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Development of an assessment tool for the transition of Japanese primiparas becoming mothers: Reliability and validity

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ABSTRACT

Objective: We developed a measurement tool that may be used for Japanese primiparas to determine their progress in the transition to being a mother.
Design: Quantitative descriptive study.
Setting: Japan.
Participants: A total of 86 and 395 participants were included in the pilot study and present survey, respectively.
Interventions: Drafting the scale involved creating a pool of items based on semi-structured interviews of primiparas at 1–6 months postpartum. After validating the items through researchers in the field of maternal nursing and midwifery, a web-based questionnaire was used to investigate the reliability and validity of the scale.
Measurements and findings: In the exploratory factor analysis of the pilot study, we explained 5 subfactors and 57 items. In the present survey, upon conducting an exploratory factor analysis of 57 items and investigation of content validity, we were able to explain 5 subfactors and 30 items. The Cronbach's α coefficient for each factor was 0.871–0.648. The inter-item correlation for subfactors with $\alpha < 0.7$ was $r = 0.394$–0.465. The confirmatory factor analysis revealed the following indices of goodness of fit of each model: *comparative fit index* = 0.838, *goodness of fit index* = 0.821, *adjusted goodness of fit index* = 0.789 and *root mean square error of approximation* = 0.07. As concurrent validity, a correlation was identified between three external criteria and the present scale.
Key conclusions: We developed a measurement tool for Japanese primiparas to determine their progress in the transition to being a mother.
Implications for Practice: Through this scale, primiparas can objectively assess the transition to becoming a mother as well as developing an understanding of their state. In cases when there are similarities between results of self-evaluation and those of evaluation of others, mothers can subsequently receive various supports that can help empower them.

Introduction

Transition is defined as the time of change between two relatively stable states that occurs during several stages of redefining oneself (Chick and Meleis, 1986). Transitioning in a healthy manner can help individuals experience subjective tranquillity along with a sense of proficiency and can help them build healthy relationships (Schumacher and Meleis, 1994).

The type of developmental transition that has drawn the most attention involves the process through which primipara women transition into mothers (Schumacher and Meleis, 1994). The primipara's transition to motherhood begins during pregnancy. After giving birth, the next stage in the transition begins with meeting their child, which is essential in helping the primipara become accustomed to life as a mother. Familiarising oneself with their maternal role involves getting familiar with taking care of a child, where childcare becomes a part of normal life.

In Japan, a unique traditional role of a mother is based on the assumption that 'women instinctively love their own child'. Owing to the devotion to their child, the sacrifices made by a mother are considered sacred (Onishi and Yoshimura, 1997) and childcare is considered to be a mother's responsibility.

This traditional maternal role is known to hinder the healthy transition process of Japanese primiparas in becoming a mother.

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Furthermore, owing to this traditional maternal role, some Japanese mothers experience a state of over-adaptation when exerting themselves to become a mother based on others' expectations. Furthermore, Japanese mothers compare their parenting styles to those of other mothers, thereby perceiving their own parenting in a negative manner, which consequently discourages some mothers. However, some mothers feel disliked when such negative perceptions are discovered by others. Therefore, although Japanese women may have negative feelings regarding childcare, they prefer to avoid showing these feelings (Takahashi, 2014). Low-risk Japanese mothers may be exposed and susceptible to such suppressed states, which may hinder the process of becoming accustomed to life as a mother.

Mercer (1995) proposed changing the thought process that the maternal role is acquired by an individual in the process of becoming a mother. The maternal role involves dealing with changes related to the growth of one's child and environment as mothers perpetually undergo the transition process throughout their lives. To comprehend the maternal role, it is important to understand that this role involves transition, i.e., accepting that becoming accustomed to life as a mother is a constant process in which one does not reach the final point in the transition process defined by becoming a mother upon acquiring the maternal role.

Currently, measurement tools related to the acquisition of the maternal role postpartum have been developed in Japan and various other countries. However, the circumstances associated with motherhood differ in each country, and applying one measurement tool that has been developed in other countries in its original form on the Japanese population is a challenge. Furthermore, existing tools measure confidence, capacity, affection, level of satisfaction and sense of self-efficacy as the state of acquisition of the maternal role (Maehara and Mori, 2005; Pontoppidan et al., 2019; Shrestha et al., 2016; Usui et al., 2020; Doster et al., 2018; Suetsugu et al., 2015; Yoshida et al., 2012; Ohara et al., 2016; Wardani et al., 2017), and the tools were developed as scales to determine whether the maternal role has been acquired or to assess poor physical and mental states postpartum (Ohara et al., 2016; Wardani et al., 2017; Sánchez-Rodríguez et al., 2020; Newman-Morris et al., 2020; Ganjekar et al., 2020; Fallon et al., 2016; Özdemir et al., 2020; Tsuchiya et al., 2016). However, in Japan, no tool currently exists that can be used to determine the actual state of the process involved in becoming accustomed to life with a role as a mother. To provide support for Japanese primipara, we believe that it is imperative to comprehend the actual process involved in becoming accustomed to life with a role as a mother as a transition to becoming a mother. Therefore, in the present study, we aimed develop a scale as a measurement tool to elucidate the transition of Japanese primipara in becoming mothers.

