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## Research Article

## Experiences of Mothers' Attachment in a Follow-Up Program Using Early Intervention for Low-Birth-Weight Infants

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## SUMMARY

**Purpose:** Mothers who give birth prematurely experience parenting stress after their babies are discharged and find it difficult to emotionally bond with them. Forming an emotional bond with a baby promotes the baby's growth and development, helps the mother cope with parenting stress after discharge, and is important for maintaining family functioning. This study aimed to identify the attachment experiences of mothers with low-birth-weight infants (LBWIs) in a follow-up program using early intervention.

**Methods:** A phenomenological perspective was used for this qualitative research. Data were collected from in-depth interviews with twelve mothers who participated in a follow-up program using early intervention for mothers with LBWIs from September 2017 to December 2017. Colaizzi's method was used to analyze the data.

**Results:** The experience of mothers' attachment was investigated on the basis of three categories: 'beginning of changes in parenting methods,' 'forming an intimate mother–child bond,' and 'concerns and expectation about the child's development.'

**Conclusion:** The results indicate that the follow-up program using an early intervention designed to increase mothers' confidence in their parenting skills can promote mother' attachment and the quality of life of families with LBWIs.

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## Introduction

Recently, nearly 85.7% of low-birth-weight infants (LBWIs) admitted to neonatal intensive care units are reported to survive [1] owing to advances in medical technology. The number of LBWIs in Korea was 3,037 in 2012, accounting for 0.6% of all newborns, which is a marked increase relative to the number of LBWIs in 1993, which was 929 [2]. As preterm infants develop, there are strong physiological relationships between brain signaling, the immune system, and inflammation in the gut with potential long-term developmental impact, which have been shown in the recent studies [3,4]. The long-term developmental morbidity of LBWIs is a serious public health concern [5].

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Several qualitative research studies show that mothers of LBWIs, who must take care of them after they are discharged from the neonatal intensive care unit, experience increased difficulty, anxiety, and stress in caring their child [6,7]. These psychosocial factors influence maternal attachment with the infant, which ultimately affect the child's developmental outcomes [8]. Attachment has been known to develop typically during the first year and can affect the infant's cognitive and social development, and most importantly, emotional development [8,9]. Importantly, attachment not only promotes infant development but also provides the infant a balance of exploration to the world and a secure base from the environment [7,9]. LBWIs have been reported to initiate interaction less often, provide fewer distinct cues to their caregiver, be less attentive, and show less positive affect. The uncontrollable and disorganized behaviors of LBWIs can influence a mother's responsiveness to her baby and also her ability to develop an attachment [10]. For this reason, providing support to mothers and sharing with them the signs of abnormal development of their LBWIs will promote their attachment relationship without stress and

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frightening, which has been identified as a factor of disorganized attachment [10,11].

Early intervention (EI) plays a significant role in building a sense of self-efficacy in parents as this encourages healthy interaction and LBWIs care [11]. Multidisciplinary team members, such as occupational and physical therapy practitioners, nurses, and physicians, deliver EI services and education to LBWIs, and the families are very much involved in the process [11–13]. Mothers described that it became easier to care for their infants and they were more approachable and reported fewer problems with behavior dysregulation, such as colic, sleep, and excessive crying after EI [12,14]. Also, a previous study showed EI has a positive effect on mother–infant attachment relationship and maternal sensitivity with LBWIs [14].

In fact, EI in Korea is conducted in the same way as rehabilitative therapy, predominantly for children with developmental problems without any distinction for LBWIs [15]. Furthermore, during EI at a clinic, the baby is treated in an unfamiliar environment away from the mother, so LBWIs are deprived of the opportunity to form attachment with their mothers [15]. Follow-up programs using EI for LBWIs are structured neurodevelopmental evaluation and therapy delivered for improving an LBWI's transition to the home [16,17]. Also, this program helps mothers of LBWIs understand attachment relationship and behaviors of their infants at home [10].

Parenting LBWIs itself, and the attachment experience during EI by home visiting, is a unique phenomenon. Therefore, qualitative research has been conducted to understand mothers' experiences of attachment with LBWIs [18]. However, most previous studies have focused on general experiences of parenting either during the hospital stay or immediately after discharge, without considering the infants' developmental problem [6,7]. In this study, the subjective meanings of the experiences that mothers have (i.e., difficulties, efforts to overcome these difficulties, etc.) as they become attached to LBWIs during participation in the follow-up program using EI were assessed thoroughly from the mothers' perspectives. This study may provide a basis for developing a follow-up program or attachment program at homes to the mothers of LBWIs who need EI due to developmental delay.

