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Nursing Intervention in Infant Mental Health: Enhancing Mother-Infant Interaction and Self-Esteem of Adolescent Mothers

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Abstract

The study was an exploratory pilot study in which subjects consisted of adolescent mothers and their infants in Japan.

Background: Japanese adolescents giving birth to their babies are increasing although only at a rate of 1.4%. They chose to give birth more often instead of abortion than in past years. In Japanese society, it is not easy for an adolescent to be recognized as a mother because their knowledge is not sufficient for parenting and they are not ready to be a mother. They usually need support to be a mother.

PurposeThe study examined relationships among adolescent mother-infant interaction, maternal self-esteem, and parenting stress, which affect child development, in order to make recommendations for helping Japanese adolescent mothers in parenting.

Methods: The subjects were 10 adolescent mothers and their infants aged 3–12 months (adolescent group) and 10 mothers whose mean age was 28.9 years, the same age range when Japanese women gave birth to their first baby (comparison group). This study examined differences in mother-infant interaction, self-esteem, and parenting stress between the adolescent and comparison groups.

Results: Maternal self-esteem had a significant negative correlation with mother-infant interaction and parenting stress. Nursing Child Assessment Feeding Scale scores-especially the "Sensitivity to Cues" subscale-among the adolescent group were significantly lower than those of the comparison group. High parenting stress was influenced by difficulty in understanding about infant and a restraint coming from the parenting role.

Conclusion: Delicately reading of child cues and promptly an appropriately responds to them make more attuned mother-infant relationships. The study suggested that adolescent mother-infant relationship has positive correlation of maternal self-esteem and parenting stress, informing recommendations for nurses to replace their negative self-image of these youth with a positive one, which may ultimately lessen parenting stress.

Keywords: Adolescent Mother, Mother-Infant Interaction, Maternal Self-Esteem, NCAFS (the Nursing Child Assessment Feeding Scale), Infant Mental Health (IMH)

Introduction

Recently in Japan, the birth rate by adolescent mothers has been increasing while the abortion rate has been decreasing [1]. An interview study where adolescent mothers were asked about their feelings towards their pregnancy and delivery reported that 80% of the mothers had positively accepted them. Meaning, they continued their pregnancy and stated that pregnancy and delivery were not unwanted [2]. However, it is not unusual that these mothers report being exhausted by their new role. In addition, because of low incomes, they have low levels of social involvement, less education, and sometimes unstable lives. Such situations lead to high stress and affect their parenting [3-5]. Based on the background mentioned above, nurses need to help young mothers to be able to accept their infants and parenting positively.

This was an exploratory pilot study with a small sample size designed to gain insight into how nurses can best support parenting, nurturing the healthy growth, and development of infants and parent-child relationships in adolescent parents.

Mother-infant interaction

Mother-infant interactions critically influence infant development, and therefore the qualities of the mother-child interaction are important.

Many researchers have shown strong relationships between the qualities of mother-infant interactions and outcomes in child development [6-12]. Caregiver-infant interactions during the first years of life are positively linked to the child's subsequent intellectual and language development and secure attachment with major caregivers [13,14]. Barnard [8] suggested a model of caregiver-infant interaction in which it is assumed that both mother and infant have certain responsibilities to maintain the interaction. The model shows that an infant must send clear cues to the mother and respond to the mother. The infant's mother must respond to the cues, alleviate distress, and by doing so will facilitate development and learning. Interruption of mother-infant interaction can occur when mothers are not engaged with their infants, and when they are under excessive stress and become less sensitive to their situation.

Parenting of adolescent mothers in Japan

Previous findings in western countries from research on adolescent parents have indicated several risk factors: financial problems, school dropout, lack of knowledge on infant behavior, parenting stress, and

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depression [15-18]. The findings above are also recognized as risk factors with vulnerable adolescent mothers in Japanese studies [2,4,19]. These risk factors may be related to adolescent mothers' low sensitivity to their infants' cues; unavailability to respond to their infants' distress; or low growth fostering, responsiveness, or sensitivity for the infant [14,16-18]. Additionally, adolescent mothers are in a process of development themselves, and may be confused by the demands of being a parent while they are still growing up themselves.

A Japanese study pointed out several challenges with adolescent mothers related to maturity: long chats on mobile phones without taking care of their babies and prioritizing their own sleep over feeding their infants [20]. Some researchers suggest maternal immaturity may be a factor in infant abuse. In fact, in Japan the most frequent child abuse perpetrators implicated in infant mortality were biological adolescent mothers [21]. It is known that often maltreated children become perpetrators when they become parents themselves, indicating a generational transference of abuse [22-26]. Early intervention to help their parenting is crucial for the termination of this vicious cycle.