As children grow and develop, their mothers face new tasks and continue to develop as mothers. Therefore, the process through which Japanese primiparas become mothers cannot be categorised in a single time period. According to Mercer (2004), this is attributable to the fact that becoming a mother involves attaining a new identity, and that such maternal identity continues to expand and change with new relationships. We believed in the importance of elucidating the conditions of the transition wherein mothers become accustomed to their broadening and constantly changing maternal identity in the process of becoming a mother. We aimed to develop a scale that measures the various degrees involved in the process through which women get accustomed to becoming mothers. Furthermore, numerous postpartum mental states exist, such as comfort and confidence (Kitada and Saitou, 2018), uneasiness (Nagata, 2020; Maehara and Mori, 2005), fatigue (Yamasaki and Takagi, 2015) and stress (Sakai and Ohashi,2009). Similar to the fact that variations exist in the postpartum mental state, it was our understanding that several factors influence a woman when she becomes accustomed to being a mother after childbirth. In the present study, we aimed to determine the factors constituting getting accustomed to life as a mother.

In this study, we developed a tool to measure the transition of a Japanese primipara to a mother and found that it involved multiple postpartum concepts by preliminary research (Katou et al., 2022). We evaluated the postpartum period of up to 6 months, the grounds of which were examined on the basis of several prior studies conducted in Japan. Previous studies have indicated that Japanese primiparas are aware of their growth as parents in the first 4 months postpartum (Suzuki and Kobayashi, 2009) and that their childcare stress decreases at 4–6 months postpartum (Maehara et al., 2017). Therefore, it is conceivable that at approximately 4–6 months postpartum, Japanese primiparas temporarily become relaxed about childcare. Through a preliminary research, we elucidated multiple postpartum concepts involved in the process in which Japanese primipara transitioned into their role of being a mother.

Operational definition

'The transition of Japanese primiparas becoming mothers'

We believe that a woman's transition to a mother begins during pregnancy. However, after childbirth, a new mother also needs to respond to the demands of the child, which gives rise to new and unexpected challenges. Therefore, mothers experience both joy and confusion as they fulfil their new roles.

However, addressing this initial confusion is of paramount importance as it may lead to a crisis in the transition period. We posit that the mother can overcome such transitional crises and become accustomed to their life as a mother, if they are provided with the proper coping tools and guidance.

Methods

In the present study, we developed a scale using a two-stage process. In stage 1, we performed a pilot study and investigated a draft scale (1), and we created a draft scale (2) for use in the present survey. In stage 2, upon completing the present survey, we investigated the reliability and validity of the scale (Fig. 1). Furthermore, after examining the structure through exploratory factor analysis, we examined the construct validity for transition to motherhood through confirmatory factor analysis.

Draft scale development process

Through semi-structured interviews of 21 primiparas at 3–6 months postpartum (Katou et al., 2022), we determined the state of the process involved in becoming accustomed to life as a mother. In reference to the components of transition defined by Schumacher and Meleis (1994), the interview content included experience as a mother and the behaviour and relationship with one's child and surrounding people. The content was categorised and 81 items were grouped from 355 items, and 7 categories with 31 subcategories were extracted. The 81 items were defined as draft items that were examined by a researcher in the field of maternal nursing and midwifery. Furthermore, face validity and content validity were examined under the supervision of nine experts who were midwives, and 81 items were consequently included in the draft scale. Regarding the scale type, we used a 5-point Likert scale, ranging from 5 (applies) to 1 (does not apply at all).

