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Development of a prenatal Maternal Self-report Inventory and verification of its reliability and validity

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SUBMISSION TRACK

Received: March 28, 2024

Final Revision: May 03, 2024

Available Online: June 30, 2024

KEYWORDS

maternal self-esteem, pregnancy, maternal self-esteem scale, validity, reliability

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A B S T R A C T

Purpose: This study aimed to develop a prenatal maternal self-report inventory (prenatal MSRI) based on the Maternal Self-Report Inventory (MSRI) and establish its reliability and validity. **Methodology:** The components of the prenatal MSRI were examined, and a 4-factor, 32-item questionnaire was developed and completed by 348 pregnant women. **Findings:** Exploratory factor analysis revealed 3 factors and 22 items in this scale. Cronbach's α coefficient for the total scale was .85. The test-retest correlation coefficient for the total score was .86. The scale showed a significant positive correlation with the Rosenberg Self-Esteem Scale, indicating concurrent validity. **Originality:** The prenatal MSRI is a new instrument with confirmed reliability and validity. **Practical Significance:** This questionnaire, which takes approximately 5 minutes to complete, offers an instant assessment of maternal self-esteem. **Practical and social implications:** This scale can be used to assess maternal self-esteem specific to the gestational period, to identify the factors that may reduce self-esteem, and provide nursing support. **Limitation:** This scale has not been used on pregnant women who require hospitalization due to serious perinatal complications. Therefore, future research should apply this scale on all pregnant women.

I. INTRODUCTION

Shea and Tronick (Shea and Tronick, 1988) defined maternal self-esteem (MSE) as a woman's self-confidence in her mothering ability. Assessing MSE is important because it predicts maternal and child health. MSE is associated with maternal acceptance (Taylor et al, 1997). Lower MSE has been associated with higher maternal depression, anger, and child abuse

(Lutenbacher, 2002; Denis et al, 2012; Denis et al, 2013; Yoo et al, 2021). Prenatal MSE is related to postnatal MSE (Farrow and Blissett, 2007). Assessing prenatal MSE is important to assess women's adaptation to motherhood.

The Maternal Self-Report Inventory (MSRI) has been the only scale to assess MSE during the postnatal period (Shea and Tronick, 1988). It has been widely used to assess MSE in mothers who have delivered their babies via caesarean section or whose infants were hospitalized (Chen and Conrad, 2001; O'Reilly et al, 2014; McGrath et al, 1993). A French version has also been developed (Denis et al, 2013). Moreover, the self-esteem of pregnant women and postpartum mothers has assessed using the Rosenberg Self-Esteem Scale (RSES) (Kazmierczak and Goodwin, 2011; Martini et al, 2015). These general measures of self-esteem are central to one's personality, do not easily change with life events, and evolve gradually over the course of a lifetime (Shea and Tronick, 1988). Therefore, self-esteem in relation to a woman's role as a mother is difficult to assess. Motherhood generally begins with the process of giving birth and caring for a child. Mercer proposed the maternal role theory, which states that motherhood begins at conception and that mothers develop maternal responsibility, readiness, and attachment to the fetus (Mercer, 1981 ; Mercer, 1985; Mercer, 2004). In other words, we can assume that MSE begins during pregnancy; however, there is no scale available to assess MSE during pregnancy. Farrow and Blissett developed a prenatal MSRI based on the short version of the MSRI (Farrow and Blissett, 2007). However, the reliability and validity of this scale have not been verified. Hence, we aimed to develop a prenatal MSRI based on the MSRI (Shea and Tronick, 1988) and to examine its validity and reliability.

II. METHODS

2.1 Scale development

We developed the prenatal MSRI in four stages.

2.1.1 Stage 1: The constructive concept and item generation Seven factors comprise MSE:

(1) *Caretaking ability* (26 items). The three instrumental tasks of caretaking are feeding, diaper changing, and bathing. The three types of social care are showing affection for one's baby, calming and holding the baby, and understanding what the baby wants.

