



Cross-cultural adaptation and validation of the First-Time Fathers Questionnaire in China

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ABSTRACT

Objective: The study aimed to cross-culturally adapt and validate the First-Time Fathers Questionnaire (FTFQ) in the cultural context of China.

Design: Prospective validation study.

Setting: The study was conducted in four public hospitals in Hangzhou, a southeast coastal city of China.

Participants: Four hundred and nineteen first-time fathers (mean age=30.45 years, SD=3.44, range 22-46) whose partners had given birth between July 20 and October 10, 2019.

Methods: The instrument "First Time Fathers Questionnaire (FTFQ)" was translated and culturally adapted to the Chinese context according to the methodological criteria of the International Society for Pharmacoeconomic and Outcomes Research. The construct-related validity of the instrument was tested through EFA and CFA. Content validity was evaluated with an analysis of the expert judgment. Reliability was assessed based on the internal consistency.

Results: Four domains were identified: "Worry", "Information", "Emotional Support", and "Acceptance", with 19 items and adequate internal reliability (0.86, 0.80, 0.86, and 0.72, respectively) and a total variance of 64.65%. The CFA model showed there is a good fit for the data: $\chi^2/df = 1.20$; RMSA = 0.03; CFI = 0.99; and NFI = 0.93. Additionally, each item achieved an I-CVI ≥ 0.83 , and the S-CVI/Ave = 0.90.

Key Conclusions: The Chinese version of the FTFQ is a valid and reliable instrument to assess first-time fathers' experience of childbirth in China.

Implications for Practice: This study provides a validated questionnaire that is suitable for the Chinese cultural context. It contributes to the knowledge of first-time fathers' experience of childbirth and facilitate further actions to improve paternal satisfaction and behavior as labour companion.

Introduction

Labour companionship was firstly proposed by the World Health Organization (WHO) in the 1990s, referring to physical, emotional and informational support for a woman during labour and childbirth (World Health Organization, 1997). With the aim of improving the quality of maternity care, WHO recently recommended the im-

plementation of labour companionship in global healthcare facilities (World Health Organization, 2015; World Health Organization, 2018). The approach of labour companionship was introduced to China in 2008, and has become an increasingly common practice in resource rich regions (Midwife Branch of Chinese Maternal and Child Health Association, 2018).

Labour companionship can be provided by a family member, friend, doula, or maternity care professional (Bohren et al., 2019). Increasing evidence suggests that fathers play an important role in childbirth, and their presence during labour and being in the delivery room is beneficial to birth outcomes, themselves, and their families. For example,

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studies reveal that participation of fathers during childbirth can shorten the duration of labour, relieve labour pain, promote positive childbirth experiences for their partners (Lewis et al., 2015; World Health Organization Human Reproduction Programme, 2016), contribute to their transition to fatherhood, reduce the risk of paternal postpartum depression (Longworth and Kingdom, 2011), and strengthen fathers' relationship with their partners and children (Kululanga et al., 2012; Sapountzi et al., 2015).

While benefits associated with the presence of fathers during childbirth can be demonstrated from multiple perspectives, recent studies reveal that some fathers would experience negative emotional feelings such as anxiety, fear and being excluded from the healthcare team during their partners' childbirth (Lindberg and Engström, 2013; Premberg et al., 2011). Fathers' negative experience may lead to adverse effects not only on their partners' childbirth experience but also on family relationships, and their own health (Bradley et al., 2008; Hildingsson et al., 2014; Parfitt and Ayers, 2009).

Being a father for the first time is a major life changing event; most first-time fathers lack knowledge and experience with childbirth, as a result, they are more likely to have negative feelings when attending the labour process (Eggermont et al., 2017; Ledenfors and Carina, 2016). It has been reported that first-time fathers are at higher risk of acute stress and posttraumatic stress disorder when compared with fathers who already have children (Iles et al., 2011). Therefore, there is an emerging need to assess first-time fathers' experience of childbirth, in order to better understand their perceptions and their needs during childbirth, so to inform further action to improve labour companionship.

According to literature, two questionnaires have been developed to assess fathers' experience of childbirth (Premberg et al., 2012; Vehviläinen-Julkunen and Liukkonen, 1998). Developed in Sweden, the First-Time Fathers Questionnaire (FTFQ) was specifically designed for first-time fathers (Premberg et al., 2012), which has subsequently been translated into four languages (English, Spanish, French, and Czech). All versions of the FTFQ have acceptable validity and reliability (Capponi et al., 2016; Molina-Velásquez et al., 2018).

