

Development and Psychometric Analysis of Fathers' Concerns Questionnaire on Low Risk Pregnancies of their Wives in Iran

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Abstract

Background: Pregnancy can be troublesome for parents. This study was conducted with the aim of development and psychometric evaluation of a Fathers' Concerns Questionnaire regarding low risk pregnancy of their wives.

Materials and Methods: This study was an exploratory sequential mixed method research. The participants were men whose wives visited Healthcare centers of Gorgan (Iran) for pregnancy care. In the qualitative stage, the individual experiences of 20 fathers were inquired by direct content analysis using semi-structured interview and questionnaire items were compiled based on findings of the qualitative study. The validity of the tool was confirmed by face, content and construct validity methods using exploratory and confirmatory factor analysis. The reliability was investigated by internal consistency methods using Cronbach's alpha and stability was determined by intraclass correlation coefficient (ICC) test-retest with an interval of 2 weeks.

Results: In the qualitative study, 28 initial items of the questionnaire were compiled in three dimensions, including the process of pregnancy and delivery (10 items), mother and child health (4 items), and individual-family concerns (14 items). In the face and content validity stage, 2 items were removed. Barlett's test was significant ($p=0.000$) and Kaiser-Meyer-Olkin was equal to 0.88. Based on factor analysis results, 2 other items were omitted. The extracted factors were investigated by confirmatory factor analysis. Total reliability was determined by Cronbach's alpha (0.93), and ICC (0.99).

Conclusion: Fathers' concerns questionnaire for low risk pregnancy of wives is designed with 24 items and 3 dimensions, which has appropriate validity and reliability and can be used to determine the status of fathers' concerns and the effectiveness of counseling interventions to reduce concerns during low risk pregnancy of their wives.

Key Words: Concern, Fathers, Pregnancy, Psychometrics, Questionnaire.

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1- INTRODUCTION

Pregnancy is a pleasurable period, but it is often a stressful time associated with physiological and psychological changes (1). There are several physical and psychological challenges for pregnant women and their husbands during this time (2). Physiological changes of pregnancy help women understand the realities of a mother's role, but it is difficult for men to understand the father's role and to adapt to the changes that take place in their life (3). Nowadays, fathers are more involved in the care of their children. Fathers are an important support source of their spouses, especially when they receive prenatal training for this supportive role. However, many fathers are not ready to transition to parenthood (4); therefore, the transition to parenting period and the expectations associated with delivery and birth lead to high levels of anxiety and fear in some men (5). Fathers also experience significant stress when trying to strike a balance between childcare and the need for work. Fatherhood as a transitional stage in men's life is 'amazing and stressful' (6), which can be associated with depression, social isolation, disturbed relationship with spouse and child, and causing serious damage to their family (7, 8). Studies have indicated that in addition to physical and mental changes (5, 9), fathers suffer from concerns about the health of mother and child during pregnancy of their spouses, the ability to play the role of father and manage the family as well as conflict of pregnancy with their work (10). The fathers have less anxiety during pregnancy than mothers, so they use less coping strategies to reduce their worries compared with mothers (11). An outcome of these concerns is the inability to acquire the skills needed to protect the mother and child (12). Therefore, it is necessary for fathers-to-be to understand what causes their worries during transition to the role of parenthood in order to reduce these

concerns as much as possible (13). A variety of tools have been developed for measuring concerns' of expectant parents during pregnancy and the concerns after it (14-17), while to the best of our knowledge we found only two questionnaires for expectant fathers: Couvade for physical changes of expectant fathers (9), and fathers' concerns in high-risk pregnancies (18). Nevertheless, no questionnaire has been designed to address fathers' concerns about low risk pregnancy of their wives and there are shortcomings regarding the concerns of expectant fathers (13). Therefore, this study was designed and conducted with the aim of development and psychometric assessment of Fathers' Concerns Questionnaire on Low Risk Pregnancies of their Wives in Iran.

2- MATERIALS AND METHODS

This study was an exploratory sequential mixed method research. To design the questionnaire, the steps recommended by Walts et al. were followed. Further explanation is given in the research method of each stage (19).