(2) *General ability as a mother* (25 items). This includes acceptance of the mothering role and sacrificing personal time and activities, enjoyment and pleasure in caregiving, teaching one's child all that he/she will need to learn, and being a loving and caring parent.

(3) *Acceptance of the baby* (10 items). This includes imagining what the baby will look like, the baby's sex, and whether the baby will experience typical development.

(4) *Expected relationship with the baby* (9 items). The mother finds fulfillment and gratification in interacting with her infant as well as in developing a close, mutual relationship with him/her. This includes the mother's ability to develop a loving bond with her baby and her expectations that the baby will love her in return.

(5) *Feelings during pregnancy, labor, and delivery* (15 items). These includes the mother's initial desire to have a baby, experiencing a very difficult labor or complications during delivery, feeling that something one did during pregnancy may have caused problems for the baby, and delivering an atypical baby.

(6) *Parental acceptance* (6 items). This includes the mother's own mother-child relationship, her identification with her own mother, and her feelings of parental acceptance and love.

(7) *Body image and health after delivery* (9 items). This includes the mother's satisfaction with her physical appearance, her body, and bodily functions during and after pregnancy.

Which dimensions comprise prenatal MSE? We examined the literature on the maternal role (Mercer, 1981; Mercer, 1985 ; Mercer, 2004), attainment of the maternal role (Mercer, 1981; Izumi, 1979a ; Izumi, 1979b), maternal adaptation (Lederman and Lederman, 1996) and

confidence during pregnancy (Shea and Tronick, 1988; Levin, 1991; Hanazawa, 1992; Huizink et al, 2004; Somerville et al, 2014). Three nursing researchers and 1 psychologist explored the factors that fell under the original and constructive concepts of prenatal MSE. Based on previous studies, prenatal maternal roles and abilities include acceptance of one's pregnancy and the fetus, maintenance of maternal health, normal fetal development, delivering a healthy child, and taking good care of one's child. In addition, preparation for motherhood is affected by the maternal image, which is based on the relationship between women and their mothers.

Initially, we used seven factors to define the concept of prenatal MSE: (1) caretaking ability; (2) one's general ability as a mother; (3) acceptance of one's baby; (4) one's expectations surrounding one's relationship with the baby; (5) one's feelings during pregnancy, labor, and delivery; (6) parental acceptance; and (7) body image and health after delivery. Factor 4 indicated that a mother expected to develop a close and mutual relationship with her infant; this is relevant because pregnant women begin to relate to their fetuses during pregnancy (Mercer, 1981). We excluded Factor 4 because such expectations are difficult for pregnant women to cope with. As a result, we only used only six factors to construct the concept of MSE during pregnancy.

2.1.2 Stage 2: Item development

The development of the items included four steps. First, three Japanese–English translators translated the MSRI from English into Japanese. After comparing the three forward translations, a translated draft was developed. Second, the draft was back-translated from Japanese to English by three other translators who had no knowledge of the original scale. Third, we compared the backward English translation with the original English version to ensure that there were no differences in the meanings of the questions. Fourth, we investigated the items corresponding to the six factors using 100 items from the original MSRI. We carefully examined whether pregnant mothers could respond to the questions and whether there was an overlap in the semantic content of the questions.

Caretaking ability consisted of four items, including confidence in providing childcare (such as breastfeeding, changing diapers, and holding one's child). General mothering ability consisted of 11 items, including the idea that being a mother will be a rewarding experience (e.g., "I think that I will be a good mother"). To explore independent-minded maternal behavior to stay healthy during pregnancy, we added two items: "I feel that I have regular habits for a normal pregnancy" and "I feel that I will keep a healthy diet for my child." Acceptance of the baby consisted of four items, including being worried about the child having typical development and being discouraged by the child's sex. Feelings during pregnancy, labor, and delivery consisted of five items, including concerns about the influence of events during pregnancy and delivery. To scrutinize independent preparation for birth, we added the item "I am eagerly awaiting the birth of my baby during this pregnancy". Parental acceptance consisted of three items, including expectations of being as good of a parent as one's own mother. Body image and health after delivery consisted of four items, including sufficient energy and health to provide childcare. To examine women's awareness of their own health during pregnancy, we added the item "I worry now whether I am healthy enough during this pregnancy."