Self-esteem of adolescent mothers

Self-esteem is an emotional self-evaluation, meaning that individuals positively accept, have confidence in, and put value on themselves. Self-esteem is not always consciously recognized but directs the individual's verbal and nonverbal behaviors, intentions, and attitudes [27].

Rosenberg [28] defined self-esteem as the capacity to accept oneself as having good points and bad points, but not to be proud of oneself for having better grades, physical ability, looks, or financial power than others (i.e., comparing oneself with others). Self-esteem is to love and respect oneself. Takagaki et al. [29] defined it as self-affirmation. Higher self-esteem is associated with better life skills to solve life problems in constructive and effective ways [27,28,30].

In child-rearing, often maternal life history, belief system, and self-confidence affect mothers' perception and acceptance of their own parenting. Self-esteem-which facilitates positive self-acceptance-can enhance parenting and leads to mothers' positive perception of their babies [4,31-33]. Mothers with low self-esteem tend to have negative feelings and perceptions toward not only themselves but also their babies; therefore, they may have difficulty in forming intimate relationships with their babies [4,5,32,33]. Although there have been previous findings on the topic, as mentioned above, no Japanese study has attempted to determine the relationship between adolescent mothers' self-esteem and the interactions between the mother and her infant.

Infant mental health

Infant mental health is a field focused on the healthy social and emotional development of a child within the context of their primary relationships from birth to 3 years. Underlying the field of IMH is the concept that responsive relationships with consistent caregivers help build positive attachments that support healthy social and emotional development [10]. Winnicott, [34] a pioneer of IMH, described the mother-infant relationship by stating that "there is no such thing as a baby. A baby is part of the mother". Thus, IMH focuses on a safe and stable parent-infant relationship as the context in which infants develop their mental and physical health and wellbeing. However, the relationship and attachment are deteriorated by negative events: loss or trauma that parents experienced in their past [35,36].

As an interdisciplinary field developed in the 1970s, infant mental health is closely associated with the goals of nursing. A myriad of IMH interventions have been developed nurses to support and enhance the parent-infant relationship [34]. Research-based programs such as the European Early Promotion Project (EEPP) [37] and the Nurse Family Partnership Program (NFP) [38]-which was conducted in five countries in Europe and the US, respectively-are representative IMH projects.

The purpose of this current study was two-fold: (1) To elucidate the interactions between Japanese adolescent mothers and their infants; (2) To explore the relationships between maternal sensitivity to infant's cues and maternal self-esteem. The study examined relationships among mother-infant interaction, maternal self-esteem, and parenting stress based on the assumption that mother-infant interaction is facilitated by enhancing maternal self-esteem and sensitivity to infant cues and behavior.

Materials and Methods

Participants

Participants were teenage mothers and their infants lived in suburban areas of Tokyo. The comparison group consisted of 10 mothers whose mean age of giving birth to the first baby was 28.9 years and their infants from the Tokyo area. The participants had no significant medical history and the fathers lived with them.

Sample

The sample consisted of 10 teenage mothers and their infants and 10 control mothers and their infants. The ages of mothers in the adolescent group were 17–19 years (M = 18.0, SD = .81), and they had completed 9-12 years of education (M = 9.80, SD = 1.13). Eight out of the 10 adolescent mothers were high school dropouts, one had graduated, and one was a high school student. All were married and lived with their husbands (aged 18–26 years; M = 22.40, SD = 3.27). Eight were nuclear families, and 2 families consisted of multi-generational members. All of the adolescent mothers had adolescent mother friends with children but did not have trans-generational communication with other mothers. Five out of 10 mothers rejected newborn checkups provided by public health nurses during home visits. Four infants had not had immunizations. The mothers in the comparison group were aged 28-35 years (M = 31.4, SD = 4.61) and had completed 12–16 years of education (M = 14.28, SD = 1.79). All were married, and their husbands were aged 28–41 years (M = 36.42, SD = 4.57); their average age was 10 years older than that of the husbands of the mothers in the adolescent group. Their family construction was the same as that of the adolescent group. All mothers of the comparison group had newborn checkups, and their infants all had immunizations on time. Demographics are shown in Table 1.