2-1. Qualitative stage

The samples included men whose wives visited hospitals and health centers in Gorgan, Iran, in 2019 for low risk pregnancy care. After identifying women with low risk pregnancies, arrangements were made to meet and interview with their husbands. The inclusion criteria were: being the spouse of pregnant mother at any age of pregnancy, having informed consent, lack of substance abuse and mental illness diagnosed in the present and past in fathers as self-reporting. In the qualitative stage, purposive sampling was performed with maximum diversity in variables of age, gender, education level, occupation. A semi-structured interview was individually held with fathers who had eligible criteria and sampling was continued until data saturation was

reached, data were saturated with 20 samples. The interview data were analyzed by direct content analysis method (20). The interview questions were based on the obtained themes, concern categories of expectant fathers in high-risk pregnancies of their wives from our previous study such as general worries over the pregnancy and delivery, maternal and neonatal health, personal and family affairs (18). The new data or text defined in the categories and subcategories of fathers' concerns on low risk pregnancies of their wives was coded separately and defined as a new subcategory or category (21).

To assess trustworthiness, four main criteria were used as follows: credibility, dependability, transferability, and confirmability (22). To achieve credibility, in-depth interviews in multiple meetings and different situations, member checking (23), peer debriefing were used, in which the data were reviewed by other members of the research team to ensure that the categories matched participants' statements (24). To check for dependability, the researcher's decisions and activities regarding collection and analysis of data were completely and continuously recorded (21).

External review method was used to control transferability and the research findings were submitted to a few persons not taking part in the research but having similar characteristics with participants to judge the similarities between the results of research with their experiences. To confirm the research credibility and confirm ability, the interviews, codes and extracted subcategories and categories were examined by the research team. At the same time, the texts of a number of interviews, codes and extracted subcategories and categories were communicated to colleagues of the researcher who were familiar with analysis of qualitative research but who did not take part in the research, to evaluate the

agreement between several researchers (24).

2-2. Item generation

After developing the concept in the form of a theoretical framework (18), the operational definitions of each construct were explained. Then, to design the items pool, the first phase of research was drawn based on qualitative results.

2-3. Item reduction

At this stage, the validity of the questionnaire was examined by face validity (qualitative and quantitative), content (qualitative and quantitative), and construct (exploratory and confirmatory factor analysis) validity. The reliability was then assessed by internal consistency (Cronbach's alpha), and test-retest reliability was checked with a two-week interval using the test (intraclass correlation coefficient [ICC]).

2-4. Validity

2-4-1. Face validity

Qualitative and quantitative methods were used to determine the face validity. In determining the qualitative face validity, fathers were asked to read the items in order to examine the level of difficulty, appropriateness, and ambiguity. Then, the questionnaire was modified according to the fathers' opinions. In the next step, to determine the significance of each item, the quantitative method of impact score was used. Thus, for each item of the questionnaire, a five-point Likert scale [1: Quite important (score 5)]; [2: Somewhat important (score 4)]; [3: Moderately important (score 3)]; [4: Relatively important (score 2)]; [5: Not important at all (score 1)] was considered. The impact score of each item was calculated separately based on the following formula: $\text{Frequency (\%)} \times \text{Importance} = \text{Impact score}$. Impact scores (≥ 1.5) were found to

be appropriate for subsequent analyses (25).

2-4-2. Content validity

Content validity was also assessed in both qualitative and quantitative forms. To determine the qualitative content validity, the questionnaire was distributed to 13 experts (including 2 PhDs in Psychology, 4 PhDs in Reproductive Health and 7 MScs in Midwifery) who had scientific and experimental backgrounds in the field of pregnancy care to comment on the grammar, wording, and item allocation and scaling were made based on their opinion. For quantitative content validity, content validity ratio (CVR), and content validity index (CVI) were used to evaluate the necessity of the item and to ensure the selection of the most accurate and important content, respectively. For this purpose, the designed questionnaire was provided to experts to review each item based on a three-point score (1. Not necessary; 2. Useful, but not essential, 3. Essential). If the content validity ratio was equal to or greater than the figure reported in Lawshe Table (depending on the number of experts), the presence of that statement in the tool was necessary and important. According to the 13 participating experts, content validity of each item was >0.54 , indicating that the presence of the relevant statement was necessary in the questionnaire with significance level of $p < 0.05$ (26). In this formula, N_e is the number of experts who assigned the required score to the item and N is the total number of experts.