## Methods

### Study design

This study was adopted to obtain detailed descriptions and stories of each mother's attachment with her LBWIs in the follow-up program using EI for LBWIs by a phenomenological method [19].

### Setting and sample

Data were collected from in-depth interviews with twelve mothers with LBWIs aged less than 12 months, who were

participating in a follow-up program using EI for LBWIs in Korea during the research (Table 1). These inclusion criteria were used as the rate of readmission within one year of discharge is high for LBWIs and the duration of rehospitalization is twice as long as that for mature babies.

Regarding participant recruitment, the director and the team leader of an EI team from a welfare facility explained the purpose of this study and the method of data collection. After obtaining approval from participants for data collection, the team leader introduced mothers who met the inclusion criteria to the researcher. After explaining the purpose of this study and the method of participation, those who consented to participate in an interview were included. There were eight mothers in their 40s, three in their 30s, and one in their 20s. Of the infants, ten had previously received an EI service five times or more and two had received ten times or more.

Data were collected between October 2017 and January 2018. The two principles of sampling in qualitative research are relevance and sufficiency [18,19]. To ensure the data were relevant, twelve mothers who had problems becoming attached to their babies were interviewed on topics relevant to the purpose of this study. Sufficiency was obtained by interviewing the participants thoroughly until no new data could be obtained.

There were five collaborators involved in this study: a neonatal doctor, a nursing professor, and three EI team members. The interview was conducted by one person. The researcher in this study was a professor of nursing who had previously worked in the pediatric department of a medical center and who was running a follow-up program for LBWIs. The researcher had also given qualitative lectures on phenomenology, theology, and the culture of technology at a graduate school and had conducted joint qualitative research by attending qualitative research conferences and workshops.

### Ethical consideration

This study was approved by the institutional review boards of Konkuk University (Approval no. 7001355-201609-HR-137). Before an interview, the participants were fully informed about the study purpose, method, recording of interview, and data storage for three years after the research had been concluded. In addition, anonymity, confidentiality, and the right to withdraw at any time were also explained. Once the participants provided written consent, the interviews were conducted. Interview recordings were saved as a computer file that guaranteed anonymity using unique numbers. The participants were rewarded with a beverage coupon.

### Follow-up program using EI for LBWIs

A follow-up program using EI for LBWIs, which consisted of structured home visit, professional education, self-help group

**Table 1** General Characteristics of Participants (N = 12).

Case	Mother's age (year)	Child's age (month)	Child's weight of birth (mg)	Times of early interventions	Child's developmental problems
A	41	2	750	5	Motor skills
B	37	3	600	5	Motor skills
C	35	3	520	6	Motor skills; social skills
D	33	5	1200	6	Motor skills; social skills
E	36	6	650	8	Motor skills; social skills
F	35	8	654	12	Motor skills; social skills; communication
G	40	8	760	12	Motor skills; social skills; communication
H	35	4	650	6	Cognitive ability
I	41	4	1000	6	Cognitive ability
J	36	5	1090	6	Cognitive ability
K	37	5	1700	7	Cognitive ability
L	28	5	600	7	Cognitive ability

meetings, and individualized SNS counseling, was designed to coach families with LBWIs. It provides support for families to help accelerate the development of LBWIs, including their communication skills and linguistic abilities, within the home environment. Also, this service accelerates the development of a baby's ability to perform daily tasks, including eating, sleeping, playing, expressing his/her feelings, moving, potty training, and getting dressed in a familiar home environment. The mothers learn methods of interaction that enhance attachment with their infants and are instructed on how to perform these interactions themselves.

The mothers with LBWIs participated in a follow-up program using EI in S city and were receiving service for one year. The main service provider visited each participant once every two weeks, and each of the participants visited the institution 4–12 times. The participants received different EI services, which lasted approximately one hour, as determined by experts.

### Procedure

The interview questions started with open topics and gradually led the participants to share their own stories. Examples of these questions are “Could you explain how you felt as you formed an attachment to your child during the early intervention program?” and “What were some of the difficulties and rewards you encountered during the process of forming an attachment to your child?” If a mother was unsure of what a question meant, it was repeated with different words and explanations until she fully understood it.

