Development of a Chinese short form of the Prenatal Self-Evaluation Questionnaire

Chun-Ting Lin, Chung-Ping Cheng, Shih-Hsien Kuo and Fan-Hao Chou

Aims. To develop a short-form version of the Chinese Prenatal Self-Evaluation Questionnaire and to examine its reliability and validity.

Background. Health professionals are short of screening instruments, especially in Chinese, to assess adaptation of pregnant women.

Design. A cross-sectional research design was used. Pregnant women who visited prenatal clinics in southern Taiwan were recruited for this study. This study was conducted in two phases. The first phase was to develop a Chinese short form of the Prenatal Self-Evaluation Questionnaire, using a convenience sample that consisted of 600 pregnant women. The second phase was to examine the reliability and validity of the short-form Chinese Prenatal Self-Evaluation Questionnaire, and used a convenience sample consisting of 225 pregnant women. Internal consistency and split-half reliability were used to assess reliability. Construct, convergent and discriminate validities were conducted to assess the validity.

Results. Item, correlation, factor and cluster analyses were used to eliminate 35 items from the questionnaire and to retain 44 items in phase one. The correlation coefficient between the short-form Chinese Prenatal Self-Evaluation Questionnaire and the original Chinese Prenatal Self-Evaluation Questionnaire was 0·95, indicating that the short-form Chinese Prenatal Self-Evaluation Questionnaire was acceptable. In phase two, 35 items were eventually retained and divided into six factors: concern for well-being of self and baby (seven items), acceptance of pregnancy (six items), identification of a motherhood role (three items), preparation for labour (six items), relationship with own mother (eight items) and relationship with husband (five items), accounting for 50·42% of the total variance. The convergent and discriminant validities were good, because the correlation coefficients between subscales and the total scale as well as between subscales and subscales were 0·57–0·71 and 0·18–0·41 ($p < 0·01$), respectively. The Cronbach's α and split-half reliabilities of the short form were 0·90 and 0·88, respectively.

Conclusions. A 35-item Chinese short form of the Prenatal Self-Evaluation Questionnaire was developed. The results of this study can be used as a measurement tool for widespread, cost-effective clinical assessment and further research.

Relevance to clinical practice. Use of the new tool may help nurses to understand the adaptation status of pregnant women and thereby provide suitable nursing care for good adaptation to pregnancy as well as enhanced quality of life.

Key words: adaptation, nurses, nursing, prenatal, questionnaires, Taiwan

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Introduction

Pregnancy involves physical, psychological and social changes to which a pregnant woman must adapt. Pregnant women also have to prepare for their role as mothers, as well as to face changes in family and interpersonal relationships (Drake *et al.* 1988, Chiu 1993, Weng 2000, Stark 2001). Many women find that it is hard to understand unexpected changes especially if they lack knowledge about pregnancy and childbirth. Fears of the unknown commonly exist among pregnant women. They may fear changes of body image after pregnancy, birth abnormalities in the baby, disruption of the relationship with their spouse, and negative impacts on their jobs (Affonso *et al.* 1999). To meet these fears and maintain a good quality of life, women must take some steps to find a balance point, to adapt to their pregnancy (Kao 1993, Chen & Chen 2000). According to a review of literature, authors tend to focus more on anxiety and stress or depression among postpartum women, but there is limited research, emphasising the healthy adaptation during pregnancy. This is especially true in research in Taiwan.

To ensure their own and their baby's safety during pregnancy and active labour, most women will tend to seek the best maternity and prenatal care services available (Kao 1993, Weng 2000). In practice, however, many health care providers, especially in Taiwan, show more concern for the foetus and pay less attention to the physical and psychological changes of the women. Health professionals need greater awareness of the pregnant women's sense of adaptation and offer adaptive support, but there is little in the way of screening tools to assist them in their assessments. And there is no screening instrument available in Chinese. If an assessment could be made in a timely and cost-effective way, knowledge gained from it could help nurses provide appropriate interventions to assist women to adapt to the changes during pregnancy.