2.1.3 Stage 3: Face and content validity

The 31 items were reviewed for face and content validity by three midwives with five or more years of clinical experience and three parous women. Each reviewer provided comments on the items and overall suitability of the scale. The following viewpoints were considered: whether pregnant women could respond to the questions, whether there was content that deviated from the topic or that was difficult to understand, whether there was content that would be difficult for pregnant Japanese women to adapt to, and whether there was content that might

cause a mental burden in pregnant women. After designing the 31 items, we developed the prenatal MSRI.

2.1.4 Stage 4: Verification of the scale's reliability and validity

2.1.4.1 Study design

We conducted a partially longitudinal, cross-sectional study using a self-administered questionnaire.

2.1.4.2 Data collection period

We carried out the research in January and March of 2015.

2.2 Measures

(1) *Sociodemographic and obstetric data* included age, gestational week, parity, obstetric complications, marital status, education level, and employment.

(2) The *prenatal MSRI* comprises six factors and 31 items. Higher scores on each 5-point Likert scale indicate greater levels of MSE during pregnancy.

(3) *RSES, Japanese version* (Yamamoto, 1982). A 10-item self-report questionnaire was developed by Rosenberg (1965) to evaluate self-esteem. This is the most widely used and recommended scale for evaluating global self-esteem. Yamamoto (1982) prepared the Japanese version. Higher scores on each 5-point Likert scale indicate greater levels of self-esteem. We used this scale to establish the concurrent validity of our own scale.

(4) The *PAS* (Hanazawa, 1992). This scale is a 32-item self-report questionnaire used to assess anxiety in pregnant women. It is widely employed to assess anxiety among high-risk pregnant women (Nakajima, 2002). High scores on each 4-point Likert scale denote high levels of anxiety. We used this scale to determine the concurrent validity of the anxiety-related items.

2.3 Ethics approval and consent to participate

The study was conducted after obtaining the approval of the Ethical Committee of the University of Tsukuba in Japan (Notice No. 924).

2.4 Procedure

The participants were ambulatory patients at an obstetric hospital in Japan. After obtaining their informed consent, the participants completed a self-report questionnaire. We invited 60 participants to return a week later to complete the prenatal MSRI again to measure test–retest reliability. Ultimately, 41 participants completed the retest.

2.5 Participants

The participants were pregnant women ($n = 378$) at 12 to 40 weeks' gestation. Of the 378 participants, we excluded 30 from the analysis because of missing data for some of their questions. Table 1 shows the participants' characteristics. The age of the final sample of 348 women ranged from 20 to 44 years (mean = 32.1; standard deviation [SD] = 4.5), and their gestational age ranged from 12 to 40 weeks (mean = 24.3; SD = 8.0). Most participants were married (97.7%) or nulliparous (50.6%). A total of 68 (19.7%) were diagnosed with perinatal complications.