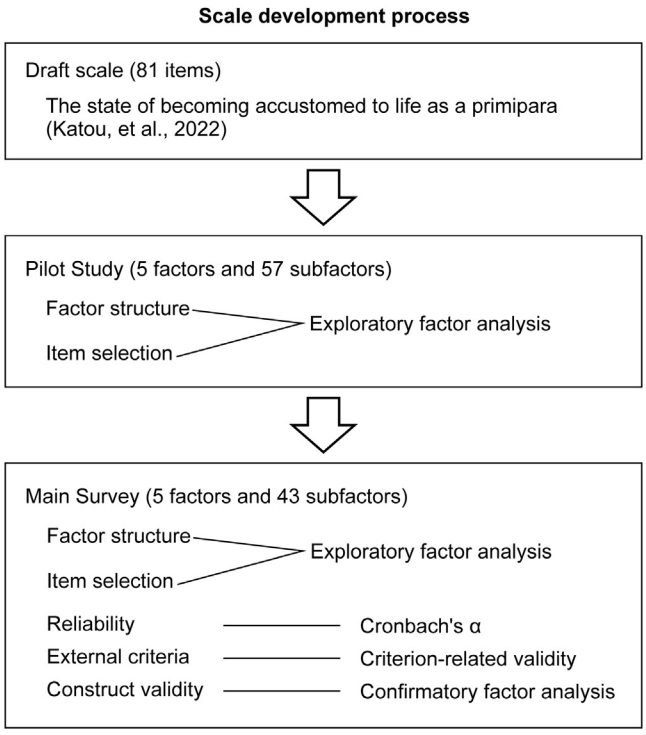

Fig. 1. Scale development process A tool for assessing how Japanese primiparas get accustomed to life as a mother.

Stage 1: pilot study

Study participants

Among Japanese primiparas at 1–6 months postpartum, the sample population included 86 individuals who were married and did not have a premature infant, low birth weight infant or multiple births.

Data collection

In May 2020, an anonymous, self-recorded, web-based survey was performed, with the whole of Japan as the target region. For the survey, questionnaires were sent to individuals who satisfied the eligibility criteria among the outsourced monitor enrolees. We ceased data collection after obtaining responses from 86 individuals, and subsequently tabulated the responses.

Survey items

The draft scale and basic participant attributes were used as survey items in the pilot study.

Data analysis

Descriptive statistics were calculated using IBM SPSS version 24 (IBM Corporation, Japan), Amos version 26 (IBM Corporation, Japan). Factors were extracted by performing an exploratory factor analysis. Factor extraction was performed using the least-squares method, and the rotation method involved promax rotation. The number of factors was determined according to an eigenvalue of ≥1, with attenuation on the screen plot. Items with factor loading of ≥0.4 were adopted, whereas those with a factor loading of ≥0.4 on multiple factors were excluded. As an investigation of content validity, the items adopted and excluded were verified by three researchers with expertise in maternal nursing, and the draft scale for the present survey was created (Table 1).

Table 1
Draft scale.

1. I am so busy taking care of my child that I don't know what I am doing
2. I am worried whether I can carry out the role of raising a child
3. I am confused about living with a child
4. I don't know how I should look after my child
5. I feel that I don't look after my child well
6. I feel that I'm not suited for being a mother
7. I feel that I am the only one who is not good at looking after a child
8. I resent the fact that I am not able to lead my life at my own pace
9. I get irritated when I am with my child
10. I don't know if I am fulfilling my role as a mother to my child
11. Looking after my child is difficult for me
12. I feel sensitive when parenting
13. Parenting is not something that I can do by myself
14. I do not have confidence in my own style of parenting
15. I compare my parenting style to that of other mothers
16. I am distressed in my current lifestyle that only involves parenting
17. I am able to gradually relax and get involved with my child
18. I feel that childcare is solely my responsibility
19. Only I understand the hardships of parenting
20. I feel stressed about having to be alone with my child
21. My sense of distance from people around me before giving birth to my child is different from that after giving birth to my child
22. I can manage to take care of my child even if I don't do it perfectly
23. I am anxious about parenting when I don't have information from other mothers
24. My child is special to me
25. I have a responsibility to protect my child
26. I look forward to seeing my child grow
27. I parent through trial and error
28. I want to protect my child
29. I have changed my lifestyle to suit my child
30. My life with my child has become the norm
31. I have started a new life through my child
32. I am able to recognise that my child's personality is different from mine
33. When my child is relaxed, I am relaxed
34. My bond with my husband/partner is deepening
35. My child is cute even when crying
36. The existence of my child helps me
37. My child is a part of me
38. I am happy to be a mother
39. I understand the feelings of my child
40. Some aspects of my relationships with others are unchanged from before the birth of my child to after the birth of my child
41. It seems that I don't need to worry too much about my child
42. When I am relaxed, my child is relaxed
43. I can express the type of parenting that I want to do
44. I seek help when needed
45. My husband/partner parents as per my expectations
46. I am able to spend time for myself even when my life is centred on my child
47. I can express my intentions about parenting
48. Depending on the situation, in some instances, I prioritise myself over my child
49. I take actions to reduce stress in parenting
50. I understand what my child wants
51. I am now able to do a lot more as a mother than before
52. In parenting, there are some things that only I can do
53. I came to understand what my child wanted me to do
54. I think it is okay to cut corners to some extent in parenting
55. I am unsatisfied in that my husband/partner does not parent as I would like
56. I do what should be done for my child as a parent
57. I cannot help but be particular about every detail in raising my child