Data were collected until data saturation was reached and until no new data could be obtained. On average, two to three interviews were conducted for each participant. A total of 32 interviews were conducted. Each single in-depth interview lasted 30 minutes to one hour. The interviews were conducted in a private setting, in convenient places such as a welfare facility lounge, a coffee shop near the hospital, and a participant's home.

The interviews were recorded with the participants' consent, and any verbal and nonverbal expressions made by the participants were recorded on paper. Newly added concepts or parts of an interview needing further details were noted. The parts needing clarification were additionally confirmed during the transcription stage. During the last stage, the interviewer clarified and confirmed the interview content with the participants. After completing the interview, the participants were given a small reward.

### Data analysis

Colaizzi's [19] phenomenological method was adapted in the analysis of the transcripts. In the first stage, we listened to the interview recordings and read the 512 statements of all participants to gain insights into their feelings and relate them to their parenting experiences as much as possible. In the second stage, we looked for statements or sentences that were directly related to a mother's attachment. In the third stage, the researchers derived meanings of statements and sentences through their intuition and analysis. Eighteen topics were derived from this process. In the fourth stage, these meanings were categorized into themes. Nine theme clusters were formed, of which four were parenting methods, two were mother–child bonding, and three were concerns about the child's development. Finally, three categories were obtained to explain the nature of the mother's experience. In the last stage, the described themes, theme clusters, and categories were confirmed by participants that they matched their experiences.

To verify the quality of this study and increase its credibility and validity, a set of standards proposed by Lincoln and Guba [20] was used as a means to confirm its trustworthiness. First, to confirm credibility, interviews were recorded, and during the interviews,

the researcher was questioned to confirm whether he/she fully understood the participant's statements. Interview recordings were transcribed on paper immediately after the interviews were over. The transcriber tried to summarize the entire interview process as accurately and concisely as possible. The results of the data analysis were reviewed by a nursing professor and a linguist with years of experience in qualitative research and interviews and feedback was received. To confirm transferability, participants who could sufficiently describe their experiences were selected and were interviewed until data saturation. If necessary, additional interviews were conducted to identify mutual experiences among the participants. To ensure auditability, interview contents, data analysis results, the analysis table used in the coding process, schedule, and memos were all stored so that they could be checked whenever necessary. Finally, to ensure confirmability, the credibility, suitability, and auditability standards were followed to improve data objectivity. The interviewer did not intentionally interrupt a participant or manipulate a situation during an interview.

### Results

A total of 512 statements were obtained from the original data regarding the twelve mothers of LBWIs. Major statements, paragraphs, and sentences were carefully reviewed, and similar statements were collated. Eventually, 109 meaningful statements were extracted. The general meanings of these statements were derived and could be categorized into 18 themes, 9 theme clusters, and 3 categories describing maternal attachment observed during the EI program (Table 2).

#### Category 1: Challenges in being the mother of a premature baby

##### 1) Feeling sorry for the lack of knowledge about LBWIs

Mothers of LBWIs did not know what to do when their babies exhibited behaviors that were out of parents' control, were not able to control these behaviors properly, and were aware that their affect or attachment methods were wrong. They experienced high levels of guilt for immaturity related to the parenting and attachment method. Even though they understood the developmental process of LBWIs, they did not have concrete ideas about how to raise the infant with attachment. Through parent coaching, the mothers of LBWIs felt regret for misunderstanding their child's behavior and gained an understanding of attachment, expression, and their behaviors.

*“I think I had difficult times because I did not know so many things. I wanted to be a good parent, yet I didn't know what I did wrong or what the correct attachment method was. But after my teacher from the intervention program told me this is all part of the developmental process during a home visit, I learned that I just have to endure this process. Whereas I used to just get scared before, I have now learned to understand my child's development and endure this process.”(Participant D).*

*“My child used to make only a few facial expressions and did not often respond to stimuli. I felt frustrated because it was hard to understand my child's behaviors. At one point, I began to find it difficult to hold in my anger when my child behaved in certain ways that were not acceptable to me, and I started to scold and yell at my child. After understanding my child's personality, I began to look at my child behaviors as they are, and I've come to affect them.”(Participant F).*

*“When my child met his grandfather for the first time, he didn't play well with him and just cried. I was told that this behavior may be*