Table 1. Sample characteristics

N = 348

	N	%	Mean	SD	Range
Demographics					
Age (Years)			32.1	4.5	20–44

20–29 years	101	29.0		
30–39 years	226	65.0		
≥40 years	21	6.0		
Marital status				
Married	340	97.7		
Not married, living with partner	7	2.0		
Single	1	0.3		
Education level				
≤12 years	70	20.1		
13–16 years	212	60.9		
> 16 years	10	2.9		
Missing	56	16.1		
Employment				
Employed	180	51.7		
Not employed	165	47.4		
Missing	3	0.9		
Obstetric information				
Gestational age (weeks)			24.3	8.0 12–40
Parity				
Nulliparous	176	50.6		
Multiparous	172	49.4		
Perinatal complication				
Gestational diabetes	52	14.9		
Threatened premature delivery	13	3.7		
Fetal growth restriction	3	0.9		

2.6 Statistical analysis

We performed statistical analysis using Statistical Package software (version 22.0; IBM Corp., Armonk, New York, USA). We deemed P values of less than .05 to be significant. For the prenatal MSRI items, we calculated averages and SDs, we examined ceiling and floor effects, and we confirmed the correlation coefficients between each item and the total score. We performed exploratory factor analysis (EFA, maximum likelihood method/ProMax rotation) to identify the factor structure. We tested the reliability of the prenatal MSRI using Cronbach's α coefficients and test–retest correlation coefficients. To verify concurrent validity, we calculated Spearman's correlation coefficients for the prenatal MSRI, the RSES, and the PAS. In previous studies, high-risk pregnant women showed lower global self-esteem than normal pregnant women (Kemp and Paqe, 1987). Pregnancy anxiety is higher in nulliparous and high-risk pregnant women (Dunkel et al, 2016). Thus, predictive validity may be verified when the total score of the prenatal MSRI is low in nulliparous and high-risk pregnant women.

Table 2. Descriptive statistics for the prenatal MSRI mean score, floor effect, ceiling effect, and item-total score correlation

N = 348

	Items	Mean	SD	Floor effect	Ceiling effect	r ¹⁾
1	I was extremely pleased when I found out I was pregnant	4.48	0.77	3.71	5.25 [#]	.27**
2	I looked forward to breast feeding my baby	4.24	0.90	3.34	5.14 [#]	.34**
3	I feel that being a mother will be a very rewarding experience	4.60	0.68	3.92	5.28 [#]	.46**
4	I am concerned about whether my baby will develop normally	3.97	1.02	2.95	4.99	-.39**
5	I am concerned about losing my figure after having had a baby	3.40	1.19	2.21	4.59	-.12*
6	I expect I will be at least as good a mother as my mother was	3.30	0.92	2.38	4.22	.44**
7	I feel that something I did during my pregnancy may have caused (or will cause) problems for my baby	2.82	1.15	1.67	3.97	-.41**
8	I am worried about being able to feed my baby properly	3.12	1.23	1.89	4.35	-.46**
9	I expect that I won't mind staying home to care for my baby	3.54	1.02	2.52	4.56	.30**
10	I am confident that my baby will be strong and healthy	3.39	0.94	2.45	4.33	.50**
11	I worry whether I am healthy enough to take care of my baby	2.90	1.16	1.74	4.06	-.50**
12	My father made me feel very loved, and I feel that I too can give my baby love and affection	4.08	0.92	3.16	5.00 [#]	.40**
13	During this pregnancy, I have often had frightening fantasies that I will deliver an abnormal baby	2.54	1.26	1.28	3.80	-.49**
14	I am worried that I will have difficulty changing my baby's diapers	1.89	1.08	0.81 [#]	2.97	-.48**
15	I think that I will be a good mother	3.30	0.79	2.51	4.09	.62**
16	I have great expectations for what my baby will be like	3.77	0.90	2.87	4.67	.35**
17	I feel as though I have plenty of energy to take care of my baby	3.39	0.99	2.40	4.38	.46**
18	I feel that my parents did a very bad job raising me and I am sure that I will not make the same mistakes with my baby	2.08	1.12	0.96 [#]	3.20	-.17**
19	I am eagerly awaiting the birth of my baby during this pregnancy	4.73	0.58	4.15	5.31 [#]	.37**
20	I am afraid I will be awkward and clumsy when handling my baby	2.47	1.25	1.22	3.72	-.57**
21	I feel like I will be a failure as a mother	2.05	0.97	1.08	3.02	-.67**
22	I worry now whether I am healthy enough during this pregnancy	3.14	1.19	1.95	4.33	-.54**
23	I did not like my mother and I worry that my baby will not like me	1.48	0.80	0.68 [#]	2.28	-.35**
24	I feel emotionally prepared for my baby's birth	3.73	1.01	2.72	4.74	.57**
25	I feel like I have lots of love to give my baby	4.23	0.76	3.47	4.99	.61**
26	I feel that I will do a good job taking care of my baby	3.42	0.85	2.57	4.27	.72**
27	I am enthusiastic about taking responsibility for caring for my baby	3.89	0.85	3.04	4.74	.61**
28	I feel that I will keep a healthy diet for my child	3.28	0.94	2.34	4.22	.44**
29	I feel that I have regular habits for a normal pregnancy	3.18	0.98	2.20	4.16	.40**
30	I have no anxieties about all there is to do as a mother	2.37	0.99	1.38	3.36	.52**
31	I am disappointed with the sex of my baby	2.33	1.38	0.95 [#]	3.71	-.25**