Ethical consideration

The Ethics Committee of Tokyo Medical Dental University granted

	Adolescent (N = 10)		Comparison (N = 10)	
	Mean	(SD)	Mean	(SD)
Mother				
Age (years)	18.00	(0.81)	31.40	(4.61)
Education (years)	9.80	(1.13)	14.28	(1.79)
Husband (years)	22.40	(3.27)	36.42	(4.57)
Income (× 10000 yen)	312.20	(63.21)	550.00	(168.44)
Infant				
Birth Weight (grams)	3,091.00	(478.07)	3,011.80	(341.04)
Age (months)	8.40	(3.09)	7.29	(2.92)
Gestation period (days)	286.30	(122.14)	242.71	(97.19)

Table 1: Demographics (N = 20).

approval for this study. All adolescent mothers were referred to the nurse researcher by an obstetrician as subjects who did not have any diagnosed mental and physical problems. The nurse researcher had consent from the mothers, with a written consent form and an explanation from the nurse about study purposes, methods, and the anonymous procedure. Husbands and parents of the mothers who gave assent to participate were asked to give consent to our study because the mothers were legally underage. The adolescent mothers also gave us consent to their infants' involvement in the study. The comparison group subjects were recruited with the same procedures and ethical considerations as the adolescent group.

Measures

Mother-infant interaction

Mother-infant interaction was measured by the Nursing Child Assessment Feeding Scale (NCAFS). The NCAFS assesses the quality of mother-infant interactions during feeding sessions up to 12 months of age. The scale has 4 subscales for the mother (Sensitivity to Cues, Response to Child's Distress, Social-Emotional Growth Fostering, and Cognitive Growth Fostering) and 2 subscales for the infant (Clarity of Cues and Responsiveness to Caregiver). Each item is scored as Yes (1) or No (0), and the maximum possible score is 76. Higher NCAFS scores indicate better mother-infant interactions. There are also subsets of contingency items for the mother (15 items) and the infant (3 items). Contingency is one of the processes by which behavior is shaped; a contingent pattern of communication is an important key to mother-infant interaction. For example, if the caregiver speaks, the child turns to listen. Immediate response to the infant helps her connect maternal responses to her own behaviors [14].

Mothers' self-esteem

Self-esteem was measured by a version of Rosenberg's Self-Esteem Scale [28] that was translated and revised into Japanese; it has been called the Japanese version of Self-Esteem Scale [39]. It has 10 items rated on a 5-point Likert scale and has proven reliability and validity. In addition, the author added 4 open-ended questions investigating (a) maternal caretaking ability, (b) general mothering ability, (c) acceptance of baby, (d) expected relationship with baby according to maternal self-esteem.

Parenting Stress

Parenting stress was measured using the Japanese version of the Parenting Stress Index (JPSI) [40]. It has 7 and 8 subscales in the child and parent dimensions, respectively; the total number of items is 78. Higher scores indicate higher parenting stresses. The scale has proven reliability and validity.

Procedure

Data collection was conducted at the mothers' homes or hospital rooms, according to the mothers' preferences, after consent was obtained. First, the mothers completed written and interview-based questionnaires. Second, the author filmed natural play and feeding interactions between the mothers and their infants with a video camera. The videos were coded by a blinded NCAST license holder; this coding generated 94.2% inter-rater reliability on a randomly selected 20% of the videos.

Analysis

Within- and between-group comparisons were conducted using SPSS 11.5J. First, descriptive statistics of the demographic data and variables (mother-infant interaction, maternal self-esteem, and parenting stress) were calculated. Spearman correlation coefficients between variables were calculated and Mann-Whitney U tests conducted in comparisons between the adolescent and comparison group data.

Results

Mother-Infant interaction

Table 2 compares NCAFS scores between the adolescent and comparison groups. The mean total score of the adolescent group was significantly lower than that of the comparison group, especially the "Sensitivity to Cues" (Mann-Whitney U test, $p=.048$) and "Response to Child's Distress" (Mann-Whitney U test, $p=.009$) subscales. The contingency score of the adolescent group was also significantly lower than that of the comparison group. While the mean scores of the adolescent mothers' infant tended to be higher than those of the comparison group, the difference was not significant.

