

# The experience of fathers whose infants were hospitalized in Neonatal Intensive Care Unit in South Korea: A scoping review

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## ABSTRACT

**Problem:** The purpose of this scoping review was to map and organize the previous studies conducted among fathers whose infants experienced admission to neonatal intensive care units (NICUs) in South Korea.

**Eligibility criteria:** A scoping review was conducted based on Arksey and O'Malley using the JBI template. The review was described by PRISMA-ScR. The studies were reviewed through five electronic databases (PubMed, CINAHL, Web of Science, RISS and KMBase) since 1996. Each study was analyzed, extracted, and summarized into the following domains: general characteristics (language, design, data collection methods, intervention, data collection site, and time) and fathers' characteristics (types of fathers, mean age, variables related to the fathers, and measurements).

**Sample:** A total of 290 studies were identified after screening titles and abstracts, and 32 full-text articles were retrieved for eligibility. Finally, 15 articles were included in the review.

**Results:** Four themes were derived after review: paternal stress, paternal attachment, fathers' adaptation, and fathers' support needs.

**Conclusions:** Infants' hospitalization in NICUs causes stress for fathers but they overcome difficulties and play multiple roles as guardians, caregivers, and decision-makers of their spouses and infants over time. Paternal attachment increases significantly after participating in tactile and educational interventions. Fathers rely on nurses and they want to receive support from nurses.

**Implications:** It is necessary for NICU nurses to understand and support fathers whose infants are hospitalized in NICUs. Medical institutions should provide nursing interventions and education for fathers to relieve their stress, help their adaptation, and improve attachment.

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## Introduction

The total fertility rate in South Korea (hereafter Korea) has been decreasing every year to 0.84, but the birth rate of premature infants continually increased to 5.8% in 2010, 6.9% in 2015, and 8.5% in 2020 (Statistics Office, 2021). High-risk infants with higher-than-average morbidity and mortality due to the conditions of delivery or maladaptation to the extra-uterine environment (Hockenberry & Wilson, 2018) are increasing in Korea (Eom & Im, 2019). Premature and high-risk infants are separated from their parents and admitted to the neonatal intensive care unit (hereafter NICU) to receive medical treatment (Craig et al., 2015; Eom & Im, 2019). The NICU is an essential

environment for the survival of premature and high-risk infants, equipped with medical devices and trained medical staff (Craig et al., 2015; Eom & Im, 2019). Hospitalization in the NICU makes it challenging for parents to connect with their newborns due to the medical devices and worry surrounding the newborn's development (Craig et al., 2015; Wigert et al., 2010), which prevents parents' transitions to parenthood (Watson, 2011). Therefore, parents have difficulty performing parental roles and experience stress about parenting role alternation as NICU nurses assume parenting behaviors instead of parents (Busse et al., 2013; Miles et al., 1993).

In the past, the father's role in pregnancy, childbirth, and parenting has been seen only as a mother's supporter. Recently, the role of a father as the determiner and supporter of their spouse and newborns while in the hospital has been emphasized (Han & Chae, 2016). In addition, the paradigm of nursing within NICUs is changing from patient-centered to family-centered (Giannini et al., 2014), and providing supportive nursing to fathers affects infants' health and wellness (Craig et al., 2015; Ionio et al., 2016), so NICU nurses consider the whole family as

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their clients. However, there is a lot of focus on mothers and infants in the current medical system (Buek et al., 2021), so research and care practices for fathers have been neglected in the NICU environment (O'Brien & Warren, 2014; Prouhet et al., 2018; Statistics Office, 2021). Especially in Korea, fathers are primarily considered in connection to economic activity due to patriarchy; therefore, they tend to be excluded in the NICU environment (Kim & Kim, 2007). Thus, research and studies have mainly been conducted among infants and mothers, and the education and interventions targeted at fathers have been insufficient in Korea (Kim & Kim, 2007). Fathers go through different roles and adaptation from mothers in the process of admission and discharge of their newborns from the NICU (Ionio et al., 2016; Sansavini & Faldella, 2013). As the parenting role and attitudes are influenced by one's culture and country (Kim & Kim, 2007), it is necessary to identify the characteristics of fathers whose infants were hospitalized in NICUs across Korea. Thus, this study used Arksey and O'Malley (2005) scoping review methodology to map and organize the knowledge of previous studies conducted among fathers whose infants were hospitalized in NICUs. The scoping review method is used to connect and guide the concepts of various research areas (Arksey & O'Malley, 2005), and it is useful for providing guidelines and frameworks for further research and systematic reviews (Peters et al., 2015; Seo, 2020). The scoping review is recommended to understand broadly a wide range of study areas (Arksey & O'Malley, 2005; Pollock et al., 2022). In addition, the scoping method is useful to clarify key concepts and their characteristics (Munn et al., 2018; Pollock et al., 2022). Thus, the scoping review methodology was an appropriate research design for reviewing previous studies and identifying the common experiences of fathers of newborns admitted to NICUs in Korea.