With a growing acceptance of labour companionship in China, more and more first-time fathers participated in childbirth (China maternal and child health association, 2019). However, there is currently no validated instrument available to assess Chinese first-time fathers' experience during the labour process. Therefore, this study aimed to translate and adapt the FTFQ, and evaluate its reliability and validity in China.

Methods

Instrument

The FTFQ includes 33 items, of which 22 (item 5-26) assess first-time fathers' experience of childbirth and the other 11 items collect background information on socio-demographic data, mode of birth and fathers' preparation regarding childbirth (item 1-4 and 27-33). The 22 items (item 5-26) measure four domains of the fathers' experience: Worry (8 items), Information (4 items), Emotional Support (6 items), and Acceptance (4 items) (Premberg et al., 2012). Each item is evaluated with a four-point Likert response scale (1, completely true; 2, partly true; 3, somewhat true; 4, not true at all). Item 5-26 are the only items assessing fathers' experience that are being scored; the total score of each domain is the average score of its containing items, the higher the score, the worse the fathers' experience.

Translation and cultural adaptation

After obtaining authorization, the FTFQ was translated and adapted to the Chinese language following the methodological criteria of the International Society for Pharmacoeconomic and Outcomes Research (ISPOR) (Wild et al., 2005). The first step is forward translation. During

this stage, the FTFQ was translated from English to Chinese by two independent bilingual translators whose mother tongue is Chinese. After forward translation, reconciliation was performed with a discussion between the researchers of this study, a midwifery academic, and the two forward translators. When the reconciliation was reached, independent back translations were performed by two bilingual translators whose native language is English. Harmonisation was subsequently performed in the same way as the reconciliation process. Finally, a review by the research team, the forward and backward translators and the main author of the FTFQ was performed to evaluate the linguistic equivalences, formulating a pre-final Chinese version.

The pre-final version was submitted for experts to review. The review board composed of five specialists: including two midwifery academics, one clinical midwife, one linguist and one psychologist. The experts assessed each translated questionnaire item according to the conceptual, semantic, idiomatic, experiential, and operational equivalences. Scores were assigned with four-point Likert scale (1, totally different; 2, item needs major modification to be equivalent; 3, item needs minor modification to be equivalent; 4, equivalent). The translation validity indexes were calculated for each item and the entire instrument (Lynn, 1986; Tang and Dixon, 2002). After agreement was reached amongst the expert panel, a cognitive debriefing, involving six first-time fathers who were native Chinese speakers, was carried out to evaluate comprehensibility of the items and statements. Finally, a pilot study was conducted with 30 first-time fathers to test the cultural adaptation and local applicability of the final translated version.

Questionnaire validation

Participants were first-time fathers whose partners had given birth in Hangzhou, a southeast coastal city of China, between July 20 and October 10, 2019. The participants were recruited through four public hospitals including two general hospitals and two maternity hospitals.

According to the original FTFQ, inclusion criteria were as follows: the father and his wife/girlfriend experienced a vaginal birth (normal or instrumental) or an unplanned caesarean delivery, the infant had an Apgar score more than 7 when assessed at 5 minutes after birth. The exclusion criteria were as follows: the newborn was not the father's first child, the father was not present in the delivery room during childbirth, and the newborn was delivered via an elective or scheduled caesarean section.

The study employed both EFA and CFA to make validly comparison. A minimum sample size for exploratory factor analysis (EFA) is suggested between 5 to 10 participants per item (Gorsuch, 1983). Since a confirmatory factor analysis (CFA) was also performed in this study, 430 participants were finally recruited. Participants are asked to complete the questionnaire within 24-72 hours after childbirth. The validated questionnaire is 419, and the questionnaire recovery rate was 97.44%. One hundred and eighty-five questionnaires were used for item analysis and EFA, and the remaining 234 questionnaires were used to perform CFA.

A descriptive statistical analysis was used to analyze socio-demographic characteristics of the participants. The reliability of each item was tested by item analysis consisting of discrimination and homogeneity. The construct-related validity was assessed by EFA and CFA. Principal component analysis extraction and varimax orthogonal rotation were used to conduct EFA. Amos 23.0 software was used to construct a measurement model of latent variables and manifest variables in accordance with the scores of four common factors and each item (Wu, 2010).