	Adolescent Mother (N = 10)		Comparison Mother (N = 10)	
Subscale (full score)	**Mean**	**(SD)**	**Mean**	**(SD)**
Mother				
Sensitivity to Cues (16)	10.90	(2.56)	14.00	(0.94)*
Response to Child's Distress (11)	8.30	(1.57)	10.30	(1.06)*
Social-Emotional Growth Fostering (14)	10.60	(1.89)	11.40	(1.17)
Cognitive Growth Fostering (9)	6.70	(1.83)	6.70	(2.11)
Mother Total (50)	36.50	(5.85)	42.40	(2.76)*
Infant				
Clarity of Cues (15)	12.90	(0.88)	12.10	(1.37)
Responsiveness to Caregiver (11)	6.30	(1.64)	6.10	(2.02)
Infant Total (26)	19.20	(2.20)	18.20	(2.39)
Mother/Infant Total (76)	55.70	(7.42)	60.60	(4.84)
Contingency				
Mother's Total (15)	8.30	(4.05)	11.70	(1.70)*
Infant's Total (3)	1.10	(0.56)	1.11	(0.88)
Mother/Infant Total (18)	9.40	(4.47)	12.80	(2.04)*

Note. A Mann-Whitney U test revealed significantly lower scores for the study sample (*$p < .05$)

Table 2: Mother-Infant Interaction (NCAFS score).

Mother's Self-Esteem

Table 3 shows the adolescent mothers' mean self-esteem scores. The total scores of the adolescent group were significantly lower than those of the comparison group. Scores for 2 of the 10 items, "4. I am able to do things as well as most other people" and "9. All in all, I am inclined to feel that I am a failure," were significantly lower in the adolescent group than the comparison group. In addition, their open answers were more negative than those of the comparison group, such as "I am not a good mother," "I take things out on others," and "I am a failure as a mother." However, open answers on their relationships with their infants were as positive as those of the comparison group, such as, "We are always close friends," "I have to protect my baby at anytime and anywhere," and "We cannot be apart."

Correlations between self-esteem and mother-infant interactions are shown in Table 4. The NCAFS "Response to Cues" subscale was significantly correlated with the self-esteem questions "I feel I do not have much to be proud of" (M = 2.60, SD = .97, r = .766) and "All in all, I am inclined to feel that I am a failure" (M = 2.70, SD = 1.25, r = .705).

Parenting Stress

The mean scores of Parenting Stress (PSI) among mothers and children in the adolescent group were significantly higher than those of the comparison group. Table 5 illustrates PSI items showing significant differences.

Tables 6 and 7 show the significant correlations observed between Self-Esteem and Mother-Infant Interaction (NCAFS) in the adolescent group. The mean PSI total score in the parent domain had significant negative correlations with the self-esteem items "I am able to do things

		Adolescent Mother (N = 10)		Comparison Mother (N = 10)	
		Mean	(SD)	Mean	(SD)
	1. I feel that I'm a person of worth, at least on an equal plane with others.	3.60	(0.97)	3.80	(0.63)
	2. I feel that I have a number of good qualities.	3.00	(0.94)	3.30	(0.48)
▲	3. At times, I think I am no good at all.	3.70	(1.25)	4.40	(0.84)
	4. I am able to do things as well as most other people.	2.50	(0.71)	3.60	(0.97)*
▲	5. I feel I do not have much to be proud of.	2.60	(0.97)	3.80	(1.23)
	6. I take a positive attitude toward myself.	3.30	(0.82)	3.10	(1.29)
	7. On the whole, I am satisfied with myself.	3.20	(1.23)	3.80	(0.79)
▲	8. I wish I could have more respect for myself.	2.10	(1.29)	2.30	(1.16)
▲	9. All in all, I am inclined to feel that I am a failure.	2.70	(1.25)	4.20	(0.92)*
▲	10. I certainly feel useless at times.	3.50	(1.08)	4.00	(1.05)
		30.20	(6.25)	36.30	(5.33)*

Note. Items with a ▲ are reverse-score.

A Mann-Whitney U test revealed significantly lower scores for the study sample (*p < .05)

Table 3: Self-Esteem of Adolescent Mothers.

		Sensitivity to Cues
	1. I feel that I'm a person of worth, at least on an equal plane with others.	.286
	4. I am able to do things as well as most other people.	.472
▲	5. I feel I do not have much to be proud of.	.766**
	6. I take a positive attitude toward myself.	.425
▲	9. All in all, I am inclined to feel that I am a failure.	.705*

Note. Items with a ▲ are reverse score.

Spearman ranked order correlation coefficients:(*p < .05, **p < .01)

Table 4: Correlations between Self Esteem of Teen Mothers and Mother-Infant Interaction (N=10).