## Material and methods

### Research design

This study was a scoping review conducted according to Arksey and O'Malley (2005) methodological framework, which included identifying research questions, searching for relevant studies, selecting studies, charting the data, and collating, summarizing, and reporting the results. This study reviewed the searched studies according to The Joanna Briggs Institute (JBI) template (2021), and the results of the review are described according to the Preferred Reporting Items for Systemic reviews and Meta-Analyses extension for Scoping reviews (PRISMA-ScR) checklist (Trico et al., 2018). This scoping review used a team approach of two researchers for rigorous review (Tricco et al., 2011) by meeting regularly through the whole process including the research review, data extraction, analysis, and presentation.

### Research procedure

#### Identifying the research question

The scoping review method provides overviews and insights into topics and concepts (Arksey & O'Malley, 2005). Thus, this study tried to map and organize what is known from previous studies conducted among fathers whose infants were hospitalized in NICUs in Korea. This study was conducted by the JBI scoping review guidance. The scoping review's research question should present according to the PCC (population, concept, and context) framework (Arksey & O'Malley, 2005). This study's population included fathers of premature and high-risk infants in Korea. The concept and context of this study was the experience of fathers whose newborns were admitted to NICUs. The research questions of this study were, "What studies have been conducted on fathers whose infants were admitted to NICUs in Korea?" and "What are the common experiences of fathers whose infants were admitted to NICUs?"

#### Searching for relevant studies

To help identify the literature to be included in this review, a literature search strategy was developed by two researchers (CS, LJ) and reviewed with a librarian. The electronic database search was conducted in July 2022. The following five electronic databases were used: PubMed, CINAHL (Cumulative Index to Nursing & Allied Health), Web of Science, RISS (Research Information Sharing Service), and KMBase. PubMed, CINAHL, and Web of Science databases were used for the literature search in English, and RISS and KMBase were used for the literature search in Korean. The search terms were as follows: 'NICU,' 'Neonatal intensive care unit,' 'premature,' 'high-risk newborns,' 'father(s),' 'parents,' and 'Korea.' Identified search terms relied on the researchers' knowledge of the field. Using Boolean operators (AND and OR), proximity searches, truncations, and wildcards, the search strategy including all search terms was tailored for each database (see supplementary S1).

This study targeted studies published since 1996, when the first study about fathers whose infants were hospitalized in NICUs was published in Korea. The inclusion criteria were as follows: (1) studies conducted among fathers whose infants have experienced hospitalization in NICUs, (2) original articles published after peer review, and (3) articles written in English or Korean. The exclusion criterion was as follows: (1) a study that does not distinguish between the father and mother in subjects, (2) studies conducted on fathers whose infants were diagnosed with a specific disease such as an intellectual and/or developmental disability and/or cardiovascular disease, and (3) editorial, letter, or review papers.

A meeting was held between two researchers (CS, LJ) to discuss the decision on the criteria for selection and exclusion of literature. Two researchers independently reviewed the abstracts, and if there was no agreement, they decided opinions with a third researcher and proceeded without disagreement.