The Content Validity Index of Items (I-CVI) and the Scale Content Validity Index-Average (S-CVI/Ave) were used to evaluate the content related validity of the instrument. The expert panel consisted of six experienced midwives; four of them worked in hospitals, and two worked at universities. Assessment documentation of the instrument was e-mailed to the six experts, who assessed each item using the criteria of relevance.

Table 1
Sociodemographic characteristics of participants (n=419).

	Descriptive statistics	
Mean age (SD)	30.45 (3.44)	
Mode of delivery	N	%
Vaginal delivery	386	92.12
Ventouse /forceps	26	6.21
Unplanned caesarean section	7	1.67
Relationship with the child's mother		
Marriage	417	99.52
Cohabitation	2	0.48
Education level		
Junior high school	6	1.43
Senior high school/technical secondary school	11	2.63
Technical college	84	20.05
University	223	53.22
Postgraduate degree	95	22.67
Childbirth experience met expectations		
Yes	377	89.98
No	42	10.02
Preparation for childbirth*		
Self-taught	101	24.11
Internet	139	33.17
Information from family and friends	199	47.49
Delivery education at an antenatal clinic	107	25.54
Other education such as Lamaze childbirth education	26	6.21
Did not prepare	69	16.47

* More than one option was possible.

Scores were given based on a scale of 1 to 4 (1, no relevance; 2, somewhat relevant; 3, quite relevant; and 4, highly relevant). The reliability of each domain was evaluated using Cronbach's α analysis.

Ethical considerations

The study was approved by the Academic Ethics Committee of Medical College of Hangzhou Normal University (No.20190005). Permission to conduct the study was acquired from the responsible hospital managers of the study settings. Each participant was given an information sheet and a consent form before participating the study. Informed consent from each participant was obtained prior to the study. Printed questionnaires were distributed to those who agreed and consented to participate. All participants were assured that their refusal or withdrawal during this study would not affect the care of their partners or children during their hospital stay.

Results

Characteristics of participants

Characteristics of the participants are shown in Table 1. The mean age of the participants was 30.45 ± 3.44 years, range between 22 and 46. More than 90% of them experienced vaginal delivery (excluding ventouse and forceps), 95% of them achieved technical college education or higher. Regarding preparation for childbirth, most of the participants (80.66%) reported gaining information from family members, friends, or the Internet; 16.47% did not prepare at all.

Item analysis

To test the reliability of each item, an item analysis was performed; results are shown in Table 2. The items of the FTFQ were analyzed by the critical ratio (CR) and the homogeneity test. The CR was used to evaluate the discrimination of each item. In this study, the CR of each item was above 3, the least value to consider a good discrimination (Wu, 2010), indicating all items of the instrument had good ability to distinguish between good and bad experience of first-time fathers.

The homogeneity of each item with the domain was tested by the correlation coefficient of the item and the score of its domain, Cronbach's α , commonality, and factor loading. In this study, the correlation coefficient of item 8 and the domain of acceptance was under 0.4, the least value to consider a good correlation with its domain. The commonality and factor loading of item 8, 13, and 14 were all under the minimal criteria (0.20 for the commonality and 0.40 for the factor loading) (Wu, 2010), suggesting these items had low correlations with the FTFQ. In addition, when item 8, 13 and 14 were removed, Cronbach's α of each item's corresponding domain increased, indicating the three items had poor homogeneity with their corresponding domain (Hays et al., 2000; Wu, 2010). Results of this study indicated that item 8, 13 and 14 of the original Swedish FTFQ were less homogeneous with the Chinese FTFQ, as a result, the three items were removed.

Construct-related validity

The EFA and CFA were performed to evaluate the construct-related validity of the FTFQ. The Kaiser-Meyer Olkin (KMO) test and Bartlett's sphericity test were performed to estimate the level of intercorrelation and sampling adequacy. The KMO value ranges from 0 to 1, the score should be as close to 1 as possible, and should be >0.6 ; and Bartlett's sphericity must be statistically significant ($P < 0.05$) (Kaiser, 1970; Tabachnick et al., 2013). In this study, the KMO value was 0.80, and Bartlett's sphericity was $X^2(185) = 1974.29$ ($p < 0.01$), which indicated that data was adequate for an EFA.