Stage 2: main survey

Participants and data collection

The main survey was implemented in October 2020. The participant and data collection method was performed as per the pilot study. The grounds for calculating the sample size were as fol-

lows: assuming a relative error of ±5% and reliability of 95%, the required sample size was ≥384 individuals. Furthermore, owing to the fact that the required sample for scale development is considered 5–10 individuals, a sample population of 395 individuals was considered appropriate.

Survey items

The survey items consisted of (1) the draft scale in the present survey, (2) basic attributes and (3) external reference measurement tools (childcare awareness and behaviour scale of Kato and Tsuda (1998) and the maternal self-confidence scale and the scale of the level of satisfaction in being a mother by Maehara and Mori [2005]).

To investigate the criterion-related validity of the scale, we used three scales as external references. The childcare awareness and behaviour scale of Kato and Tsuda (1998) measures stress in childcare. This scale consists of three subfactors, including 'stress in childcare life', 'sense of affirmation in childcare' and 'negative childcare behaviour', in which a higher or lower score indicates higher or lower stress levels, respectively. The maternal self-confidence scale of Maehara and Mori (2005) measures self-confidence in one's ability to appropriately care for one's child. The scale consists of four subfactors, including 'self-confidence in knowledge and skills', 'reading signals', 'responding to demands' and 'approach suited to the self and one's child' in which a higher score indicates a higher degree of self-confidence in implementing childcare. Furthermore, the scale related to the level of satisfaction in being a mother was developed to measure satisfaction and happiness experienced through interaction with one's child and the achievement in overcoming the role-related challenges. This scale comprises two subfactors, i.e. 'sense of affirmation in childcare' and 'enjoyment in interaction', wherein higher scores indicate a higher level of satisfaction with being a mother.

Data analysis

Item analysis

To confirm the ceiling and floor effects, we performed item-total (I-T) and inter-item correlation analyses.

Exploratory factor analysis

Exploratory factor analysis was performed to confirm the factor structure (least-squares and promax methods), the number of factors, criteria for adopting items and method for investigating content validity were as described in the pilot study.

Investigation of reliability

To confirm internal consistency, Cronbach's α coefficients were calculated for the overall items and for each factor, with the reference level defined as ≥0.7.

Investigation of validity

To confirm concurrent validity as criterion-related validity, we calculated the Pearson's correlation coefficients with external criteria. Furthermore, to confirm construct validity, we performed a confirmatory factor analysis.

Ethical consideration

The web-based survey was outsourced to survey companies that monitor participants in an appropriate manner and had a large number of monitor enrolments. Information on the study objectives, data management method, free consent and withdrawal of participants, anonymisation, protection of personal information and associated rights of study participants, disadvantages and publication of the results was specified and made public knowledge on the Internet. Responding to the questionnaire on the Internet was considered as participant consent. The external reference measurement tool as per the childcare awareness and behaviour scale developed by Kato and Tsuda (1998) and the maternal self-confidence and satisfaction of being a mother scales by Maehara and Mori (2005) were used to measure external criteria after obtaining permission from the tool creators.

The study was conducted with the approval of the Ethical Committee of the first author's University (No. 19,284, 26 March 2020) and the Ethical Committee for Epidemiology of the third author's University (E-1984, 27 April 2020), in accordance with the Declaration of Helsinki and current legislation.

Results

Pilot study

Participant attributes

The mean age of the participants was 32.52 years, and the survey was conducted at 1, 2, 3, 4, 5, and 6 months postpartum in 15 (17.4%), 9 (10.5%), 15 (17.4%), 12 (14.0%), 14 (16.3%) and 21 (24.4%) individuals, respectively.

Exploratory factor analysis

Five factors were determined based on an eigenvalue of ≥1 and scree plot. Regarding factor extraction, 16 items with factor loading of <0.4 and 5 items with factor loading of ≥0.4 for multiple factors were excluded; thus, 62 items were extracted as scale items. Six and three items were excluded and included after investigating the factors and items in a qualitative manner. Therefore, 5 factors and 57 items were included. The sample validity in the Kaiser–Meyer–Olkin (KMO) test of 57 items was 0.906, thereby confirming that the 57 items were appropriate for the exploratory factor analysis in the present survey.