#### Selecting studies and charting the data

As a result of the search, the researchers found 145 studies from PubMed, 21 studies from CINAHL, 85 studies from Web of Science, 31 studies from RISS, and eight studies from KMBase. Among them, 72 duplicates were removed using Endnote 20 (Clarivate, Philadelphia, PA, USA) and the Micro Excel program (Microsoft Inc., Redmond, WA, USA). Then, 68 studies were selected, excluding 150 studies by screening title. 32 studies were selected after excluding 36 studies after reviewing the abstracts. The final 15 studies were selected after excluding 17 studies after reviewing the full text: studies conducted on parents without separating fathers and mothers ( $n = 10$ ), studies conducted on fathers whose infants were not hospitalized in NICUs ( $n = 2$ ), review papers ( $n = 3$ ), and studies conducted on fathers of infants with intellectual and developmental disabilities ( $n = 2$ ). The search process using the PRISMA guideline (Page et al., 2021) is shown in Fig. 1. The reviewed studies are shown in supplementary S2.

#### Collating, summarizing, and reporting results

The scoping review is similar to a systematic review, but it does not include quality appraisal and reports findings in a narrative form (Grant & Booth, 2009; Rumrill et al., 2010). The scoping review does not include quality appraisal because the purpose of scoping reviews is to take an overview of all data (Arksey & O'Malley, 2005). Therefore, this study reviewed all included studies and synthesized those studies. The two researchers are fluent in Korean and English, and English was used as the main language when organizing and summarizing data. Two researchers developed an analysis framework to identify the common experience of fathers whose infants were admitted to NICUs. The analysis framework consists of the study's general characteristics and characteristics related to the fathers. The study's general characteristics include its written language, design, the tools used, its purpose, the presence or absence of an intervention, and the location and frequency of data collection (Table 1). The father-related variables include the type