To date, North American and European researchers have developed a few prenatal adaptation questionnaires, including the Prenatal Self-Evaluation Questionnaire (PSEQ) (Lederman 1984) and the Cognition Adaptation to Stressful Events (CASE) (Taylor 1983, as cited in Beck 1999) among others. Taylor's scale focuses on active labour and postpartum, therefore is not useful until late in pregnancy. Lederman's questionnaire, on the contrary, emphasises psychological adaptation among pregnant women (Lederman 1996) and is more appropriate for screening during the pregnancy experience. It is a simple instrument to use and score and would be appropriate for use with Chinese women. However, the questionnaire usually takes 30 minutes to complete, as it consists of 79 statements, some of which are complicated and redundant. Therefore, it could not appropriately provide adaptation-related assessment of pregnant women in a short time.

To better understand adaptation among pregnant women, the purpose of this research was to develop a Chinese version of the PSEQ in short form to provide health professionals a simple and effective assessment tool, which can actively reveal assessments and explore women's needs in a timely way. This knowledge will allow nurses to support women as they adapt throughout the pregnancy, help reduce their frustration and difficulty, and provide a satisfactory pregnancy and delivery experience to their families. Thus forward and backward translations of the PSEQ were conducted previously as a pilot study (Chou *et al.* 2005) to assist the development of a short instrument that would be useful for screening and that would be appropriate in both language and cultural issues for a Chinese population.

Literature review

Adaptation during pregnancy

Lazarus and Folkman (1984) proposed that adaptation is a way to manage threats. When people face threats, they will do something to adapt to achieve a balanced process. Lederman (1996) pointed out that pregnancy is a transition process which brings someone from childlessness to parenthood. It links a woman's former body image, beliefs, values and behaviours with other people to the current changes she is experiencing. In addition, the woman's problem-solving skills will be re-evaluated during the nine months of pregnancy. Some old-fashioned concepts will be abandoned, and new concepts will be adopted. However, if the woman cannot adjust during the pregnancy process, she may experience severe conflict or ambivalence. Therefore, 'adaptation to pregnancy' refers to adaptation behaviours of self-changes during pregnancy, making new connections with husband and family, and integrating the baby into the family after the birth (Lederman 1984).

The factors influencing maternal adaptation during pregnancy are multifactorial, such as age, parity and reproductivity. Stark (1997) used different age-group comparison design to evaluate the relationship between age and psychosocial adaptation to pregnancy. The results suggested that the two groups had similar adaptation to pregnancy except fear of helplessness and loss of control in labour. Younger pregnant women (age 32 years and younger) had more fear of helplessness and loss of control in labour than did older pregnant women (age 35 years and older). In addition, a study of Halman *et al.* (1995) to compare adaptation to

pregnancy and motherhood between infertile and fertile primiparous mothers during the third trimester of pregnancy, revealed that infertile and fertile primiparous women had no significant differences in their adaptation to pregnancy.

Prenatal Self-Evaluation Questionnaire and issues of instrument development

This research focused on Lederman's Prenatal Self-Evaluation Questionnaire (1984). The PSEQ was developed in 1979 by Lederman who believed that psychological adaptation during pregnancy is extremely important, as there is a relationship between psychological conflicts during pregnancy and complications during childbirth. At first, the original PSEQ was only applied to third-trimester women to measure maternal adaptation. The original questionnaire consisted of 78 items with seven dimensions; Lederman modified it to include 79 items in 1984 (cited by Beck 1999). The PSEQ was formatted as a four-point Likert scale with agreement responses being 4, 'very much so,' 3 'moderately so,' 2 'somewhat' and 1 'not at all.' Higher scores indicated a higher level of ambivalence, fear or anxiety, and a poor level of maternal adaptation (Halman *et al.* 1995). Approximately 25–30 minutes are required to finish the test.

From 1984 to 1997, five studies using the PSEQ found that the internal consistency reliability, Cronbach's α for the total PSEQ ranged from 0·82–0·94 (Lederman 1996). In addition, the Cronbach's α for the Chinese version of the PSEQ was 0·93 (Chou *et al.* 2005). Cronbach's α among the seven dimensions or subscales were: concern for well-being of self and baby (10 items, 0·83); acceptance of pregnancy (14 items, 0·90); identification of a motherhood role (15 items, 0·79); preparation for labour (10 items, 0·80); fear of pain, helplessness and loss of control in labour (10 items, 0·75); relationship with own mother (10 items, 0·92); and relationship with husband (10 items, 0·82). Reliability and validity were deemed satisfactory (Lederman 1996).