1) Spearman's rank correlation

* p < .05 ** p < .01 # Floor or ceiling effects

Table 3 Factor structure of prenatal MSRI items

N = 348

	Items	Factor loadings			Communality
		Factor 1	Factor 2	Factor 3	
Confidence in being a mother ($\alpha = .82$)					
27	I am enthusiastic about taking responsibility for caring for my baby	.68	.12	.22	.53
26	I feel that I will do a good job taking care of my baby	.68	-.18	-.00	.57
15	I think that I will be a good mother	.65	-.11	-.03	.49
30	I have no anxieties about all there is to do as a mother	.61	-.13	-.22	.37
6	I expect I will be at least as good a mother as my mother was	.56	.00	-.09	.31
28	I feel that I maintain a healthy diet for my child	.56	.09	-.02	.40
17	I feel as though I have plenty of energy to take care of my baby	.55	.07	.05	.33
25	I feel like I have lots of love to give my baby	.53	.00	.23	.48
29	I feel that I have a regular habits for a normal pregnancy	.40	-.01	.00	.36
16	I have great expectations for what my baby will be like	.40	.14	.10	.21
One's own health and that of one's child ($\alpha = .80$)					
22	I worry now whether I am healthy enough during this pregnancy†	.02	.67	-.01	.44
13	During this pregnancy, I have often had frightening fantasies that I will deliver an abnormal baby†	.12	.63	-.11	.32
4	I am concerned about whether my baby will develop normally†	.07	.63	.05	.36
7	I feel that something I did during my pregnancy may have caused (or will cause) problems for my baby†	.11	.61	-.01	.32
11	I worry whether I am healthy enough to take care of my baby†	-.00	.56	-.05	.38
8	I am worried about being able to feed my baby properly†	-.07	.53	.04	.36
14	I am worried that I will have difficulty changing my baby's diapers†	-.05	.49	-.03	.37
20	I am afraid I will be awkward and clumsy when handling my baby†	-.21	.46	.03	.38
Looking forward to being a mother ($\alpha = .76$)					
3	I feel that being a mother will be a very rewarding experience	.00	-.10	.72	.45
1	I was extremely pleased when I found out I was pregnant	-.05	.01	.72	.41
2	I looked forward to breastfeeding my baby	.05	.04	.63	.42
19	I am eagerly awaiting the birth of my baby during this pregnancy	-.01	-.06	.62	.35

Extraction method: maximum likelihood method; rotation method: promax rotation

Cronbach's α total = .85

† reverse scoring

Bolded values are factor loadings with $>.40$ on the factor.

III. RESULTS

3.1 Frequency distribution of the scale items

Table 2 shows the mean scores, SDs, floor effects, ceiling effects, and item–total score correlations of the prenatal MSRI items. We deleted three items with a correlation coefficient

of $r < .20$ between the item and the total score. We used four items with floor effects and five with ceiling effects because of their importance to the scale. Finally, we employed 29 items after deleting two items from the pool of 31 items.