**Table 2** Attachment of Mothers Receiving EI Program for LBWIs.

Theme	Theme cluster	Categories
Guilt for immaturity of the parenting and attachment method	Feeling sorry for the lack of knowledge about LBWIs	Becoming the mother of a premature baby in challenges
Regret for misunderstanding the baby's behavior.	Acquiring confidence in how to get close to the baby	
Removal of the baby's stuffy mind without burden		
Not fail to get the point by myself when I am confused	Learn and perform physical stimulation and body games	
Play with a baby through physical stimulation		
Learn how to play with my baby		
Catch up what my baby really want	Becoming sensitive to the child's needs	Forming an intimate mother–infant relation
Cope with exactly what the baby is asking for		
Interact at the baby's eye level	Know how to communicate with the child	
Confidence in keeping the baby safe to follow	Getting comfort and easy from praise	
Find the harmony between being affectionate and being strict		
Taking care of the baby with a relaxed mind	Concern about the next developmental stage	Creating a comfortable environment for a baby to develop
Worry that my baby will feel hurt in the next step		
Feeling pressure by my family's expectations	Desire to make visible outcome	
Change of a child's vocalization through early intervention		
Decrease in a behavioral problem through early intervention	Hope for continued support and assistance	
Rise of hope when my child gets much progress		
Sense of achievement that made a good attachment		

Note. EI = early intervention; LBWIs = low-birth-weight infants.

*due to fear of strangers, and so I tried to forcibly change my child's behaviors. However, I have played games with my child so that he can be more comfortable around strangers, and now he no longer fears others, and looks happier. I came to understand my child's behaviors by developing maternal attachment behaviors.” (Participant C).*

#### 2) Acquiring confidence in the method to get close to the baby

During their participation in the EI program, the mothers were aware of the need to improve their parenting methods and believed that the EI program provided them with an opportunity to bring about this improvement. The self-confidence of mothers of LBWIs increased as they learned to handle the uncontrollable behaviors of their children. In addition, by applying tips from a parent coaching session or consulting an expert, they learned to control their babies' problematic behaviors with maternal affection and interaction instead of staying confused or afraid.

*“I think I was just confused due to taking care of my baby. I felt that as a mother, I had to do something for my child every time he reached the next developmental stage even though I didn't know what to do. I used to worry that my child would not develop normally because I didn't take proper care of him. But now, I feel significantly less concerned.” (Participant A).*

*“Once, my child threw a tantrum for one hour, and I didn't know what to do. Tantrums were one of the biggest things I feared when raising a child. I don't fear it anymore, now.” (Participant B).*

#### 3) Learn and perform physical stimulation and body games

Before their participation in the EI program, the mothers accessed information about parenting methods through lectures, books, and the Internet and were very interested in learning them. However, they did not know how and what to play with their babies. In the program, they learned and practiced the ways of making physical contact and stimuli that they can use with their babies. Also, they tried to get close with their babies by playing body games.

*“I did not spend enough time playing with my child because I was at risk of miscarriage when I was pregnant with my second child. Early intervention home visits became a play time for me and my child, during which we played all kinds of physical games. As I tried*

*various games that I learned from the program with my child, I realized that my child really enjoyed playing the games, and I grew to do things that my child liked. I think my child has become happier because I began to do things that he likes.” (Participant C).*

*“I learned many small tips and methods on how to treat a child. I learned how to cope with my child's tantrum or uncontrollable behaviors. I also learned how to play with my child to have a fun. My child used to like playing on the cell phone a lot. Now, he prefers to play physical games, and laughs a lot when he does.” (Participant B).*

#### 4) Becoming sensitive to the child's needs

Although the mothers lacked the ability to figure out what their babies liked and needed because of their lack of understanding of parenting, as well as attachment, they learned to become sensitive to their babies' expressions and needs, to satisfy these needs, and to use appropriate parenting skills after their participation in the EI program.