	Adolescent Mother (N = 10)		Comparison Mother (N = 10)	
	Mean	(SD)	Mean	(SD)
Child Domain				
C2: Mood	18.30*	(5.66)	13.00	(3.71)
C4: Distractibility/Hyperactivity	16.40*	(1.78)	11.60	(2.72)
C6: Acceptability	9.00*	(2.62)	6.40	(2.27)
C7: Adaptability	10.70*	(2.63)	8.10	(2.08)
Child Total	91.90*	(14.59)	71.50	(17.35)
Parent Domain				
P1: Role Restriction	23.60*	(6.20)	18.60	(5.93)
P3: Spouse	14.90*	(3.81)	9.60	(4.20)
Parent Total	107.20*	(23.80)	85.70	(26.47)
Child + Parent Total	199.10*	(33.07)	157.20	(38.59)

Note. A Mann-Whitney U test revealed significantly lower scores for the study sample (*p < .05)

Table 5: Parenting Stress (PSI).

		Parenting Stress	
		Child Domain	Parent Domain
	1. I feel that I'm a person of worth, at least on an equal plane with others.	-.325	-.337
	4. I am able to do things as well as most other people.	-.114	-.798**
▲	5. I feel I do not have much to be proud of.	-.449	-.868**
	6. I take a positive attitude toward myself.	-.227	-.048
▲	9. All in all, I am inclined to feel that I am a failure.	-.664*	-.778**

Note. Items with a ▲ are reverse score.

Spearman ranked order correlation coefficient (*$p < .05$, **$p < .01$)

Table 6: Correlations between Self Esteem of Teen Mothers and Parenting Stress (PSI) (N = 10).

Mother Subscale	Parenting Stress	
	Child Domain	Parent Domain
Sensitivity to Cues	-.799*	-.643*
Social-Emotional Growth Fostering	-.088	-.019
Cognitive Growth Fostering	-.016	-.161
Contingency	-.556	-.252
Mother Total	-.652*	-.334

Note. Spearman ranked order correlation coefficient (*$p < .05$, **$p < .01$)

Table 7: Correlations between Mother-Infant Interaction (NCAFS) and Parenting Stress (PSI) (N = 10).

as well as most other people" ($r = -.798$, $p < .01$), "I feel I do not have much to be proud of" ($r = -.868$, $p < .01$), and "All in all, I am inclined to feel that I am a failure" ($r = -.664$, $p < .05$). There was a significant correlation between the mean PSI total score in the child domain and the self-esteem item, "All in all, I am inclined to feel that I am a failure." The mean total PSI scores in the parent and child domains had significant negative correlations with both the NCAFS "Sensitivity to Cues" subscale score and the mean total PSI score in the child domain.

Discussion

Characteristics of adolescent mother-infant interaction

The adolescent group's "Response to Cues," "Response to Child's Distress" and "Maternal Contingency" subscale scores on the NCAFS were significantly lower than those of the comparison group. Teenage mothers tend to lack awareness of disengagement cues such as arching of the baby's back, and they sometimes feed their babies without talking toward them. With such behaviors, teenage mothers have difficulties in reading their baby's cues and interpreting their baby's needs. This leads to stress in mother–infant relationship. A stressful mother–infant relationship that lacks empathy and mutual understanding may hinder the healthy social-emotional development and well-being of the child.

Ainsworth contended that sensitive mothers are warm and attuned their babies' wants and needs [11]; she defined maternal sensitivity as interpreting and understanding an infant's needs and rendering a response to the infant [41]. However, it is not easy to read infants' subtle cues. Commonly, mothers develop sensitivity toward their babies and parenting skills through intergenerational transference from their own experiences of being parented as well as other parenting models. In other words, mother's sensitivity may depend on her own experience and history. Eight out of the 10 adolescent families is the nuclear families, and 8 were high school dropouts. They tended to be isolated because they did not have trans-generational relationships, and they also tended to avoid receiving home visits from public health nurses and participating in parenting classes in the community. Such isolated parenting may have impacted their ability to be responsive to their infants. Most adolescent mothers gave birth to their baby before they learn how to establish inter-personal relationships and receive help from others [2]. It is a critical and urgent need for Japanese society to create a support system with easy access for these harder to reach mothers.

Child's NCAFS scores and developmental ages in the adolescent group tended to be higher than those in the comparison group. Clear cues-such as louder crying voice, crawling toward the mother to be fed, and initiating eye contact with the mother-effectively reinforce caring and baby-oriented maternal behaviors. In other words, the babies fulfilled their responsibility to induce care from less-sensitive and less-responsive mothers in a way that compensated for their mothers' poor interaction behaviors.