The PSEQ has been used in different countries over a long period. Several researchers have used this instrument in various populations in its long form (Zachariah 1994, Halman *et al.* 1995, Stark 1997, Lederman & Miller 1998). In Taiwan, Chou *et al.* tested the long form of the instrument and verified that the PSEQ can be applied to the three trimesters of pregnancy transculturally (Chou 2001, Chou *et al.* 2005). For example, the reliability coefficient, Cronbach's alpha, for the entire PSEQ scale was 0·93 and for the seven subscales was 0·68–0·82. The test–retest reliability coefficient calculated by intraclass correlation coefficient (ICC) was 0·95.

Generally, in the beginning of instrument development, researchers focus on accurate measurements of themes and

concepts and give less consideration to quantity of questions and time consumption. However, if an instrument needs much time and manpower, as a result of too many questions and complexity of data collection, it may result in limited clinical and research application. Furthermore, for internal consistency reliability, if the Cronbach's α is too high (for example, higher than 0·90), questions may be duplicated and so some of them will need to be deleted (Hattie 1985). For example, Widmer *et al.* (2003) proposed 'Development of the Aristotelian Ethical Behavior in Leisure Scale (AEBLS) short form'. The number of questions included in the AEBLS decreased from 64 to 24 questions on the AEBLS short form. One of the reasons was that AEBLS is a manpower- and time-consuming instrument and the Cronbach's α was as high as 0·98, which indicated that there might be some duplicated questions that could be deleted. As the PSEQ also has a large number of items and a high internal consistency score, a short form for the PSEQ is feasible and may be useful to enhance future research application and clinical accessibility and generalisation.

Methods

This research was conducted in two phases. The first phase was to develop a Chinese version of the PESQ short form and the second phase was to examine the reliability and validity of the PSEQ short form. In phase one, the original questionnaire was used with a large sample size to determine question deletion and to develop the short form of the PSEQ. In phase two, cross-validation was used to verify the PSEQ short-form factor structures.

Phase one: PSEQ short-form development and evaluation

Sample

Participants were recruited from one medical centre, one local hospital and one specialty hospital in southern Taiwan, using convenience sampling. Inclusion criteria for sample selection included: pregnant, an ability to communicate in Chinese, and an ability to read Chinese. As the PSEQ involves the relationship with the woman's mother, participants whose mothers had already passed away were excluded from this research. In addition, as factor analysis needed to be conducted later, a sample size of 5–20 times the total number of questions was required, and this could not be fewer than 200 persons (Tabachnick & Fidell 2001). The long form of the research questionnaire included 79 questions. Therefore, an estimated sample size of 395–1580 women was needed, and a final sample of 600 persons was recruited, which fell within the appropriate range.

Measurement

The research questionnaire in phase one was comprised of two parts. The first part was demographic data, which included age, educational level, vocation and gestational weeks. The second part was the long form of the Chinese language version of the PSEQ.

To ascertain acceptability of the content, and suitability of the wording of the Chinese version of the PSEQ, the researchers invited a panel of experts consisting of a nurse with more than 10 years of perinatal clinical experience, a clinical instructor, a school nurse with six years of obstetric clinical experience, and two pregnant women to examine the long form of the PSEQ. The index of content validity (CVI) among the experts was 0·96 for the PSEQ. Certain phrasing was modified in the demographic data section to make that portion of the questionnaire more 'user-friendly'.

Data collection

This research was approved by the Institute Review Board and permission was obtained from the hospitals concerned. Consent forms were obtained after receiving the research participants' agreements, and the questionnaire was distributed to each participant. Research participants had the right to withdraw from this research at any time during the data collection process without jeopardising their right to seek medical care. A token gift was given to each research participant after she filled out the questionnaire.

Research questions

The research questions of this study were the following:
1 How many items should be included in the Chinese short form of the PSEQ?
2 What is the reliability and validity of the Chinese short form of the PSEQ?

Statistical analysis

Several methods were used to determine which items were kept for the short form PSEQ and then to conduct the initial evaluation of the new instrument. Each is described below. Item analysis, including missing value examination, descriptive statistics evaluation, item-total correlation and extreme group examination, was used to evaluate the suitability of the items (Ferketich 1991, Gorsuch 1997, Gauthier & Froman 2001). Correlation and factor analyses, considering number of items, number of factors, factor loading and rotation (Gorsuch 1997, Fabrigar *et al.* 1999), were used to achieve item integration, item reduction and construct validity (Devellis 1999). Cluster analysis, using icicle plots and dendrograms, was also conducted to do the item reduction because the original author used cluster analysis rather than factor analysis.