3.2 Examining the question items by exploratory factor analysis

We performed EFA to determine the number of factors for all 29 items. We found a 3-factor structure to be suitable according to the scree plot and constructability (Table 3). We deleted factor loadings of less than .40 and high loadings for multiple factors. Finally, we defined three factors and 22 items as the scale items. The Kaiser-Meyer-Olkin (KMO) measure of sample adequacy was .86, while Bartlett's test of sphericity was 2,497.4 ($p < .01$), confirming the validity of the factor analysis.

We defined the first factor using 10 items and interpreted it as confidence in being a mother. We defined the second factor, which we reverse scored, using eight items and interpreted it as one's own health and that of one's child. We defined the third factor using four items and interpreted it as looking forward to being a mother. The Cronbach's α coefficient for each factor was .82 to .76, whereas the total scale had an α of .85

3.3 Test-retest reliability

The test-retest correlation coefficients for the Prenatal MSRI total score and each factor are shown in Table 4. The correlation coefficients were factor 1, $r=.81$; factor 2, $r=.81$; factor 3, $r=.78$. The correlation coefficient for the prenatal MSRI total score was .86.

Table 4. Test-retest reliability of the subscale and total score

N = 41

Factor	Test		Re-test		r^a	α^b
	Mean	SD	Mean	SD		
Factor 1 [Confidence in being a mother]	3.41	.56	3.34	.54	.81**	.84
Factor 2 [One's own health and that of one's child] †	3.14	.75	3.08	.71	.81**	.83
Factor 3 [Looking forward to being a mother]	4.51	.57	4.47	.45	.78**	.71
The prenatal MSRI total score	3.69	.46	3.63	.46	.86**	.89

^{a)} Spearman's rank correlation coefficient

^{b)} Cronbach's α coefficient

** $p < .01$

† reverse scoring

3.4 Concurrent validity

Correlations between Prenatal MSRI and RSES and PAS are shown in Table 5. The prenatal MSRI showed a moderate correlation with RSES ($r = .46$, $p < .01$). The three factor showed a low to moderate correlation with RSES ($r = .42-.18$, $p < .01$). The PAS showed moderate correlation with Factor 2 (one's own health and that of one's child: reverse scoring) ($r = -.65$, $p < .01$).

The results of the analysis of the total score of the prenatal MSRI and the scores of the three factors by parity are shown in Table 6. The total scores on the prenatal MSRI and Factor 2 (one's own health and that of one's child: reverse scoring) were significantly lower in nulliparous women than in multiparous women ($p < .01$)

The results of the analysis of the total score of the prenatal MSRI and the score of the three factors with and without perinatal complications are shown in Table 7. The total scores on the prenatal MSRI and Factor 2 (one's own health and that of one's child: reverse scoring) were significantly lower in women who had been diagnosed with perinatal complications ($p < .01$).

Table 5. Correlations between the RSES-Japanese version, the PAS, and the prenatal MSRI

		N = 348	
		RSES	PAS

Factor	<i>r</i> ^{a)}	<i>p</i>	<i>r</i> ^{a)}	<i>p</i>
The prenatal MSRI total score	.46	<.01**	-.52	<.01**
Factor 1 [Confidence in being a mother]	.42	<.01**	-.26	<.01**
Factor 2 [One's own health and that of one's child] †	.39	<.01**	-.65	<.01**
Factor 3 [Looking forward to being a mother]	.18	<.01**	-.10	.05

a) Spearman's rank correlation coefficient

† reverse scoring

***p* < .01

Table 6. Relationship between the prenatal MSRI and parity

N = 348

Factor	Nulliparous (N = 176)		Multiparous (N = 172)		<i>p</i>
	Mean	SD	Mean	SD	
The prenatal MSRI total score	74.3	10.6	80.4	9.9	<.01 ^{a)} **
Factor 1 [Confidence in being a mother]	33.4	5.5	34.8	5.6	.02 ^{a)}
Factor 2 [One's own health and that of one's child] †	22.8	5.9	27.4	5.3	<.01 ^{b)} **
Factor 3 [Looking forward to being a mother]	18.0	2.4	18.0	2.1	.54 ^{b)}