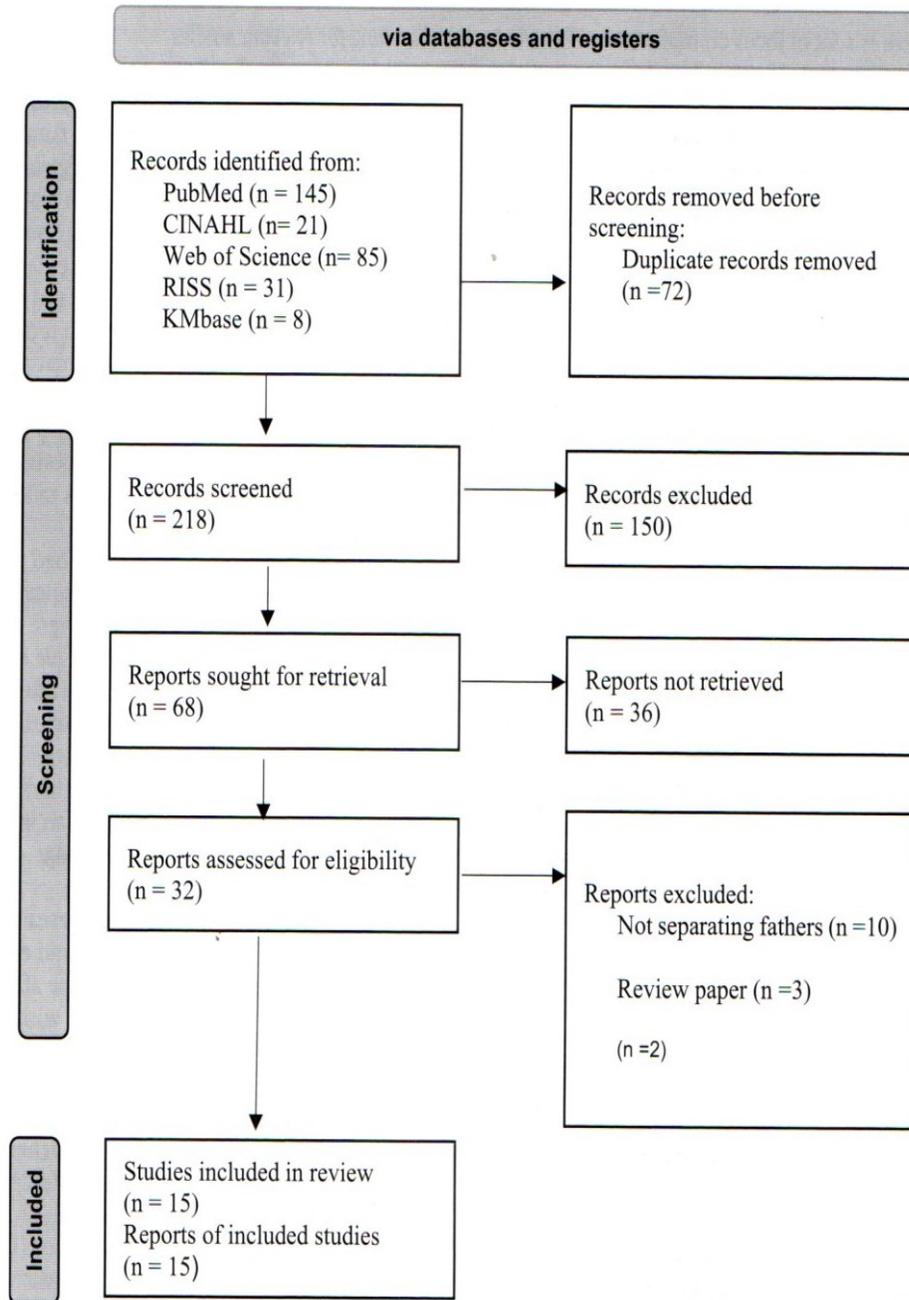


Fig. 1. Flow diagram for study selection.

of subjects, fathers' mean age, father-related variables, and tools used to measure father-related variables (Table 2). Then, two researchers (CS, LJ) independently examined the full texts of those 15 articles that passed the inclusion and exclusion criteria and extracted data relevant to the framework and results of content analyses from the included articles in a Micro Excel program (Microsoft Inc., Redmond, WA, USA). After reviewing each other's files, the two researchers recorded 'yes' in the matching part, 'no' in the inconsistent part, and 'unsure' in the uncertain part. The 'no' and 'unsure' parts were agreed through discussion and the results were presented.

## Results

### General characteristics of reviewed studies

The publication years of the reviewed studies ranged from 1996 to 2021. In written language, six studies (Ahn & Kim, 2007; Eom & Im, 2019; Heo & Oh, 2019; Kim et al., 2017; Lee, Lee, et al., 2019; Moon et al., 2021) were written in English and nine studies (Han & Chae, 2016; Jeong et al., 2021; Kim & Cho, 2017; Lee, Jang, et al., 2019; Oh, 1996; Oh et al., 2010; Park & Bang, 2014; Park & Lee, 2017; Sung et al., 2004) were written in Korean. In the study design, there were nine

descriptive studies (Eom & Im, 2019; Han & Chae, 2016; Lee, Jang, et al., 2019; Lee, Lee, et al., 2019; Moon et al., 2021; Oh, 1996; Oh et al., 2010; Park & Bang, 2014; Sung et al., 2004) two quasi-experimental studies (Kim et al., 2017; Kim & Cho, 2017), one randomized controlled trial (Heo & Oh, 2019), one mixed method study (Ahn & Kim, 2007), and two qualitative studies (Jeong et al., 2021; Park & Lee, 2017). Regarding data collection methods, 12 studies (Ahn & Kim, 2007; Eom & Im, 2019; Han & Chae, 2016; Heo & Oh, 2019; Kim et al., 2017; Kim & Cho, 2017; Lee, Jang, et al., 2019; Moon et al., 2021; Oh, 1996; Oh et al., 2010; Park & Bang, 2014; Sung et al., 2004) used self-report questionnaires and three studies (Jeong et al., 2021; Lee, Lee, et al., 2019; Park & Lee, 2017) used interviews. In the intervention studies, two studies (Kim et al., 2017; Kim & Cho, 2017) provided a tactile intervention and two studies (Ahn & Kim, 2007; Heo & Oh, 2019) provided an educational intervention. Regarding the data collection site, except for one study (Jeong et al., 2021) that did not mention the data collection site, seven studies (Ahn & Kim, 2007; Eom & Im, 2019; Heo & Oh, 2019; Kim et al., 2017; Kim & Cho, 2017; Lee, Jang, et al., 2019; Lee, Lee, et al., 2019) collected data from one hospital and seven studies (Han & Chae, 2016; Moon et al., 2021; Oh, 1996; Oh et al., 2010; Park & Bang, 2014; Park & Lee, 2017; Sung et al., 2004) collected data from multiple instruments and hospitals. Regarding the data