$$CVR = \frac{(N_e - N/2)}{(N/2)}$$

Content validity index (CVI) was used to calculate the three criteria of simplicity and fluency, relevance, and transparency separately in a Likert scale. The questionnaire was evaluated by the same number of experts in terms of these three criteria. The content validity index is obtained by dividing the number of experts

who have assigned the score 3 or 4 to the total number of experts. $I-CVIs \geq 0.78$ and an $S-CVI/Ave \geq 0.90$ showed the excellent content validity (27).

2-4-3. Construct validity

To determine the factor structure, samples were taken from eight private health centers and a hospital. The number of samples required in factor analysis is estimated at 3-10 participants per item (28). Therefore, considering 26 items and 10% estimated probability of sample loss, 302 fathers were recruited in the study (302 subjects for exploratory factor analysis and random selection of 200 individuals from the same sample for confirmatory factor analysis). Eligible individuals were given explanations about the research plan, and then a written consent form was provided to those who had expressed their willingness to participate in the study. Exploratory factor analysis was performed using the maximum-likelihood method and Promax Rotation by SPSS statistical software version 16.0. The normal distribution of the data was assessed by the skewness ($3 \pm$), and kurtosis ($7 \pm$) measures (29). Sampling adequacy was assessed using Kaiser-Meyer-Olkin (KMO) test and correlation matrix between items by Bartlett's test. $KMO=0.8$ was considered as an acceptable indicator for assessment (28). After extracting the factors and related items, the minimum factor load to remove the items was considered as turning point of 0.5. In the second step, the extracted factors were investigated with the confirmatory factor analysis (LISREL 8.8 software) as well as the most common model fit indices and their acceptable values as follows: Root Mean Square Error of Approximation or RMSEA (good < 0.08), Parsimony Normed Fit Index or PNFI (< 0.5), Normed Fit Index or NFI (> 0.9), Non-Normed Fit Index or NNFI (> 0.5), Comparative Fit Index or CFI (> 0.9), Goodness of Fit (> 0.9), Adjusted

Goodness of Fit Index or AGFI (>0.8), Incremental Fitness Index or IFI (>0.9), Relative Fit index or RFI (>0.9), and the ratio of chi square to degree of freedom or CMIN/df (>3) (30).

2-5. Reliability

To examine the reliability of the questionnaire, the internal consistency and stability were determined. The internal consistency of the questionnaire in a sample of 30 randomly selected fathers was calculated using Cronbach's alpha. The maximum Cronbach's alpha for deleting a statement was 0.7 (31). To determine the reliability of the stability, the test-retest method was used at two-week interval. The scores of these two steps were compared using intraclass correlation coefficient, (ICC) > 0.9 showed excellent stability and between 0.75 and 0.9 showed the good stability (32).

2-6. Ethical considerations

The present study was approved by the ethics committee in Nursing and Midwifery Faculty of Shahid Beheshti University of Medical Sciences with ethics code IR.SBMU.PHNM.1397.158. To conduct the research, the researcher introduced herself to study settings and obtained informed consent of fathers taking part in the research who were assured that participation in the research was optional and that they could withdraw from it whenever they wished. In addition, all the research participants were guaranteed the confidentiality of the information obtained. The telephone number and other specifications of the researcher were provided to the participants.

3- RESULTS

3-1. Sample characteristics

In the qualitative stage of the study, interviews were held with eligible fathers

and saturation was achieved with 20 participants. In quality control of face validity, 10 fathers with education range of primary to high school confirmed the items. In the psychometric assessment stage, 302 recruited fathers with an average age of 31.12 ± 6.01 years completed the questionnaires. A majority of samples belonged to Persian ethnicity (62.3%), and most of them had received high school and university education (34.9% and 34.9%, respectively). In terms of occupation, 50.2% had freelance jobs. 41.9% of the samples experienced their first pregnancy.