The values are presented as the mean and SD

a) Two-sample t-test b) Mann–Whitney U test

***p* < .01 † reverse scoring

Table 7. Relationship between the prenatal MSRI and perinatal complications

N = 348

Factor	Perinatal complications				<i>p</i>
	Yes (N = 68)		No (N = 280)		
	Mean	SD	Mean	SD	
The prenatal MSRI total score	73.5	8.8	78.3	10.9	<.01 ^{a)} **
Factor 1 [Confidence in being a mother]	33.2	5.1	34.3	5.7	.15 ^{b)}
Factor 2 [One's own health and that of one's child] †	22.0	5.4	25.8	5.9	<.01 ^{a)} **
Factor 3 [Looking forward to being a mother]	18.1	2.1	18.0	2.3	.95 ^{b)}

The values are presented as the mean and SD

a) Two-sample t-test

b) Mann–Whitney U test

***p* < .01

† reverse scoring

IV. DISCUSSION

We aimed to develop a prenatal MSRI based on the original MSRI and to examine its validity and reliability. We confirmed that the prenatal MSRI, consisting of three factors and 22 items, showed good reliability and validity for assessing prenatal MSE.

4.1 Validity of the scale

We assumed six factors based on MSE to comprise prenatal MSE. We classified the factors included in MSE according to pregnancy, delivery, and childcare periods; we did not subject the original 100 items that overlapped with the semantic content of the questions to factor analyses.

Pregnant women have yet to give birth and care for their babies in utero. Therefore, we excluded three factors from the factor analysis: maternal confidence, worry, and expectations during pregnancy.

Factor 1 (confidence in being a mother) involves expectations for being a good mother, such as taking care of a baby, having lots of love to give the baby, and having regular habits for a

normal pregnancy. Rubin (1984) reported that the incorporation of maternal identity into the self-system occurs through the idealized image of the self as the mother of one's child. There is an orientation toward the ideal as well as a search in the environment and memory for models of new and desirable attitudes and abilities, in addition to ideal elements, to replicate and incorporate as one's own. The first factor should consist of the idealized image along with the original factors, such as caretaking ability, general ability as a mother, acceptance of the baby and body image, and health after delivery. MSE is defined as a woman's self-confidence in her mothering ability (Shea and Tronick, 1988). Thus, it is appropriate that confidence in being a mother is a factor in prenatal MSE. Factor 2 (one's own health and that of one's child) relates to a normally growing fetus and maternal health during pregnancy and the postpartum period. Seeking and ensuring safe passage through pregnancy and childbirth are of great importance to pregnant women (Rubin, 1984). Maternal illness during pregnancy or birth may affect a woman's self-esteem and drain energy that would otherwise be available for mothering (Mercer, 1981). Pregnant women are concerned about their children's health (Hanazawa, 1992; Huizink et al, 2004). Since caretaking ability is important in maintaining the health of one's child, this factor entails caretaking abilities such as feeding, changing diapers, and holding a baby. Factor 3 (looking forward to being a mother) encompasses the pleasure of pregnancy, awaiting birth, and breastfeeding. Pregnancy acceptance is a key dimension of psychosocial adaptation in pregnancy (Lederman and Lederman, 1996). Acceptance of pregnancy affects various aspects of maternal life, such as the motivation to adapt to the maternal role and positive feelings toward the fetus.