**Table 1**  
General characteristics of reviewed studies (N = 15).

First Author	Year	Language	Research Design	Data collection Methods	Purpose	Intervention	Data collection		
							Site	Numbers	Timing
Him	2007	English	Mixed method design study	Self-report questionnaire	1) To compare the perception of parents with premature infants in the NICU* and parents with full-term newborns 2) To evaluate the effects of NICU* educational support on parents regarding their perception of neonate and parental stress	Educational program	1 university-affiliated hospital	2	1st: day after delivery 2nd: 7–8 days after hospitalization
Eom	2019	English	Descriptive study	Self-report questionnaire	To define the level of perceived stress, social support, and paternal role confidence in Korean fathers with high-risk infants admitted to NICU* and investigate how fathers perceived stress and social support influence their confidence in paternal role	None	1 hospital	1	After at least 72 h of hospitalization
Han	2016	Korean	Descriptive study	Self-report questionnaire	To examine the paternal stress and nursing support perceived by fathers of high-risk infants hospitalized in NICU*	None	1 university-affiliated hospital & 1 hospital	1	After at least 48 h of hospitalization
Heo	2019	English	Randomized controlled trial	Self-report questionnaire	1) To develop a parent participation improvement program 2) To evaluate the effectiveness of the program on parents' partnerships with nurses, attachment to infants, and infants' body weight	Parent participation improvement program	1 hospital	2	1st: before intervention during hospitalization 2nd: after intervention during hospitalization
Jeong	2021	Korean	Phenomenological study	Semi-constructed interview	To explore intrinsic theme and meaning of the role experiences of fathers whose first child was born premature and hospitalized in NICU*	None	Not mentioned	1–2	After at least 2 weeks of hospitalization ~ after discharge
Kim, Cho	2017	Korean	Quasi-experimental study	Self-report questionnaire	To test the effectiveness of kangaroo care experience on paternal attachment of fathers of premature infants hospitalized in NICU*	Kangaroo care	1 tertiary hospital	2	During the hospitalization
Kim, Kim	2017	English	Quasi-experimental study	Self-report questionnaire	To test the effectiveness of tactile stimulation by fathers on their infants' physiological responses and fathers' attachment to infants in the NICU*	Tactile stimulation	1 university-affiliated hospital	2	1st: onset of intervention during hospitalization 2nd: fifth days of intervention during hospitalization
Lee & Jang	2019	Korean	Descriptive study	Self-report questionnaire	To characterize the relationship between parental stress and nurses' communication perceived by parents of high-risk newborns in NICU*	None	1 university-affiliated hospital	1	After at least 48 h of hospitalization
Lee & Lee	2019	English	Descriptive study	Retrospective interview	To investigate the anxieties of parents of premature infants in NICU* regarding infantile diseases	None	1 university-affiliated hospital	6	After discharge
Moon	2021	English	Descriptive study	Self-report questionnaire	To compare the level of perceived parental stress experienced by parents of VLBW <sup>§</sup> and NICU* nurses.	None	3 hospitals	1	During hospitalization
Oh	1996	Korean	Descriptive study	Self-report questionnaire	To identify stressors perceived by parents of critically ill newborns hospitalized in NICU*	None	2 university-affiliated hospitals & 1 medical center	1	During the hospitalization
Oh	2010	Korean	Descriptive study	Self-report questionnaire	To examine the differences in stress between the parents of sick newborns hospitalized in NICU*	None	6 university-affiliated hospital	1	During the hospitalization
Park	2014	Korean	Descriptive study	Self-report questionnaire	To identify the perceived nursing needs and differences by general characteristics of	None	2 general hospitals	1	After at least 48 h of hospitalization

(continued on next page)

**Table 1** (continued)

First Author	Year	Language	Research Design	Data collection Methods	Purpose	Intervention	Data collection		
							Site	Numbers	Timing
Park	2017	Korean	Grounded theory study	Unstructured interview	parents of infants in NICU* To identify the experience of becoming a father of a high-risk premature infant hospitalized in NICU*	None	1 hospital & Internet	2–3	After at least 2 weeks of hospitalization ~ after discharge
Sung	2004	Korean	Descriptive study	Self-report questionnaire	To investigate the degree and sources of stress of fathers in NICU* experience	None	5 university-affiliated hospitals	1	During hospitalization