3-2. Content validity

Based on content validity ratio of <0.54, the number of items was decreased from 28 to 26. The items "I'm worried my child won't love me" and "I'm worried I won't love my child" were removed. The S-CVI/Ave was 0.98 and acceptable. The preliminary and proposed estimates of items of concern for fathers in normal pregnancies of their spouses are shown in **Table.1**. According to the table, the number of proposed items was 28. The results of paternal concern in normal pregnancy were placed in 9 sub-categories and 3 main themes of pregnancy and childbirth, maternal and child health, personal and family affairs (**Table.1**). The initial questionnaire was designed in a five-point Likert scale (never=0, rarely=1, sometimes=2, most often=3, always=4). The level of concern for each item is a score between 0 and 4. A higher total score indicates high level of concern.

3-3. Face validity

As the impact factor was calculated >1.5 for each item, the quantitative face validity was suitable. Qualitative content validity was also applied to the items of the questionnaire according to expert opinion.

3-4. Construct validity

In this research KMO was equal to 0.89, indicating that the present sample has excellent adequacy and sufficiency for Kaiser-Meyer-Olkin index was 0.8 and the results of Bartlett's test were significant ($p=0.000$), indicating that factor analysis was permitted. The whole statistical sample ($n=302$) was subject to factor analysis. A total of four factors had eigenvalue >1 , which explained 51.19% of the total variance observed in the questionnaire. Out of 26 items, item 6 ("I have little information on pregnancy"), and item 10 ("I am worried about my wife's nutrition") did not have a suitable impact to be included in any of the factors and were removed. In this analysis there is no cross-loading.

Table.2 shows the exploratory factor analysis of items "Fathers' Concerns Questionnaire on Natural Pregnancies of their Wives".

The results of confirmatory factor analysis are shown in **Table.3**. As can be seen, a

analysis. According to the guidelines, the factors were extracted with eigenvalue >1 .

majority of the indicators related to matching and goodness of fit are at an acceptable level.

Figure.1 shows the values of the coefficients of standard path for model fit to the data.

3-5. Reliability analyses

To check the reliability of the questionnaire, Cronbach's alpha and correlation matrix between items were determined. The internal consistency of fathers' concerns scale on natural pregnancy of wives was reported to be 0.93 with Cronbach's alpha. To evaluate the consistency of the scale over time, intraclass correlation coefficient (ICC) was calculated 0.99 with a confidence interval of 0.98-0.99, which is considered as a favorable level of consistency.

Table-1: Items based on the themes and categories.

Dimension	Main Category	Number of items	Total
Pregnancy and delivery	Condition of spouse in pregnancy and delivery	2	10
	Medical care status	3	
	The unpredictability of pregnancy and delivery process	2	
	The ambiguity of pregnancy and delivery process	3	
Health of mother and child	Child's Health	2	4
	Mother's Health	2	
Personal-family concern	Father and spouse role	5	14
	Change in daily life	6	
	Meeting family needs	3	
Total items	28		

Table-2: The exploratory factor analysis of items "Fathers' Concerns Questionnaire on Low Risk Pregnancies of their Wives".