*“I did not know what my child was trying to say. By figuring out what my child wants to do, and doing what my child wants me to do, I can fulfill my child's needs, and my child has become happier.” (Participant G).*

*“I didn't know when my child wanted to play, and how to play with him. I learned simple games during the program and played them with my child at home.” (Participant H).*

*“I don't force my child to keep trying something that he just cannot do. I am now trying to be an accepting and understanding mother. I try to do the activities that my child is good at.” (Participant D).*

*“I used to tell my child that a no is a no. But after my teacher told me to become more receptive, I tried to be so. After a month or two of receiving the visits, my child has become much happier ... In the past, I used to question my child's behavior whenever he exhibited certain behaviors that were not normal by my standards and feel frustrated. Now, I try to think from my child's perspectives as much as I can.” (Participant J).*

*“I always try to figure out my child's needs. I observe what my child is trying to do. If my child throws a tantrum or starts crying, I just ignore the situation and try to divert my attention something else to quickly put an end to the situation.” (Participant K).*

## Category 2: Forming an intimate mother–child bond

### 1) Knowing how to communicate with the child

Mother D found that by empathizing with her child's feelings and interacting with him, she could accelerate her attachment to him. She used to respond to her child in an oppressive and rejecting manner whenever he expressed negative emotions. Through her participation in the EI program, she learned that her response was not appropriate. The mothers became interactive at the baby's eye level by playing games with them during the EI program and learned the importance of maintaining the attitude to communicate and empathize with their babies. After repeatedly playing games, they felt confident in keeping the baby easy to follow and it became much more natural to play with their babies.

*"I learned to interact with my child. Other therapies involve activities that require few actions, and focus on repeated learning, but this program taught both me and my child how to connect with one another. Regardless of how well or bad my child is functioning, it is more important to know that my child wants to do something of his own will, and to care about others' feelings." (Participant D).*

*"Had we not participated in the early intervention program, I think it may have taken much longer for my child to develop interest in others. He now feels closer to me and trusts me. He knows that his mother is always around him to play with him." (Participant E).*

*"I think I have become much closer to my child and am surprised due to something difficult to explain. It seemed that we naturally became closer to one another as we played together without realizing that we were. I now feel more connected to my child. I now have more opportunities to just play naturally with my child." (Participant I).*

### 2) Getting comfort and easy from praise

When asked about any changes that occurred after their participation in the EI program, the mothers of LBWIs explained that they felt more comfortable about parenting. They learned about the harmony between affection and strictness in parenting, although the relationship between the parent and child must be compassionate. Mother B explained that a good attachment is to take care of the child with relaxed mind which also allows mothers to maintain receptive parenting attitudes and solve their babies' problematic behaviors.

*"I feel much more at ease since my child expresses his thoughts and accepts me. Since I no longer respond sensitively to my child, this has positively affected him, and he feels much more at ease, as well." (Participant C).*

*"In the past, I couldn't carry my child on my back because he would not hold onto me unless there was a baby carrier, and I was afraid he would fall backward. In the early intervention program, my child began to hold onto me, and now I can carry him on my back without a carrier. Physical affection has become more natural and comfortable between me and my child." (Participant I).*

*"Although I loved my child, I didn't know what to do for him. I hesitated to approach him, and when I did, I felt very awkward. But many things have changed after I participated in the early intervention program. My child enjoys being with me now and listens to me because I play with him." (Participant H).*

*"The early intervention has been therapeutic for me. The teacher encouraged me by ensuring me I was doing very well. I think when the mother is at ease, the child is positively affected, and the mother*

*also learns to overcome difficult situations. My child has become happier since I started treating him with more ease." (Participant D).*

*"It's harder to be strict than to be affectionate. I try to show my child that I can be determined and strict at times without getting angry at him. My child has learned to understand he needs to give up when I keep telling him no, and my life has become easier and more anger-free." (Participant F).*

## Category 3: Creating a comfortable environment for a baby to develop

### 1) Concern about the next developmental stage

As time passed, the mothers looked forward to the next developmental stages as they observed changes in their babies and hoped that they would lead to a normal life. They worried that their child will feel hurt in the next step and felt pressure by family's expectations. Although they could not have the positive progress, they hoped their child will reach the goals one by one.

*"Although my child started to express his thoughts, he had pronunciation problems. Most times, I'm the only person who understands what he's saying. His dad or teachers can't understand him. I'm worried that a will emotionally get hurt as he grows up because of his pronunciation problems. This is my worry for the next developmental stage." (Participant A).*

*"As my child started to express himself more and more, I began to get less frustrated. But I am still slightly worried. Although I am relieved to see the improvements my child has made, I don't know how long it will take until he can talk like normal baby, or until people won't see that my child is different from any other baby." (Participant E).*

*"My parents-in-law have been urging me to do something since their only grandson has been developing at a slower rate than other baby. They have high expectations for him. He has made some improvements after we participated in the early intervention program. I hope he will grow to not significantly differ from other baby." (Participant D).*

### 2) Desire to make visible changes

Delays in the growth and speech of LBWIs make interactions with their mothers more challenging and agitate the mothers. During their participation in the EI program, the babies showed some progress in their language development as they began to use their muscles much more naturally than before, increased their attempts to speak, and used a wider range of vocabularies. They watched carefully how the child changes during the program.