The EFA showed that cumulative variance contribution rate of the four factors was 64.65%. Factor 1 (Worry), factor 2 (Emotional Support), factor 3 (Acceptance) and factor 4 (Information) accounted for 20.76%, 20.00%, 12.47% and 11.42% of the variance respectively. Table 3 showed the 19 items and their own factor loadings, and Fig. 1 indicated the scree plot agreed with the structure of the four factors.

The model offered by the CFA fit well with the data. The ratio of chi-square to degrees of freedom (X^2/df) = 1.20, root mean square error of approximation (RMSEA) = 0.03, comparative fit index (CFI) = 0.99, and normed fit index (NFI) = 0.93, all indicated the measurement model and the observed data had good fit. The measurement model of the Chinese FTFQ is shown in Fig. 2.

Content-related validity

Generally, $I-CVI \geq 0.78$ and $S-CVI \geq 0.8$ indicate that an instrument has excellent content validity (Polit et al., 2007; Shi et al., 2012). In this study, the I-CVI of the Chinese FTFQ ranged from 0.83 to 1.00, and the S-CVI/Ave was 0.90 (Table 4), indicating that the Chinese FTFQ has excellent content validity.

Reliability

For the reliability of the Chinese FTFQ, Cronbach's α was calculated to evaluate the internal consistency of each domain. Cronbach's $\alpha > 0.70$ is generally regarded as satisfactory (Barbaranelli et al., 2015). In this study, the Cronbach's α values for Worry, Information, Emotional Support and Acceptance were 0.86, 0.80, 0.86 and 0.72 respectively, which were all >0.70 , indicating high internal consistency and reliability.

Resulting questionnaire

After rigorous cross-cultural adaptation and reliability and validity analyses, the original instrument was adapted and validated to the Chinese FTFQ. Three items (8, 13, and 14) were removed, and the domains of the Chinese FTFQ were the same as those of the original FTFQ: Worry, Information, Emotional Support, and Acceptance.

Table 2
Summary of the item analysis of the Chinese FTFQ.

Items	CR	Item-domain correlation	Cronbach's α of removed the item	Commonality	Factor loading	Number of indicators not achieving the criteria	Note
14. There are situations I would rather not have experienced	7.14	0.47	0.86*	0.11*	0.34*	3	Remove
15. I worried about my wife/girlfriend	4.83	0.66	0.82	0.55	0.74	0	Maintain
16. I worried about my child	7.75	0.67	0.82	0.55	0.74	0	Maintain
17. I worried that something would go wrong	14.42	0.82	0.79	0.73	0.86	0	Maintain
18. I worried that I could not provide support	14.98	0.73	0.81	0.54	0.74	0	Maintain
19. I worried that unexpected situations would happen	21.30	0.82	0.79	0.73	0.86	0	Maintain
20. I worried about my reaction during childbirth	19.49	0.68	0.82	0.40	0.63	0	Maintain
23. During the delivery, there were things that frightened me	14.29	0.67	0.82	0.36	0.60	0	Maintain
5. I felt I received enough information	10.89	0.78	0.44	0.73	0.86	0	Maintain
6. I felt well-prepared	17.29	0.86	0.32	0.82	0.91	0	Maintain
11. I received enough information	9.47	0.70	0.53	0.60	0.77	0	Maintain
13. There is some information about childbirth I lacked	4.45	0.44	0.80*	0.01*	0.10*	3	Remove
12. I was guided about how to help my wife/girlfriend	10.38	0.69	0.85	0.49	0.70	0	Maintain
21. I felt that the midwives and other medical staff took my feelings into consideration	11.82	0.72	0.84	0.53	0.73	0	Maintain
22. In order to give me a break, the medical staff took the initiative, took over and supported my wife/girlfriend.	10.24	0.70	0.84	0.53	0.73	0	Maintain
24. When I felt frustrated, the medical staff comforted me (such as verbal comfort, eye comfort, or shoulder patting, etc.)	12.50	0.80	0.83	0.65	0.81	0	Maintain
25. The medical staff taught me how to hold the baby	14.89	0.86	0.81	0.70	0.83	0	Maintain
26. The medical staff encouraged me to hold the baby	18.15	0.83	0.82	0.65	0.80	0	Maintain
7. We were admitted to the hospital of our choice	10.51	0.70	0.56	0.55	0.74	0	Maintain
8. I felt welcome when I called the maternity unit	5.71	0.21*	0.72*	0.10*	0.10*	4	Remove
9. When we arrived at the obstetrics department, I was treated very well	3.16	0.84	0.39	0.71	0.84	0	Maintain
10. I felt that the medical staff focused close attention on me	3.85	0.85	0.41	0.74	0.86	0	Maintain
Criteria	≥ 3	≥ 0.4	\leq Note	≥ 0.2	≥ 0.45		