Extraction component	Items		Component (factor loading)				Eigenvalue	Variance (percentage)	Cronbach's alpha
			1	2	3	4			
1. Personal-family concern	13	I worry about my ability to care for the child.	0.67				4.46	17.76	0.9
	7	I'm worried that my child will have a birth defect or a serious health problem at birth.	0.66						
	14	As a father, I am worried that I will not be able to efficiently perform my tasks.	0.66						
	8	I'm worried that my child will be born prematurely.	0.64						
	17	I am worried that my wife will have little time for me after the birth of our child.	0.62						
	9	I'm worried I won't be able to make the right decision for my wife.	0.57						
	16	I am worried about the damage to my intimate relationship with my wife.	0.57						
	12	I am worried that my wife will die due to pregnancy and childbirth complications.	0.51						
	20	I am worried that there will be a restriction on social communication after the birth of my child.	0.48						
	5	I'm worried because I don't know about childbirth.	0.44						
2. Pregnancy and delivery concern	2	I am worried that my wife will not be able to bear the pain of childbirth.		.72			3.41	14.21	0.83
	23	I'm worried about my wife's delivery.		.73					
	4	I am worried about the inefficiency of the staff during my wife's delivery.		.75					
	1	I am worried about unforeseen unpleasant events during my wife's pregnancy and childbirth.		0.73					
	24	I'm worried about choosing the place where my wife will give birth.		0.74					
	11	I am worried that I will not be able to admit my wife to hospital due to the lack of access to a hospital or a doctor.		0.54					
	3	I'm worried about the recurrence of unforeseen adverse events in my wife's pregnancy.		0.53					
3. Concern for care of child	22	I'm worried that when I'm at work, no one will help my wife with the child.			0.61		2.57	10.71	0.76
	25	I'm worried that I won't be able to do my normal daily activities well after my child is born.			0.55				
	21	I'm worried I won't be able to help my wife with childcare.			0.54				
	26	I'm worried that my wife won't be able to take care of the child.			0.53				
4. Concern about meeting the requirements of the family	19	I am worried about meeting the future needs of my child and family.				0.88	2.04	8.50	0.83
	18	I am worried about the financial issues of pregnancy and childcare expenses.				0.61			
	15	I'm worried about not meeting my wife's needs.				0.49			

Table-3: Evaluation of fit indices of research model.

Fit index	Chi-square	df	P-value	CMIN/df	RMSEA	PNFI	NFI	NNFI	CFI	AGFI	IFI	RFI
Estimated values	1035.58	246	.000	4.21	0.097 ; 0.11	0,81	0.91	0/81	0.93	0.73	0.93	0.89

Note: RMSEA (0.08) > PNFI, NNFI > (0.5), NFI, CFI, GFI, IFI, RFI > (0/9), CMIN/df > (3 good).

Abbreviation: CMIN/df=Chi-square/degrees of freedom ratio, RMSEA= Root Mean Square Error of Approximation, PNFI= Parsimony Normed Fit Index, NFI= Normed Fit Index, NNFI =Non-Normed Fit Index, CFI= Comparative Fit Index, GFI= Goodness of Fit Index, AGFI = Adjusted Goodness of Fit Index, IFI= Incremental Fit Index, RFI= Relative Fit Index.

