuPDQ with Cronbach alpha 0.79 and convergent validity with state-anxiety 0.44 to 0.57.^[16]

Regarding intercultural studies, the extracted factors have similarities and differences with other studies. The similarity of our study with three other studies is that in all studies, four sub-components were considered as the concern and sources of distress among pregnant women. These components include medical and financial problems, physical symptoms, parenting, as well as labor and delivery. The advantage of the present study compared to the others is that we used 12-item NuPDQ for women in the second trimester of pregnancy, and 17-item NuPDQ for women in the third trimester. In addition, the validity of each questionnaire has been evaluated and reported separately in our project. Note that the previous studies have assessed both trimesters by a 17-item questionnaire, and they have not reported each trimester separately.

There were a number of limitations and research implications to be mentioned. The first limitation was that the pregnant women usually began prenatal visits after 12 weeks of gestation. Thus, the study population did not include any pregnant woman with a gestation period shorter than 12 weeks. It is suggested that pregnancy distress be evaluated in women with less than 12 weeks of gestation in future studies. It is important to consider detecting the distress areas at early stages of pregnancy as it provides the opportunity to support pregnant women more adequately. The second limitation was that the population study was representative of women with low-risk pregnancy in health care centers. It is not clear whether the scale covers the worries of women with high-risk pregnancy. Further research is required to confirm the exploratory factor analysis of Persian NUPDQ in women with high-risk pregnancy. Nevertheless, the psychometrics of the Persian version of NUPDQ may help clinicians in using a specific scale to measure the pregnancy stress. Consistent with the results of other studies, the results of the present study suggest that the questionnaire maintained its structure with minimum changes and with the removal of one question in NuPDQ of the third trimester. Thus, cultural and racial differences or different experiences of pregnant women in Iran did not cause a different assessment compared with the English version of pregnancy-specific stress questionnaires. Generally, it can be stated that psychometric assessments, through verifying the reliability and validity of the

questionnaires, facilitate their application, and provide an opportunity to be used by researchers.

Conclusion

Both 12-item NuPDQ Persian version for women in the second trimester of pregnancy and 17-item Persian version NuPDQ for women in the third trimester had a good validity and reliability for assessing pregnancy-specific stress in Iranian society. Thus, NuPDQ can be used in clinical practice and provide a wide range of research opportunities for assessing pregnancy-specific distress.

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Conflicts of interest

Nothing to declare.

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