* The indicator did not achieve the criteria. The criterion for Worry (items 14, 15, 16, 17, 18, 19, 20, and 23) is ≤ 0.84 (Cronbach's α). The criterion for Information (items 5, 6, 11, and 13) is ≤ 0.62 (Cronbach's α). The criterion for Emotional Support (items 12, 21, 22, 24, 25, and 26) is ≤ 0.86 (Cronbach's α). The criterion for acceptance (items 7, 8, 9, and 10) is ≤ 0.61 (Cronbach's α).

Table 3
Factor structure and loading of the Chinese FTFQ (19 items).

Items	Worry	Emotional Support	Acceptance	Information
17. I worried that something would go wrong	0.86			
19. I worried that unexpected situations would happen	0.85			
16. I worried about my child	0.78			
15. I worried about my wife/girlfriend	0.77			
18. I worried that I could not provide support	0.71			
20. I worried about my reaction during childbirth	0.60			
23. During the delivery, there were things that frightened me	0.57			
25. The medical staff taught me how to hold the baby		0.89		
26. The medical staff encouraged me to hold the baby		0.84		
22. In order to give me a break, the medical staff took the initiative, took over and supported my wife/girlfriend.		0.69		
21. I felt that the midwives and other medical staff took my feelings into consideration		0.66		
24. When I felt frustrated, the medical staff comforted me (such as verbal comfort, eye comfort, or shoulder patting, etc.)		0.66		
12. I was guided about how to help my wife/girlfriend		0.56		
7. We were admitted to the hospital of our choice			0.84	
10. I felt that the medical staff focused close attention on me			0.66	
9. When we arrived at the obstetrics department, I was treated very well			0.61	
5. I felt I received enough information				0.88
6. I felt well-prepared				0.87
11. I received enough information				0.65

Discussion

This study provided a validated instrument for assessing first-time fathers' experience of childbirth that can be applied in the cultural context of China. The instrument was adapted and validated following the methodological criteria of ISPOR and questionnaire validation. The Chi-

nese FTFQ presented a factorial structure that is similar to that of the original FTFQ, and the EFA and CFA both supported the structure. The Chinese version maintained four factors that were used in the original version, while the French FTFQ has three factors and the Spanish FTFQ has two factors (Capponi et al., 2016; Molina-Velázquez et al., 2018).