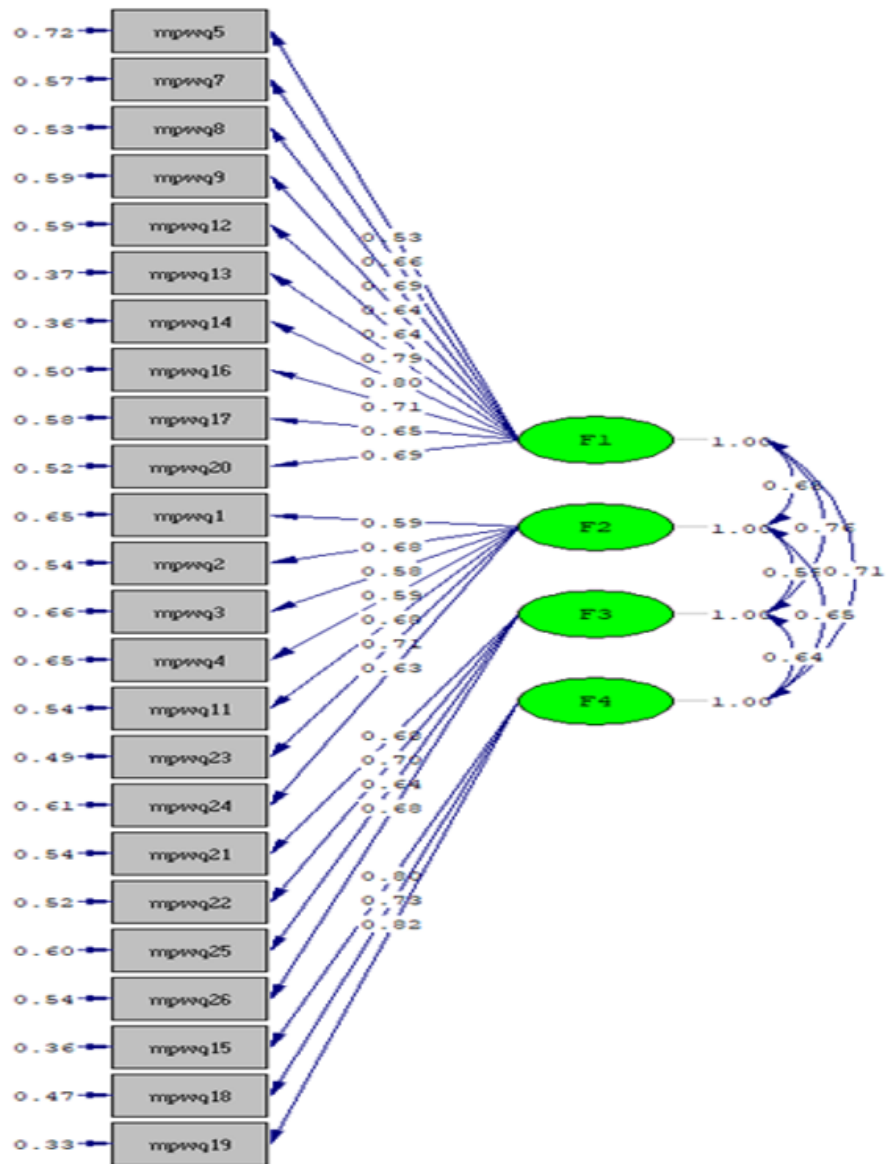


Fig.1: Basic model with standard path coefficients.

4- DISCUSSION

The main goal of this study was to design and validate the fathers' concern

questionnaire in natural pregnancy. According to the present study, in factor analysis, four components had eigenvalue >1. In total, four components explained

51.19% of the total variance observed in the questionnaire scores. The first component of concern was related to the personal-family concern, the second to pregnancy and delivery concern, the third to concern for care of child and finally the fourth to concern to meet requirements of the family, which were revealed with 17.76, 14.21, 10.71 and 8.50 percent of variance explanation, respectively. Cronbach's alpha indicates the homogeneity of the measurement questionnaire in all items, and the Cronbach's alpha coefficient of total items was 0.93, which shows good reliability of the questionnaire. The dimensions of concern about the personal-family concern, pregnancy and delivery concern, concern for care of child and concern to meet requirements of the family had Cronbach's alpha of 0.90, 0.83, 0.76, 0.83, respectively, which reveals acceptable reliability. Therefore, it can be stated that the questionnaire has a good reliability. Intraclass correlation coefficient test retest reliability is most acceptable for determining consistency. ICC > 0.9 showed excellent stability and between 0.75 and 0.9 showed the good stability (32).

ICC of the questionnaire in this study was 0.99, which was considered as favorable consistency. Considering the development of the concept of the present study in a theoretical framework based on the questionnaire of Men's Worry about Their Wives' High Risk Pregnancy Questionnaire (18), the analysis of the data of the present study did not reveal two categories of concerns about impaired care of other children and worrying about loneliness at home during hospitalization, which were personal-family themes in the mentioned questionnaire. Also, during the analysis of data in the present study, the categories of concern about consequences of pregnancy related to the theme of pregnancy and delivery of expecting

fathers on high-risk pregnancy of their spouses was not revealed (18). Furthermore, the mental retardation and death of neonate from the subclass of concern about the health of baby was not revealed, which was related to the study of expecting fathers regarding high-risk pregnancies of their wives. The reason for variety of dimensions, categories and subcategories of fathers' concerns in low risk pregnancy compared to high-risk pregnancy was the difference in the type of pregnancy and the increased risk perceived for mother and child by expecting father. In justifying the above difference, it can be explained that the consequence of pregnancy, death and mental retardation of the baby are more pronounced in high-risk pregnancies due to the specific conditions of such pregnancies.