The prenatal MSRI is significantly positively correlated with the RSES. Shea (1988) reported a strong association between the MSRI and global self-esteem. Chen and Conrad (2001) found that global self-esteem was associated with MSE in mothers who delivered premature babies, demonstrating evidence of concurrent validity. The prenatal MSRI scores were lower in nulliparous women and women with perinatal complications. Scores for factors 1 (confidence in being a mother) and 2 (one's own health and that of one's child) were lower in nulliparous women than in multiparous women. Because multiparous women are familiar with the process of becoming mothers owing to previous perinatal experiences, they are more confident in terms of their physical health and normal fetal growth during pregnancy. In previous studies, MSE in the early postpartum period was lower in nulliparous women than in multiparous women (Maehara and Mori, 2005 ; Mercer and Ferketich, 1995). This result is consistent with those of previous studies.

Kemp and Page (1987) found that high-risk pregnant women had lower global self-esteem than typical pregnant women. McGrath et al (1993) observed that mothers who delivered premature babies had lower MSE than mothers who delivered full-term infants. Infant and maternal health are independent variables in the MSRI (Shea and Tronick, 1988). During high-risk pregnancies, women and their fetuses are at risk of serious physical harm. MSE is associated with perinatal complications. In addition, we demonstrated evidence of predictive validity.

4.2 Reliability of the scale

The Cronbach's α coefficient of the prenatal MSRI was .76 or more, with the reliability of this scale being generally secured. The Cronbach's α coefficient for Factor 3 (looking forward to being a mother) was less than .80 during both the test and retest. Polit and Beck (2004) reported that the reliability of composite self-report and observational scales was partly a function of the number of items. Fewer items may lower the α coefficient. The test-retest reliability also indicated better stability over time. For the current study, we conducted a retest after 1 week. Generally, with paper-and-pencil measures, a period of 2 weeks to 1 month is recommended between the two testing times. However, given that we performed this study in

pregnant women with greater physical and psychological changes, this interval may be appropriate.

4.2.1 Availability of the scale

These scales, consisting of 22 questions, assess prenatal maternal self-esteem (MSE) efficiently in about 5 minutes. They are designed to evaluate self-esteem during the gestational period, identify factors that may lower it, and aid in offering targeted nursing support.

4.3 Limitations

We confirmed that this scale is applicable to pregnant women with a typical course of pregnancy. In prior studies, a drop in MSE was observed in pregnant women who deviated from the typical course, such as those who delivered a premature baby or were at high risk (Kemp and Page, 1987 ; McGrath et al, 1993). It is necessary for pregnant women to deviate from the normal course in order to assess MSE. However, this scale has not been used for pregnant women who require hospitalization because of severe perinatal complications or pregnancies with medical and surgical complications. Further research is necessary to establish the scale's use among pregnant women in general.

V. CONCLUSION

We developed the prenatal MSRI and verified its reliability and validity. We confirmed the scale—which consists of a 3-factor structure with 22 items—to be valid and reliable. This scale assesses MSE specific to pregnancy.

The prenatal Maternal Self-esteem Rating Instrument (MSRI) is a newly developed tool with verified reliability and validity. **Practical Significance:** The questionnaire is concise, requiring approximately 5 minutes to complete, and it yields an immediate evaluation of maternal self-esteem. **Practical and Social Implications:** Specifically tailored for the gestational period, this scale evaluates maternal self-esteem, pinpoints factors that might diminish it, and assists in delivering focused nursing support. **Limitation:** The MSRI has not yet been administered to pregnant women hospitalized with severe perinatal complications, indicating the need for future studies to extend its application to all expectant mothers.

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ACKNOWLEDGEMENTS

This study was funded by the charitable trust of the Fumiko Yamaji Foundation for Nursing Education and Research and the Gushinkai Foundation (grant #H27-No. 22, 079). We wish to thank all those who participated in scale translation as well as the nurses and doctors who took part in the study and all staff from the participating hospital unit.