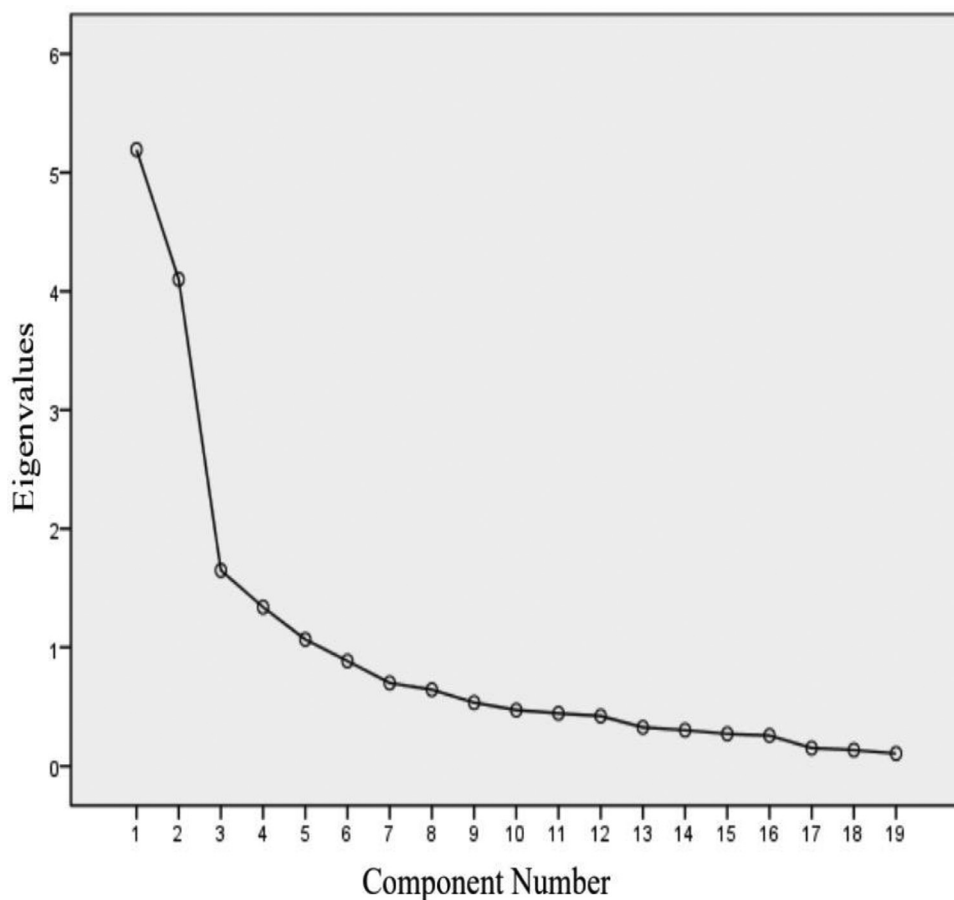


Fig. 1. The scree plot of the FTFQ in China.

Table 4
Expert ratings and CVI.

Items	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Expert 6	Number of experts who rated the item as 3 or 4	I-CVI
5	4	3	2	4	4	4	5	0.83
6	4	2	3	4	3	4	5	0.83
7	4	4	4	4	3	4	6	1.00
9	4	3	4	4	3	4	6	1.00
10	4	3	2	4	3	3	5	0.83
11	4	3	3	4	3	4	6	1.00
12	4	3	4	4	4	4	6	1.00
15	4	4	4	4	4	4	6	1.00
16	4	4	4	4	3	4	6	1.00
17	4	4	4	4	2	4	5	0.83
18	2	4	3	3	3	4	5	0.83
19	4	4	3	4	2	4	5	0.83
20	3	2	3	3	3	4	5	0.83
21	4	2	3	4	3	3	5	0.83
22	3	2	3	3	4	3	5	0.83
23	3	3	2	4	3	3	5	0.83
24	4	3	3	4	3	4	6	1.00
25	3	3	4	4	4	3	6	1.00
26	3	2	3	3	4	3	5	0.83

The study discovered that the Chinese FTFQ demonstrated better construct-related validity than the original FTFQ. In the Chinese FTFQ, the cumulative variance contribution of the four factors was 64.65%, and the factor loading of each item ranged from 0.56 to 0.89, while the four factors in the original FTFQ accounted for 48% of the variance, and the factor loading of each item ranged from 0.41 to 0.82 (Premberg et al., 2012). For the French and Spanish versions, the proportion of the total variations explained by factors are 54.12% and 87%, respectively, and the factor loading of each item ranges from 0.43 to 0.89 and from 0.37 to 0.80, respectively (Capponi et al., 2016; Molina-

Velásquez et al., 2018). Comparing with the French FTFQ, the Chinese version presented better performance in construct-related validity. Although the Chinese FTFQ’s cumulative variance of the contribution rate was lower than that of the Spanish FTFQ, the factor loading of the Chinese version was higher, indicating that items in the Chinese FTFQ have better homogeneity with their own domains.