Moreover, it is more probable for the mother to be hospitalized in high-risk pregnancy ward, leaving the father alone at home. Psychometric items and the concern dimensions of Men's Worry about Their Wives' High Risk Pregnancy Questionnaire (18) in the study are comparable to the present research. Subcategories of pregnancy and delivery as well as individual factors are present in the current tool similar to fathers' concerns tool about high-risk pregnancy of wives. Although the dimensions of maternal and neonatal health were considered in the qualitative stage based on directional analysis method, the subcategories of neonatal and maternal health were placed in other subcategories in exploratory factor analysis and two subscales of concern for child and family needs were formed in factor analysis stage in this questionnaire. This change can be attributed to the fact that there are stronger factors threatening the health of mother and baby in high-risk pregnancies, so it is normal for maternal and child health to be important aspects of parental concerns dimensions and subcategory about wives' high-risk

pregnancies. In a low risk pregnancy that is free from the dangers of high-risk pregnancies, there are concerns such as caring for the child and meeting the needs of the family. The order of variance explanation rates in the dimensions of these two studies is somewhat different, which could be due to the fact that the participants of our study included only normal pregnancies, while the Hajikhani et al.'s study, sample consisted of fathers whose spouses had high-risk pregnancies (18). The specific conditions of high-risk pregnancies and their unforeseen complications are different from low risk pregnancy. A number of items in questionnaire of expecting fathers having wives with high-risk pregnancies are similar to the current questionnaire. These items include inability to care for the child, making the right decision for the spouse, worrying about the death of the spouse, lack of information on pregnancy and childbirth, type of delivery, unforeseen events, intolerance of labor pain by the spouse during pregnancy, all of which are partly influenced by men's lack of precise and genuine information on the process of pregnancy and childbirth. Therefore, it is strongly recommended that the counseling and training of expectant fathers be considered as important as that of mothers with more serious, regular, and extensive planning. Although fathers now attend a limited number of pregnancy preparation sessions together with mothers, the content of such classes is mostly based on the needs of mothers and therefore is unable to meet the needs of expectant fathers. The reliability of the 29-item Couvade questionnaire is comparable to the present study (9). This questionnaire, which has been developed based on review of literature, measures the physical symptoms of expectant fathers in the first pregnancy of their spouses and has a high degree of confidence (Cronbach's $\alpha=0.89$). Although the Ganapati questionnaire has good validity and reliability similar to that

of the present study, it is only suitable for measuring the physical symptoms of expecting fathers. Content and construct validity of this tool is acceptable in the present study. Moreover, the calculated consistency with internal homogeneity (Cronbach's α), and reliability (test-retest and correlation coefficient of > 0.7) were acceptable. Therefore, the present questionnaire is considered to be reliable. One of the advantages of this questionnaire is the fact that the lack of a history of mental illness was considered a prerequisite for the participants; therefore, the measured anxiety of the samples was only the result of concern about pregnancy and related issues. The second advantage of this questionnaire is that the design of the questionnaire was based on the experiences of fathers. Another strong point is confirmatory factor analysis as well as exploratory factor analysis in psychometric assessment of the present questionnaire. One of the limitations of this study is that the criterion validity was not assessed due to the lack (or inaccessibility) of the standard questionnaire of fathers' concerns in the low risk pregnancy of the spouse. It is suggested that this tool be used in intervention studies based on the counseling of expectant fathers in order to make better judgments about its responsiveness. Another limitation is that the analysis of confirmatory factor was done in the population of Gorgan city, so it is better to study the factor analysis in another place to determine the differences.

5- CONCLUSION

Overall, the present study revealed that fathers' concerns questionnaire concerning low risk pregnancies of their wives had face, content, and construct validity as well as good reliability, which could be used to determine fathers' concerns and the effectiveness of counseling interventions to reduce their

concerns relative to fathers with wives having low risk pregnancy.

6- ACKNOWLEDGMENTS

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7- CONFLICT OF INTEREST: None.

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