Main survey

Participant attributes

The mean age of the participants was 31.25 years, with a standard deviation of 4.32 (Table 2). The KMO test revealed sample validity of 0.906, whereas the Bartlett test results revealed $p < 0.001$, suggesting that the sample size was appropriate.

Statistical analysis of items

There were 13 items with ceiling effect and 2 items with floor effect. In the I-T correlation analysis, a constant correlation was noted with $r = 0.222$–0.722. At this stage, no items were removed.

Exploratory factor analysis and factor naming

Five factors were determined based on an eigenvalue of ≥1 and scree plot.

Following the exploratory factor analysis, 14 items with factor loading of <0.4 were removed. Table 3 presents the factor structure of 45 items, including the 43 items with factor loading of ≥0.4 after removing the 14 items from the 57 items and 2 items (52.54) to be considered for addition to investigate content validity.

Among the 45 items, when items with similar content were observed within the same factor, the item with high factor loading was retained, and the other items were removed. We removed 5 items (14, 10, 5, 20 and 15) in Factor I, 1 item (28) in Factor II and 3 items (50, 39 and 43) in Factor III.

Factor I was defined as 'feelings of insufficiency in the maternal role' and consisted of items related to the inadequacy in and lack of self-confidence in one's parenting and not being able to

Table 2
Participant attributes ($N = 395$).

Item	No. of individuals	%
Mean age	31.25 years	
No. of months postpartum		
1	50	12.7
2	63	15.9
3	74	18.7
4	67	17.0
5	80	20.3
6	61	15.4
Profession		
Full-time homemaker	175	44.7
On parental leave	211	53.8
Employed	6	1.5
Mean no. of weeks of pregnancy at birth	39.27 weeks	
Mode of birth		
Vaginal birth	335	84.8
Caesarean section	60	15.2
Married	385	100
Infant without abnormality	385	100

thoroughly execute one's maternal role. Factor II was named 'what childcare means to me' and consisted of items related to the existence of one's child in performing childcare for one's child and living with one's child. Factor III was named 'a sense of mastery in fulfilling the mother's role' and consisted of items related to understanding the demands from one's child and awareness of starting to behave as a mother. Factor IV was named 'relationship with one's partner in childcare' and consisted of items related to feelings about the paternal role executed by one's husband or partner and the relationship with him as a parent. Factor V was named 'developing one's own view of parenting' and consisted of items related to developing one's own childcare style rather than adopting established childcare styles.

We examined the content validity according to the subfactor name and semantic content. Items removed owing to low content validity were as follows: 3 items in Factor I (9.21.1), one in Factor II (38), one in Factor III (49) and one in Factor V (37). After investigating content validity, one item in Factor III (52) and one item in Factor V (54) were added to the subfactors as necessary items.

Therefore, we extracted 30 items, including 10 items in Factor I, 8 items in Factor II, 6 items in Factor III, 3 items in Factor IV and 3 items in Factor V.

Investigation of reliability and validity

Investigation of reliability

Cronbach's α coefficient for each factor was 0.871 for Factor I, 0.870 for Factor II, 0.751 for Factor III, 0.767 for Factor IV and 0.648 for Factor V. We confirmed an inter-item correlation in Factor V with coefficient below the reference value of 0.7. A constant inter-item correlation was $r = 0.347–0.465$.

Investigation of validity

As concurrent validity, we confirmed the correlation coefficients of three external criteria and scale developed in the present study. In the childcare awareness and behaviour scale, a negative correlation was observed at $r = -0.459$ ($p < 0.01$), whereas we noted a positive correlation in the maternal self-confidence scale at $r = 0.394$ ($p < 0.01$) and the scale of the level of satisfaction in being a mother at $r = 0.569$ ($p < 0.01$) (Table 4).

Confirmatory factor analysis was used to examine the construct validity; in addition, it was used to examine data consistency in the hypothetical model based on the results obtained in the exploratory factor analysis. As a result of the analysis, the indices of goodness of fit were *comparative fit index* (*CFI*) = 0.838, *goodness of fit index* (*GFI*) = 0.821, *adjusted GFI* (*AGFI*) = 0.789 and *root mean square error of Approximation* (*RMSEA*) = 0.07 (Fig. 2).