*"My child can now say 'Mommy.' Although he can't pronounce 'Daddy' clearly, it's sometimes close enough. He has definitely improved a lot." (Participant K).*

*"My child has started to vocalize. Sometimes, he says words that consist of both vowels and consonants. It give me a desire my child will be make something different." (Participant G).*

*"One month later, my child flipped himself on his own. In the past, he didn't even attempt doing it, and couldn't do it even if I helped him by placing my hand underneath his tummy. He would turn his head to the side, and his neck would follow in the same direction, but his body would not turn ... now he can easily flip himself." (Participant F).*

### 3) Hope for continued support and assistance

The mothers started to be hopeful that they could become good parents as they observed positive changes in their babies and themselves through their participation in the EI program. They gained confidence when their parenting behaviors produced positive responses in their babies, and their parenting efficacy increased. Despite the sense of achievement and confidence from forming good attachment, they hoped for continued support through EI.

*“My child’s eyes shine. He’s very curious and always questions things. He finds new friends to hang out with. Seeing him lately, I feel more hopeful about his future.” (Participant E).*

*“I appreciated myself for changing myself and trying to build a good relationship with my baby by participating in the early intervention program. I used to feel guilty about being a bad mother. Now, I have confidence that I can change, and I feel that I am growing as a mom.” (Participant D).*

*“I always felt annoyed whenever my child had a tantrum. During the last visit, I learned how to talk with my child. When my teacher checked on me to see if I had been using the method correctly, I struggled a bit, but the teacher’s advice was definitely helpful. I feel a sense of achievement when I manage to do something using the skills I learned in the program.” (Participant F).*

## Discussion

This qualitative study provides insights into mothers’ experience of attachment with their LBWIs during their participation in a follow-up program using EI. In the present study, 9 theme clusters were derived from 18 themes, and the theme clusters were categorized into three categories.

First, the mothers found themselves changing out of a sense of guilt and changed their parenting methods. In this study, mothers were frustrated that they did not know how to develop attachment with their babies because of shock due to LBWIs and were expecting recovery in their babies through treatment. A previous study showed that levels of anxiety, depression, and stress decreased among mothers of premature babies who participated in EI [10]. A confused situation led the mothers of LBWIs to an uneasy state of mind, which in turn made the fight with the infants more important than the relationship with them. During the follow-up program using EI, the mothers controlled their emotions regarding their babies’ development and treatment even if they felt depressed and anxious. Also, most mothers have talked about “the lack of information and difficulty to access” as a major limitation to form attachment, which means information other than about general upbringing is required. The limited information related to attachment prevents a mother from properly supporting her child’s care and allows her to feel guilty and sorry. In general, parents of LBWIs have a lower sense of parenting efficacy than those of a normal baby as they have to take more care of their weak baby after they are discharged from the hospital [21,22]. However, they learned and acquired confidence in how to care and get close, including making positive relationship with their babies through this program. The follow-up program using EI that included psychosocial support resulted in better outcomes for mothers of LBWIs [10,15,17]. Through EI, mothers can directly receive necessary education and information for attachment. Furthermore, physical stimulation and playing with the baby’s body made the mother feel closer to the baby. Mothers liked to touch, roll, and play around the baby’s body by themselves in the familiar environment of home. The

mother felt that her touch gave the baby joy and figured out the baby’s preferred way of playing. After learning how to play with physical touch, mothers were able to figure out more accurately what the baby wanted to do. Mothers described that their behaviors changed the moment they understood that what they thought was not important was necessary for their attachment to the baby. In the present study, mothers became more sensitive to their babies’ needs and developed maternal instincts in response. Thus, this is in accordance with previous research that the baby’s capacity to be attentive to the mother is important, as is the mother’s capacity to understand the baby’s behavior in terms of underlying states [7,9].