Furthermore, assessment of model fit in CFA concluded that the model had a good fit according to the results of χ^2/df , CFI, NFI and RMSEA. Firstly, χ^2/df indicates the probability of the correctness of the model. The closer it is to 0, the more consistent the observed data

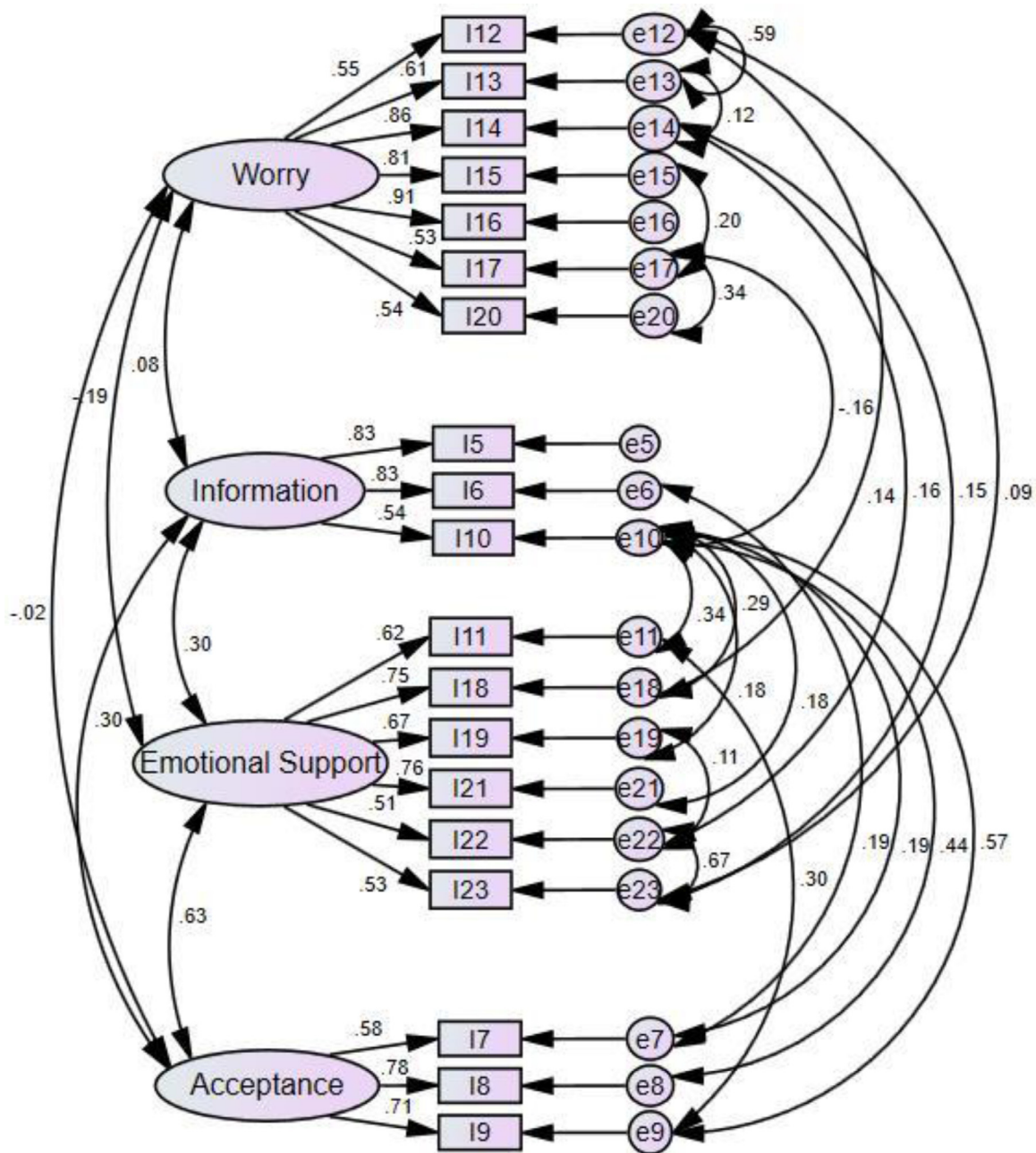


Fig. 2. Measurement model of the Chinese FTFQ. Note: Details of the 19 items in Fig. 2 can be found with reference to Table 3. The arrows leading from the factor (circle) to the item (box) represent the standardized regression coefficient weight of the factor on the indicator. The value by each box (FTFQ item) indicates the proportion of variance of the item explained by the factor. The “e” in each small ellipse represents the error term. The double-headed arrows between two small ellipses represent a reciprocal relationship between these two error terms. The double-headed arrow between the factors represents the covariance between factors.