When the first step of the instrument development was completed, the short-form questionnaire was evaluated for reliability and validity, specifically 'internal consistency' and 'construct validity.'

Phase two: re-verification of factor structure, reliability and validity of the PSEQ short form

Sample, measurement, data collection and statistical analysis
Participants recruited for phase two followed the same procedure as phase one. However, 225 women participated in phase two, a sample size five times the number of items in the short form as opposed to the long form used in phase one. The only difference of measurement was that data were collected using the new PSEQ short form. Factor analysis was used to re-verify the factor structure of the short-form questionnaire and to calculate the validity.

Results

This research was conducted from December 2005 to May 2006. Eight hundred and thirty-one pregnant women were initially recruited during the data collection. Six had lost their mothers and so were excluded from this research. The total number of participants recruited in this research was 600 in the first phase and 225 in the second phase for the PSEQ short-form evaluation.

Phase one: construction of the short-form questionnaire

Demographic data (n = 600)

As shown in Table 1, the average age of the participants was 29·49 years old (SD 4·55), ranging from 17–43 years. Most of the participants were 26–30 years old, with an educational level of high school or above. The majority of participants were employed, primigravidas, non-smokers ($n = 588$, 98·0%), had planned pregnancies and did not drink alcohol ($n = 596$, 99·3%). Most were married ($n = 571$, 95·2%).

Construct validity of the short-form questionnaire

Factor structure verification. To ensure that the data matched the original author's concepts, this research used a summary of the total items in each dimension using exploratory factor analysis to verify factor structure (Bagozzi & Heatherton 1994, Wu 2006). The results indicated that the factor loadings were all above 0·60, which was consistent with the original author's instrument.

Six standards included in the item analysis. First, missing values testing: there were no missing values included in this research. Second, descriptive statistics examination: the

Table 1 Demographic characteristics of the original and short-form PSEQ*

Demographic characteristics	*n* (%)	
	Sample of the PSEQ (*n* = 600)	Sample of the short-form PSEQ (*n* = 225)
Age (year)		
17–25	107 (17·8)	33 (14·7)
26–30	248 (41·3)	104 (46·2)
31–35	188 (31·3)	69 (30·7)
36–45	57 (9·5)	19 (8·4)
Education		
Junior high school and below	16 (2·7)	6 (2·6)
Senior high school	215 (35·8)	75 (33·3)
College	162 (27·0)	66 (29·3)
University	172 (28·7)	69 (30·7)
Graduate school	35 (5·8)	9 (4·0)
Occupation		
Housewife	259 (43·2)	81 (36·0)
Employed outside home	341 (56·8)	144 (64·0)
Gravidity		
Primigravida	326 (54·3)	119 (52·9)
Multigravida	274 (45·7)	106 (47·1)
Gestational period		
First trimester	150 (25·0)	80 (35·6)
Second trimester	199 (33·2)	76 (33·8)
Third trimester	251 (41·8)	69 (30·7)
Planned pregnancy		
Yes	469 (78·2)	171 (76·0)
No	131 (21·8)	54 (24·0)
Lived with		
Couple only	252 (42·0)	96 (42·7)
Couple and mother	61 (10·2)	27 (12·0)
Couple and mother-in-law	287 (47·8)	102 (45·3)
Spouse's education		
Junior high school and below	28 (4·6)	15 (6·7)
Senior high school	228 (38·0)	74 (32·9)
College	136 (22·7)	57 (25·3)
University	149 (24·8)	61 (27·1)
Graduate school	59 (9·8)	18 (8·0)

*PSEQ = Prenatal Self-Evaluation Questionnaire.

average total score ± 1·5 SD was used to measure deviation, discrimination and skewness. After calculation, there were eight items above 2·43 of the average score of each item. The discrimination of each item was not too low. Twenty items were highly skewed. Third, extreme group comparison: the extreme groups, which accounted for 27% of the highest and lowest total scores among all research participants, were examined by *t*-test. The results showed that a significant difference was found ($t = -17·45$–$2·39$, $p < 0·001$), which indicated that the discrimination of the total items was good.

Fourth, homogeneity examination: the correlation coefficient was set at 0·30. The results showed that seven items had poor homogeneity. Fifth, factor loading: the correlation coefficient was set at 0·30. The results showed that 17 items had correlation coefficients of less than 0·30. Finally, in conclusion, item 30, which was 'I dwell on the problems the baby might have,' was deleted as it could not meet more than three of the above six standards. In addition, item 5, which was 'My husband has been critical of me during the pregnancy,' and item 7, which was 'I feel it is necessary to know a lot about labour,' were deleted as they could not meet any three of the standards. As a result, these three items were deleted in the first phase.