Discussion

Investigation of reliability

The Cronbach's α coefficient exceeded the reference value of 0.70 for Factors I, II, III and IV. For Factor V, it is possible that the Cronbach's α coefficient was below the reference value considering that the number of items was low, i.e. 3. Therefore, inter-item correlation was confirmed in Factor V. Accordingly, this scale appeared to have a certain level of reliability.

Investigation of validity

A correlation was observed between the external criteria and the present scale. A negative correlation was observed between the present scale and the childcare awareness and behaviour scale, wherein a higher score indicated a higher level of childcare stress. In contrast, the present scale was positively correlated with the maternal self-confidence scale and the scale of satisfaction in being a mother, and the outcomes indicated that a higher maternal self-confidence and level of satisfaction was represented through a higher score in the maternal self-confidence scale and in the scale of satisfaction in being a mother, with concurrent validity ensured.

The goodness of fit of the model used in the confirmatory factor analysis was approximately 0.8, ranging from 0.789 to 0.838 in GFI, AGFI and CFI. Although the values were <0.9, GFI was greater than AGFI, which highlighted the suitability of the model. A relatively smaller observable variable indicated a smaller GFI (Ishii, 2005). Therefore, the number of items may have affected the results of the present study. As the participants in the present survey included primiparas with a child born up to 6 months prior, it was our understanding that the burden of responding was minimised as much as possible. However, an increase in the number of items would result in a decrease in the response rate and an increase in the number of individuals discontinuing the questionnaire midway and in the number of inappropriate responses. Furthermore, as an index for disparity in the population, the RMSEA was 0.07. Therefore, the goodness of the model was considered to be within the permissible range for the population. This scale is currently at the development stage, and we believe that, it should be examined multiple times in the future. Such examinations will be essential in confirming and investigating the goodness of fit of the model.

Table 3
Exploratory factor analysis.

	No.	Item	Factor load I	II	III	IV	V
Factor I: Feelings of insufficiency in the maternal role							
	2	I am worried whether I can carry out the role of raising a child R	0.738	0.085	−0.081	0.044	0.019
	4	I don't know how I should look after my child R	0.717	−0.018	−0.099	0.184	0.074
*	14	I do not have confidence in my own style of parenting R	0.711	0.201	−0.138	0.061	0.134
	3	I am confused about living with a child R	0.701	−0.202	0.062	0.120	−0.019
	6	I feel that I'm not suited for being a mother R	0.700	−0.125	0.048	0.102	−0.046
*	10	I don't know if I am fulfilling my role as a mother to my child R	0.698	−0.001	−0.103	0.150	0.119
*	5	I feel that I don't look after my child well R	0.687	0.010	−0.181	0.083	0.215
	8	I resent the fact that I am not able to lead my life at my own pace R	0.665	−0.029	0.037	−0.111	−0.022
	16	I am distressed in my current lifestyle that only involves parenting R	0.643	−0.053	0.140	−0.211	−0.100
	11	Looking after my child is difficult for me R	0.643	0.171	−0.179	0.144	−0.027
*	20	I feel stressed about having to be alone with my child R	0.606	−0.058	0.105	−0.179	−0.250
	7	I feel that I am the only one who is not good at looking after children R	0.603	−0.235	0.099	0.078	0.329
*	15	I compare my parenting style to that of other mothers R	0.591	0.031	0.164	−0.087	0.171
	13	Parenting is not something that I can do by myself R	0.569	0.277	−0.005	0.058	−0.246
	12	I feel sensitive when parenting R	0.565	0.199	0.005	−0.098	0.136
*	9	I get irritated when I am with my child R	0.498	−0.272	0.056	−0.018	−0.005
*	21	My sense of distance from people around me before giving birth to my child is different from that after giving birth to my child R	0.416	0.202	0.101	−0.238	−0.147
*	1	I am so busy taking care of my child that I don't know what I am doing R	0.413	0.039	−0.200	−0.023	0.271
Factor II: What childcare means to me							
	25	I have a responsibility to protect my child	0.009	0.906	−0.140	−0.038	−0.107
	26	I look forward to seeing my child grow	0.019	0.897	−0.088	0.013	−0.061
*	28	I want to protect my child	−0.015	0.874	−0.133	0.017	−0.029
	24	My child is special to me	0.026	0.751	−0.058	−0.048	−0.150
	27	I parent through trial and error	0.230	0.710	0.034	0.065	−0.132
	29	I have changed my lifestyle to suit my child	0.092	0.665	0.070	0.013	−0.002
	33	When my child is relaxed, I am relaxed	0.139	0.573	0.107	0.040	−0.075
	30	My life with my child has become the norm	−0.112	0.538	0.139	−0.004	0.094
	31	I have started a new life through my child	−0.036	0.505	0.124	0.081	0.185
*	38	I am happy to be a mother	−0.237	0.406	0.236	−0.042	0.256
Factor III: A sense of mastery in fulfilling the mother's role							
	53	I came to understand what my child wanted me to do	0.058	0.049	0.757	−0.156	−0.018
*	50	I understand what my child wants	−0.055	−0.160	0.714	−0.096	−0.042
*	39	I understand the feelings of my child	−0.086	0.061	0.606	−0.070	0.383
*	43	I can express the type of parenting that I want to do	0.091	0.002	0.596	0.130	−0.010
	47	I can express my intentions about parenting	−0.066	0.026	0.528	0.167	−0.141
	51	I am now able to do a lot more as a mother than before	−0.074	0.184	0.510	−0.073	−0.140
	44	I seek help when needed	0.030	−0.039	0.510	0.323	−0.122
	56	I do what should be done for my child as a parent	0.036	0.100	0.506	−0.014	0.077
*	49	I take action to reduce stress in parenting	−0.180	−0.146	0.411	0.223	−0.159
	52	In parenting, there are some things that only I can do	−0.026	0.220	0.393	−0.148	−0.003
Factor IV: Relationship with one's partner in childcare							
	45	My husband/partner parents as per my expectations	0.146	−0.080	0.218	0.695	−0.032
	55	I am unsatisfied in that my husband/partner does not parent as I would like R	0.068	−0.019	0.163	−0.620	0.181
	34	My bond with my husband/partner is deepening	0.126	0.165	0.147	0.602	−0.002
Factor V: Developing one's own view of parenting							
	22	I can manage to take care of my child even if I don't do it perfectly	0.085	0.268	0.235	−0.014	−0.511
	57	I can't help but be particular about every detail in raising my child R	0.234	−0.052	0.073	−0.066	0.492
*	37	My child is a part of me R	−0.091	0.241	0.191	−0.010	0.455
	54	I think it is okay to cut corners to some extent in parenting	−0.031	0.210	0.351	0.072	−0.373