are with the theoretical model. Generally, $X^2/df < 2$ indicates a good fit. In this study, $X^2/df = 1.20$ indicated that the constructed model had good adaptability to the observed data. Secondly, the CFI and the NFI range from 0 to 1; the closer to 1, the better the fit of the model. CFI and NFI > 0.90 indicates an acceptable fit (Brown, 2006). In this study, the CFI = 0.99, and the NFI = 0.93 indicated a good fit. RMSEA is also between 0 and 1. The closer to 0, the better the actual data fit the model. Generally, $RMSEA > 0.10$ indicates poor fit; $0.08 < RMSEA < 0.10$ indicates mediocre fit; $0.05 < RMSEA < 0.08$ indicates reasonable fit; and $RMSEA < 0.05$ indicates good fit (Browne and Cudeck, 1992). In this study, $RMSEA = 0.03$ indicated that the theoretical model and the observed data shared a good fit.

The Chinese FTFQ demonstrated high content validity. The results of the content validity analysis showed that the I-CVI and S-CVI/Ave both reached high levels. Regarding reliability, Cronbach’s α of the four domains of the Chinese FTFQ ranged from 0.72 to 0.86, which was higher than that of the original FTFQ, indicating good internal consistency of the Chinese FTFQ (Premberg et al., 2012).

When compared with the original version, there are some variations in the final Chinese FTFQ, and three items were removed due to the lack of homogeneity. Item 8 "I felt welcome when I called the maternity unit." was removed firstly because 4 indicators of its homogeneity did not achieve the minimal criteria as reported in the study. In addition, the descriptive statistical analysis of this study found that 89.73% of the

surveyed first-time fathers did not call the maternity units before they went there for childbirth. This suggested that item 8 barely achieved the purpose of the survey and had low efficiency. In China, prenatal care is delivered through an obstetrician-led care model focusing on screening, diagnosis, and routine prenatal tests (National Health Commission of People's Republic of China, 2013). The majority of pregnant women and their families only contact obstetricians during their prenatal visits and do not usually have contact information of the maternity units where they will give birth. With the current midwifery initiatives in China, such as antenatal class, midwife clinic and group-based prenatal care, telephone and online consultation services are becoming available and more accessible to women and their family (Gu et al., 2013; Zhou et al., 2019). This study was conducted in Hangzhou, where better care services are provided for women and their families than that in other cities in China. However, in this study setting, merely 10% of new fathers had called the maternity unit, and other cities may have lower rates. Therefore, the measurement efficiency of item 8 was too low under such conditions, and the item was removed from the questionnaire in this study. When telephone and online consultations become common in maternity services in China, the inclusion of item 8 in the instrument can be considered in future studies.

Item 13 "There is some information about childbirth I lacked." and item 14 "There are situations I would rather not have experienced." were removed from the Chinese FTFQ because three indicators of the homogeneity in both items did not reach the minimal criteria. Similar results were found when the FTFQ was validated in the Latin American cultural context (Molina-Velásquez et al., 2018).

Considering the results of this study reported above, the Chinese FTFQ is culturally adequate, reliable and valid to be applied to Chinese first-time fathers. The use of this instrument will enable the assessment of Chinese first-time fathers' experience of childbirth and facilitate further actions to improve paternal satisfaction and behavior as labour companion.

Limitations

This study adopted a convenient sampling method to test the questionnaire in a southeast coastal city in China. Whether it is applicable to hospital settings in other regions needs to be further explored. Another limitation is that the questionnaire was completed between 24 and 72 hours after childbirth. Since the time of data collection was close to the time of birth, the complex feelings of being a father may have influenced their perceptions with regard to childbirth experience. Nevertheless, participants in this study came from a variety of districts in Hangzhou and some from other regions of Zhejiang province, so it is not feasible to collect data after they were discharged from the hospitals. Future study should consider distributing the questionnaire at different time points after childbirth to further confirm the validity of the instrument.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Credit Author Statement

Zhang Xiu-Zhen: designing this study, writing original draft, revising manuscript

Zhang Jing: directing the research methods, supervising and controlling the quality of this study, reviewing the article

Zhou-Lin: directing the research methods, reviewing this article, analyzing the data

Aasa Premberg: providing information support about FTFQ, reviewing this article

Ma Dong-Mei: communicating with ethics committee and experts in this study to ensure the smooth running of the research

Xu Meng-Yan: consulting literatures, distributing the questionnaire, analyzing the data

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Ethical approval

The procedures of the study received ethics approval from Hangzhou Normal University (reference number 20190005).

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