Correlation analysis. As Lederman analysed correlation coefficients to construct the PSEQ, correlation coefficients were considered for the process of item reduction. According to the correlation coefficients, items cannot measure the same concepts when correlation coefficients between each item do not fall into 0·30–0·70, correlation coefficients between each item and the total score do not fall into 0·30–0·70, and correlation coefficients between each item and subscales are less than 0·50 (Kerlinger 1986). Twenty-three items did not meet these criteria and thus were deleted.

Factor analysis. According to the description above, 26 items were deleted. Further item reduction was conducted using factor analysis. The adaptation of factor analysis was evaluated before conducting it. The Kaiser–Meyer–Olkin (KMO) of this research was 0·921, which was higher than the required score of 0·90. In addition, Bartlett Test of Sphericity (BT) value was significant here ($\chi^2 = 12\ 284·855$, $p < 0·001$), which showed that the sample was appropriate. Therefore, the standards of conducting factor analysis were matched.

To decide on the number of factors, 10 factors had an eigenvalue of above 1·0. Results of the scree plot and the parallel analysis suggested seven factors. The author of the PSEQ also separated the original questionnaire into seven factors. Therefore, the number of factors was set from 5 to 10. Then, these 5–10 factors were applied to conduct factor analysis. Principal axis factor (PAF) was used for factor extraction. In addition, a cut-off point of factor loading of higher than 0·40 was set in promax to select meaningful items. Seven and eight factors included were found to analyse those, similar to the original author's results. In addition, the same results were found in item reduction of seven and eight factors included. As seven factors were the original construct of the PSEQ, the final decision of seven factors was made. Furthermore, item 3 was deleted as it could not be categorised as the testing factor. In addition, eight items were deleted as their factor loadings were less than 0·40. Finally, 44 items

remained. Moreover, items included in factor 5 (fear of pain, helplessness and loss of control in labour) were assigned to other factors. Therefore, the number of factors of the Chinese version of the PSEQ was set at 6, and a total number of 54·68% of variance could be explained.

Cluster Analysis. Correlation matrix was transformed as distance matrix and then was analysed by hierarchical cluster method. After the items were deleted, six clusters were obtained. Based on the results of factor analysis, we also classified items according to the factors which the items' loading is highest. Only one item in six clusters was found to be different compared with the results of factor analysis. Classification of the other 43 items was the same across the results of cluster analysis and factor analysis. The results of factor analysis and cluster analysis were very similar.

Phase two: short-form PSEQ's factor structure, reliability and validity

Demographic data (n = 225)
As shown in Table 1, pregnant women's age ranged from 17 to 45 years, with an average of 29·76 years (SD 4·24). The majority of participants were 26–30 years old, had an educational level of high school or above, were employed, primigravidas, and had planned pregnancy. Most of them were non-smokers (n = 219, 97·3%), and all of them did not drink alcohol (100%). About 95·6% of the women were married (n = 215).

Reliability and validity of the short-form PSEQ
This short-form PSEQ included 44 items. The Cronbach's α of the total scale was 0·90 and of factor 1–6 were 0·84, 0·83, 0·77, 0·84, 0·89 and 0·77, respectively. The internal consistency reliability was good. The correlation coefficients between each item of the short-form questionnaire and subscales were 0·61–0·86. The correlation coefficients between each item of the short-form questionnaire and the total score were 0·31–0·59. The split-half reliability of the short-form was 0·78, and 0·88 after correction. Test–retest reliability was measured with one-tenth of the original sample size (n = 23) 2 weeks later. Test–retest reliability, using ICC, was 0·97 (p < 0·01, 95% CI: 0·94–0·99) for the total short-form scale, and the values were 0·96, 0·97, 0·91, 0·97, 0·98 and 0·87 for the subscales, respectively. The results indicated that they were highly correlated, which demonstrated that the test–retest reliability was good. In addition, factor analysis was used for construct validity. The result of KMO was 0·857. Six factors were proposed, PAF was applied for factor extraction, and the cut-off point of a factor loading of higher

than 0·40 was decided for the promax. Nine items were deleted as their factor loadings did not reach 0·40. A total of 35 items remained. Table 2 shows the factor analysis results of the final Chinese version of the PSEQ short form. Six factors were extracted, and a total of 50·42% of the variance could be explained. The correlation coefficients between subscales and the total scale were 0·57–0·71 (p < 0·01), which indicated moderate to high correlation, and the convergent validity was also good. The correlation coefficients between subscales and subscales were 0·18–0·41, which indicated low to moderate correlation, and the discriminate validity between subscales was good.