Second, the mothers described that their attachment resulted in an intimate mother–infant relation while participating in the EI program. The mothers became aware of the importance of their attachment to their babies and found themselves actively responding to their babies’ needs. In the previous study, mothers were interested in information and advice that will help build and strengthen their skill and confidence as a mother through the EI program [7,10,17]. Also, the EI program gave advice to ensure the mothers understood their babies and focused on working with the mothers to determine appropriate responses from LBWIs based on understanding of child growth including neuroscience aspects [13]. By interpreting their babies’ expressions and behaviors to understand their needs, the mothers became more receptive and gained confidence in their parenting abilities [9]. In other words, through the process of understanding their babies’ basic needs, means of expressing their needs, and behaviors, the mothers learned to use proper coping methods, and such efforts led to the correction of or changes in the baby’s problematic behaviors. These changes in the mothers’ attitudes developed as they learned how to treat and play with their babies and realized the harmony between being affectionate and strict [9]. Such changes in a mother’s parenting methods and attitudes over time promote the growth and development of her child and create a desirable mother–child attachment. Mothers with a high sense of parenting efficacy tend to be more receptive to their babies, use parenting tactics that do not involve corporal punishment, understand their babies better, and interact with them more smoothly [22,23]. Thus, the participants in this study increased their sense of parenting efficacy while participating in the EI program. They became more confident in understanding and satisfying their babies’ needs and coping with relevant solutions and developed a stronger attachment to their babies based on praise. Previous studies have shown that social support increases parents’ sensitivity and sense of responsibility [15]; these programs promote mothers’ knowledge of how to respond to their babies’ expressions and attitudes more sensitively and resolve problems, thereby enhancing their attachment to their babies. Current findings are consistent with the findings of previous studies [10,13]. Furthermore, during the program, mothers were able to form a balanced attachment with their baby without being too coercive or controlling.

Third, in the category “creating a comfortable environment for a baby to develop,” participants expressed hope to have more rehabilitative therapy opportunities for their physiologically premature babies. The mother recognized the improvement of the baby after treatment but, at the same time, experienced the burden of keeping her child healthy. The mothers actively participated with their therapists in physical games that are designed to stimulate baby’s brains and then played these games with their babies by imagining themselves as the therapists. The mothers wanted systematic information about long-term prognoses and developmental problems of premature babies and methods of checking for disabilities in LBWIs [11,23]. However, it is difficult for parents to detect developmental problems in their babies on their own; an expert

must regularly visit them to detect and assess potential developmental problems. For this reason, developmental delays in LBWIs can easily be overlooked. The mothers described they experienced both passion and fatigue in their attachment to their babies. Although attachment is difficult, the reason why mothers recognized its value is because they experienced positive consequences for their babies during the program. Based on their attachment experience, mothers can plan for their baby's future treatment. Additionally, the mothers explained the reason why attachment causes fatigue and is tiring; it is because of the reality of rehabilitation therapy in Korea which includes the difficulty to visit the clinic separately, expensive therapy fees, and social prejudice against a disabled baby. For the mother to continue carrying out her passionate attachment, attachment in the home must be extended to the public domain. In other words, the responsibilities of attachment and caring, which have been left entirely to the mother, should be shared through social cooperation.

The present study was conducted as a pilot test of the follow-up program using EI developed for the purpose of enhancing the interaction with LBWIs. Participants in this study wanted to visit frequently to find out if their parenting method was appropriate and to know how to play to facilitate interaction with their children. As evident from the results, it is necessary to make modifications to the details of the program such as increasing the number of home visits and adding play therapy at self-help meetings.

This study was limited by the inclusion of a small convenience sample of mothers with LBWIs similar to each other and using a qualitative research method. Results may not be generalizable to the rest of the population. Note that follow-up using EIs is different, and feedback from mothers in different interventions may or may not mean the same thing. Further research is warranted to include a comparison of differences in how mothers of full-term, late preterm, and early preterm infants gain attachment during EI programs.

## Conclusion

In this study, qualitative research was conducted to obtain experiences of attachment of mothers with LBWIs participating in a follow-up program using EI by in-depth interviews. Nine theme clusters were derived from the 512 statements from the twelve mothers of LBWIs. Three categories emerged from 9 theme clusters describing maternal attachment: challenges in being the mother of a premature baby; forming an intimate mother–child relation, and creating a comfortable environment for a baby to develop. As a result, the maternal attachment through EI for LBWIs is a process of personal growth despite the challenges of motherhood with the willpower to protect the developmental environment. The findings provide basic data for nurses, acknowledge the joys of initiating interaction of mothers with their LBWIs, and address their concerns.

## Conflicts of interest

The authors declare that they have no conflict of interest.

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