Factor extraction method: least-squares method
Rotation method: promax
R: reverse item
* : Items to be deleted due to content validity

Table 4
Criterion-related validity.

	Pearson's correlation coefficient	*p values*
Childcare awareness and behaviour scale	−0.459	<0.01
Maternal role confidence scale	0.394	<0.01
Scale of the level of satisfaction in being a mother	0.569	<0.01

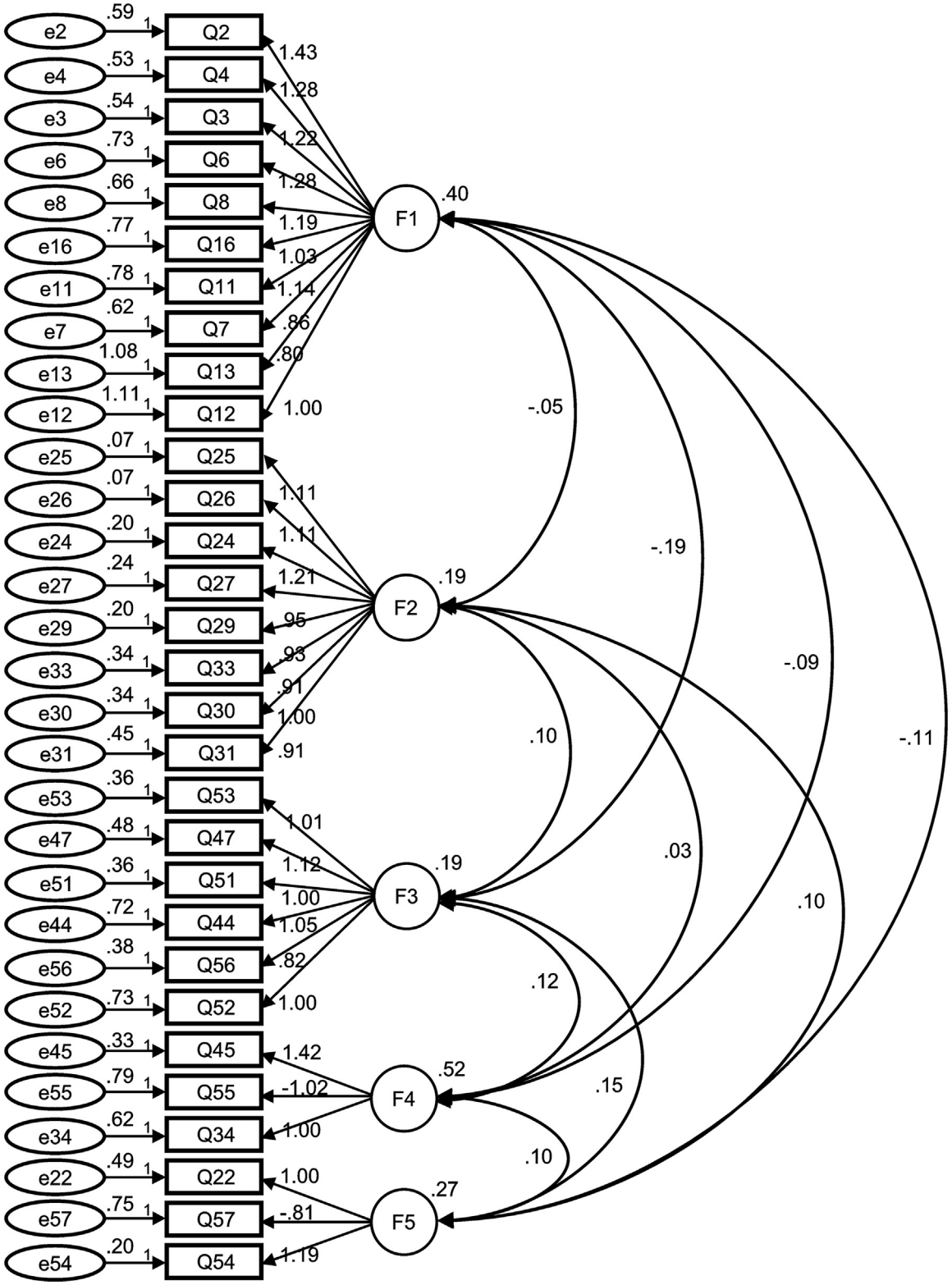

Fig. 2. Measurement model of the transition of Japanese primiparas becoming mothers.

Scale practicality

The present survey was created on the basis of interviews of Japanese primiparas, up to 6 months postpartum, who were in the transition of becoming accustomed to life as mothers. We were able to present the state of the transition to becoming a mother according to five subfactors realised on the basis of the participants' expressions. The primiparas had developed negative emotions of not being able to achieve the maternal role owing to a lack of confidence regarding childcare. Additionally, the primiparas had positive perceptions in cases when they naturally became accustomed to childcare. Japanese mothers raising premature ba-

bies care for their child with feelings of ambivalence (Iwasaki and Nojima, 2016). These feelings were observed in low-risk Japanese primipara as well. We believed that the presence of these negative feelings is one of the processes involved in becoming accustomed to the maternal role. Therefore, we did not disregard these feelings, but considered them important and monitored them accordingly. When scoring according to the scale overall and each subfactor, we were able to use the scale as a tool to elucidate which part of life as a mother the participants have become accustomed to and the extent thereof. Furthermore, by including participants in different postpartum periods, we were able to visualise changes over time.