Relationship between self-esteem and adolescent mother-infant interaction

Adolescence is the entryway to adulthood. It is also the time of changes in ways of social involvement, and in which individuals prepare for social independence. Adolescents have not only bright images but also fears about their future. Adults need to understand adolescents' chaotic transitional states and accept their feelings too. When adults warmly respond to the messages sent by adolescents and cooperate with them, the adolescents feel safety and stability in their daily life, which translates into their relationships with their babies.

Rosenberg said that if adolescents perceive acceptance by significant others (mother, father, teachers, and classmates), they can develop high self-esteem [28]. Parenting with hardship made adolescent mother vulnerable and threatened their self-esteem, even though they placed high value on pregnancy and giving birth and decided to be a good mother. The experience above may support the results of scores on the self-esteem items of "I am able to do things as well as most other people" and "All in all, I am inclined to feel that I am a failure" were significantly lower than those of the comparison group. These lower scores reflect the adolescent mothers' feelings on hardship, difficulty, and their less-successful parenting experiences. In addition, significant correlations between self-esteem scores on such items as "All in all, I am inclined to feel that I am a failure" and "I feel I do not have much

to be proud of" and the NCAFS "Sensitivity to Cues" score show that mothers' negative feelings toward themselves related to lower maternal responsiveness to their babies. People with low self-esteem tend to focus on negative events, so that they are caught in remorse and fail to effectively cope with hardships when facing hard times [42]. This study could not identify the cause-and-effect relationship between self-esteem and mother-infant interaction. But adolescent mother also said, "I have to protect my baby in any situation" and "I cannot leave my baby," as did the comparison group. We do learn that it is important for nurses to support mothers in enhancing their responsiveness to their babies and to foster increased maternal self-esteem in order to promote healthy development of their infants.

It has been pointed out that helpers supporting adolescent mothers need "principles" such as respect, a non-judgmental stance, trust; "acceptance" that the mothers are teenagers before being mothers; and "non-negative attitudes" such as understanding diverse cultural values [43,44].

Required support is to help adolescents form their identity as mothers, improve the mother–child relationship, and promote the child's social-emotional development.

Parenting stress

Parenting stress scores in both of the child and parent domains were significantly higher among the adolescent group than the comparison group. Higher parenting stress in the adolescent group indicates more difficulty with soothing a fussy baby, feeding their baby, and the compatibility of housework with child rearing. Such stresses may stem not only from a lack of knowledge and understanding of parenting, but also from low levels of coping strategy and ability.

Strong negative correlations between self-esteem and parenting stress, and mother-infant interaction and parenting stress suggest that parenting stress influences maternal self-image and the mother-infant relationship. Adolescence is a period of transition to adulthood. Therefore, they can act as the parent of an adult causing great stress.

They need helpers who adequately support the mothers, having enough time to form a good relationship with their infants and feeling satisfied with the time spent. Mothers giving warm and secure parenting are invaluable to child growth and development.

Nursing support for the enhancement of adolescent mother-infant interaction

Parenting support based on IMH focuses on emotional well-being formed through parent-infant relationship/interaction during a few years after birth. Professional helpers support their relationship/interaction in giving parents empathic responses and in forming a supportive relationship with them. [35,36] A stable and safe relationship between the mother and the helper, who serves as a role model, and consistent parenting support help adolescent mothers feel safe and have higher self-esteem which may contribute to a mature self-image as a mother.

Several parenting support programs have been designed from the perspective of mother-infant interaction between adolescent mothers and their children in Western countries [45-49]. In such parenting support programs, it is effective for the nurse to compliment good behaviors and give positive feedback to the mothers [14,48]. Maternal self-esteem is improved when mothers experience feelings such as "I can do it" and "I am happy with it" through their parenting and learning process [50].

When an adolescent mother is not ready to accept her baby or when she is isolated from her family and friends, a professional helper can assist the mother in learning about her baby's development, and promote warm and stable mother-infant interactions. They need to adapt to expected maternal roles through parenting experience, while collecting more knowledge on parenting, building closer interpersonal relationships in society, and promoting mental stability.

Limitations and Future Directions

As mentioned above, this study had a small sample size and did not adopt a randomized controlled trial design, which limits the generalizability of the results. However, despite the limitations of this study, it generated insight into the potential impact of interventions on beneficial effects in the adolescent mothers' parenting and sense of competence and self-efficacy as parents. Therefore, this study is a valuable trial that should be used to inform development of new parenting support models for adolescent mothers and their infants in Japan. Additional expanded and modified replications of this study should be conducted in the future.

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