Discussion and conclusions

Research focusing on women's adaptation during pregnancy is limited. In addition, there are few tools for health professionals to use for clinical evaluation. Therefore, this research aimed to simplify the PSEQ for widespread, cost-effective clinical evaluation. Six hundred pregnant women were recruited for this research to examine the short form of the PSEQ. A further group of 225 pregnant women were recruited to test the reliability and validity of the short-form PSEQ. The cross-validation was made to verify whether the items deleted from phase one could also be applied to another sample to enhance the reliability and validity of the short-form PSEQ.

The results indicated that the short-form PSEQ was highly positively correlated to the original scale (r = 0·95, p < 0·01). Items were reduced from 79 to 35. The Cronbach's α was reduced from 0·94 to 0·90. The length of testing time was shortened from 30 to 10 minutes. As a result, health care providers can measure adaptation among pregnant women within a short time.

The original author did not use item analysis as well as factor analysis for the construct standard of the scale. However, the results of this research illustrate that the categorisation generated from factor analysis is the same as that of the original author. In addition to factor analysis, cluster analysis, which was proposed from the original scale, was also applied for verification. The results of factor analysis were consistent with the results of cluster analysis. Therefore, items included in the short-form version were within an acceptable range. Comrey and Lee (1992) suggested that at least three variables should be included in each factor for measurement. Five or more measuring variables included in each factor would be the best (cited by Gorsuch 1997). In the short-form PSEQ of this research, each factor included 3–8 items, indicating that it is appropriate in each factor for measurement.

Short form of the prenatal self-evaluation questionnaire

Table 2 Factor analysis of the Chinese short-form of the Prenatal Self-Evaluation Questionnaire (*n* = 225)

Items	Factor loadings					
	1	2	3	4	5	6
57 I am worried that something will go wrong during labour.	**0·83**	−0·04	−0·03	−0·02	0·03	−0·01
51 I am anxious about complications occurring in labour.	**0·72**	−0·03	−0·08	−0·02	−0·04	0·10
16 I am worried that the baby will be abnormal.	**0·68**	−0·11	−0·11	−0·07	0·12	0·12
68 I focus on all the terrible things that could happen in labour.	**0·67**	0·07	0·01	0·09	−0·03	−0·08
52 I feel that the stress of labour will be too much for me to handle.	**0·60**	0·07	0·03	0·06	−0·12	0·00
41 I am afraid that I will be harmed during delivery.	**0·55**	0·08	0·11	0·04	0·02	−0·09
17 I think the worst whenever I get a pain.	**0·50**	0·01	−0·07	0·04	0·08	0·02
62 I wish I wasn't having the baby now.	0·03	**0·84**	0·05	−0·02	−0·06	−0·08
76 I have regrets about being pregnant at this time.	0·04	**0·83**	−0·08	−0·06	−0·01	−0·01
32 I am glad I'm pregnant.	−0·16	**0·64**	−0·05	0·06	0·16	0·05
58 It's difficult for me to accept this pregnancy.	0·02	**0·64**	0·06	−0·07	−0·03	−0·04
69 This pregnancy has been a source of frustration to me.	0·14	**0·62**	0·20	0·03	−0·10	−0·05
1 This is a good time for me to be pregnant.	−0·05	**0·59**	−0·18	−0·01	0·05	0·11
78 I feel I will enjoy the baby.	−0·11	−0·06	**0·71**	−0·06	0·02	0·13
73 I feel I already love the baby.	−0·02	−0·02	**0·63**	0·02	0·06	0·21
75 I believe I can be a good mother.	0·04	0·09	**0·60**	0·10	0·16	0·02
24 I have a good idea of what to expect during labour and delivery.	−0·07	0·00	−0·06	**0·77**	−0·05	0·15
48 I know some things I can do to help myself in labour.	0·01	−0·05	0·05	**0·73**	0·04	−0·10
25 I understand how to work with the contractions in labour.	0·11	−0·07	−0·01	**0·69**	−0·11	0·07
56 I feel well informed about labour.	0·02	−0·05	−0·16	**0·68**	0·19	0·11
38 I am preparing myself to do well in labour.	−0·10	0·13	0·07	**0·58**	−0·03	0·13
47 I feel prepared for what happens in labour.	0·12	−0·04	0·12	**0·57**	0·07	−0·15
37 I feel good when I'm with my mother.	−0·07	−0·04	0·07	0·03	**0·85**	−0·21
31 My mother looks forward to this grandchild.	0·08	0·03	−0·06	−0·16	**0·77**	0·19
21 My mother offers helpful suggestions.	−0·01	−0·12	0·06	0·09	**0·77**	−0·06
59 My mother encourages me to do things in my own way.	0·00	0·00	−0·01	0·18	**0·74**	−0·20
28 It's easy to talk to my mother about my problems.	0·06	0·00	0·16	−0·06	**0·72**	−0·06
55 My mother reassures me when I have doubts about myself.	−0·01	0·10	−0·15	0·16	**0·67**	−0·05
14 My mother shows interest in the coming baby.	−0·01	−0·02	0·11	−0·11	**0·66**	0·18
20 My mother is happy about my pregnancy.	0·05	0·09	−0·04	−0·18	**0·58**	0·28
70 I can count on my husband to share in the care of the baby.	0·01	−0·15	0·17	−0·04	−0·10	**0·68**
40 I can count on my husband's support in labour.	0·00	−0·02	0·04	0·10	−0·03	**0·64**
23 My husband is interested in discussing the pregnancy with me.	−0·08	0·12	−0·02	0·18	0·07	**0·55**
35 My husband helps me at home when I need it.	0·09	0·03	0·12	0·08	−0·10	**0·65**
10 My husband is understanding (calms me) when I get upset.	0·05	0·09	0·02	−0·02	−0·01	**0·51**
Accounting of variance (%)	8·63	6·39	2·64	5·46	23·39	3·91
Eigenvalue	4·02	4·90	3·10	4·74	6·17	4·69