This scale was designed to not only assign a high or low score to specific parameters but can also determine the awareness regarding the degree to which an individual is accustomed to their life with a maternal role. We believe that through answering the questions in this scale, mothers can become aware that they are in the process of becoming accustomed to their maternal role and they can reflect on their own style of parenting. The awareness of growth as a mother (Nakamura, 2014) and reflection on one's parenting can reportedly help with maternal growth, (Zukawa, 2017) and therefore, we believe that mothers can improve maternal growth and achieve empowerment through self-reflection by responding to this scale and encountering the affiliated items.

For further practical application of this study, we believe that the relationship between each subfactor, as well as the significance of the balance of the five subfactors and overall score, need to be examined. In addition, an investigation of the timing and interval used for the scale is warranted. In future, we hope to increase the sample population to include mothers other than those at low risk and to examine the relationship between the present scale and a scale that can determine high risk status, such as a scale of postpartum depression and childcare stress. We believe that these investigations will help in providing individualised support for mothers in various situations.

Disclaimer

Use of the scale requires the researchers' permission.

Authors' contributions

All authors conceived the idea and initiated the project. YK collected the data. YK and MO performed the analysis. All authors participated in the interpretation of the results and critically reviewed the manuscript. All authors read and approved the final manuscript.

Ethical approval

The present study was conducted with the approval of the ethical review board of Kurume University (March 26, 2020, No. 19284) and the ethical review board of Hiroshima University (April 27, 2020, No. E-1984). Responding to the questionnaire on the Internet was considered to imply consent.

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Clinical trial registration number

None.

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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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.midw.2022.103485.

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