A further examination of the dimensions between the short-form and the original scale was conducted. Six dimensions were covered in the short-form PSEQ: concern for well-being of self and baby, acceptance of pregnancy, identification of a motherhood role, preparation for labour, relationship with own mother and relationship with husband. They were close to the seven dimensions of the original scale. When constructing the short-form PSEQ, the dimension of 'fear of pain, helplessness, and loss of control in labour' was grouped to the dimension of 'concern for well-being of self and baby' and 'preparation for labour'. According to the original author's research, compared with other factors, 'fear of pain, helplessness, and loss of control

in labour' were highly correlated with 'concern for well-being of self and baby' (*r* = 0·52) and 'preparation for labour' (*r* = 0·47) (Lederman 1996). This research also found that 'fear of pain, helplessness, and loss of control in labour' was highly correlated with 'concern for well-being of self and baby' (*r* = 0·56, *p* < 0·01) and 'preparation for labour' (*r* = 0·62, *p* < 0·01). As a result, only six dimensions remained in the short form, as the dimension of 'fear of pain, helplessness, and loss of control in labour' could not stand alone. The pregnant women during the third trimester worry about labour mostly (Chiu 1993). The situation of labour is covered in the original author's dimensions of 'fear of pain, helplessness, and loss of control in labour,' 'concern

for well-being of self and baby,' and 'preparation for labour'. This is also the reason why these three dimensions are highly correlated to each other. 'Fear of pain, helplessness, and loss of control in labour' is an important factor during pregnancy; however, it was not significant in this research. In addition, first-expectant mothers might not be able to imagine and evaluate the questions with regard to the 'fear of pain, helplessness, and loss of control in labour' during the data collection process, and so the results of this factor could not be merged.

The original author used pregnancy anxiety scale to measure the criterion-related validity of the PSEQ. As there are limited similar scales to verify the short form's validity, the construct validity instead of the criterion-related validity of the PSEQ was conducted. Future research should use appropriate scales to verify the criterion-related validity. This research was a short-form construct and cross-sectional data collection. Therefore, evaluation could not be made for each trimester. As adaptation status is a continuous process, a further longitudinal study design is needed to examine the differences among three trimesters, with more emphasis on adaptation during pregnancy.

Contributions

Study design: CTL, FHC; data analysis: CTL, CPC and manuscript preparation: SHK, FHC.

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