\* NICU = neonatal intensive care unit.

collection times, eight studies (Eom & Im, 2019; Han & Chae, 2016; Lee, Jang, et al., 2019; Moon et al., 2021; Oh, 1996; Oh et al., 2010; Park & Bang, 2014; Sung et al., 2004) collected data at one time and seven studies (Ahn & Kim, 2007; Heo & Oh, 2019; Jeong et al., 2021; Kim et al., 2017; Kim & Cho, 2017; Lee, Lee, et al., 2019; Park & Lee, 2017) collected data more than one time. Regarding the timing of data collection, ten studies collected data during hospitalization in NICUs (Ahn & Kim, 2007; Eom & Im, 2019; Han & Chae, 2016; Heo & Oh, 2019; Kim et al., 2017; Kim & Cho, 2017; Lee, Jang, et al., 2019; Moon et al., 2021; Oh, 1996; Oh et al., 2010; Park & Bang, 2014; Sung et al., 2004), two studies (Jeong et al., 2021; Park & Lee, 2017) collected data during hospitalization and after discharge of NICUs, and one study (Lee, Lee, et al., 2019) collected data after discharge of NICUs.

*Fathers' characteristics*

Eight studies (Eom & Im, 2019; Han & Chae, 2016; Kim et al., 2017; Lee, Jang, et al., 2019; Oh, 1996; Oh et al., 2010; Park & Lee, 2017;

Sung et al., 2004) were conducted on fathers of high-risk infants, five studies (Ahn & Kim, 2007; Heo & Oh, 2019; Jeong et al., 2021; Kim & Cho, 2017; Lee, Lee, et al., 2019) were conducted on fathers of premature infants, one study (Moon et al., 2021) was conducted on fathers of very low birth weight infants, and one study (Park & Bang, 2014) was conducted on fathers whose newborns were hospitalized in the NICU without specific explanations. Except for three studies (Jeong et al., 2021; Lee, Lee, et al., 2019; Park & Lee, 2017) that did not mention the mean age of fathers, most fathers were in their 30s. Regarding variables related to the fathers, eight studies (Ahn & Kim, 2007; Eom & Im, 2019; Han & Chae, 2016; Lee, Jang, et al., 2019; Moon et al., 2021; Oh, 1996; Oh et al., 2010; Sung et al., 2004) were conducted about parental stress using the Parental Stress Scale (PSS), three studies (Heo & Oh, 2019; Kim et al., 2017; Kim & Cho, 2017) were conducted about paternal attachment using the paternal attachment scale, and one study was conducted about each parental perception (Ahn & Kim, 2007): nursing needs (Park & Bang, 2014), nursing support (Han & Chae, 2016), paternal adjustment (Park & Lee, 2017), social support and confidence in the

**Table 2**

Fathers' characteristics of included studies (N = 15).

First authors	Year	Types of fathers	Mean age of participants	Variables related to the fathers	Measurements
Ahn	2007	26 dyads of parents of full-term infants 22 dyads of parents of premature infants	F: 35 M: 33	Parental perception Parental stress	Parental Stress Scale (PSS) Neonatal Perception Index (NPI)
Eom	2019	160 fathers of high-risk infants	34.9	Parental stress Social support Confidence in parental role	Parental Stress Scale (PSS) Social support tool Confidence in parental role tool
Han	2016	88 fathers of high-risk infants	34.01	Parental stress Nursing support	Parental Stress Scale (PSS) Nurse Parental Support Tool
Heo	2019	132 parents of premature infants (F 66, M 66)	Exp: 34.6 Con: 34.97	Nurse-parent partnership Parental attachment	The Pediatric Nurse-Parent Partnership Scale The Maternal Attachment Inventory
Jeong Kim, Cho	2021 2017	11 fathers of premature infants 34 fathers of premature infants (Exp 17, Con 17)	Not mentioned Exp: 36.9 Con: 35.4 Total: 36.17	Role of fathers Paternal attachment	N/A Paternal Attachment Scale
Kim, Kim	2017	40 fathers of high-risk infants (Exp 20, Con 20)	Exp: 36.40 Con: 33.95 Total: 35.18	Paternal attachment	Paternal Attachment Scale
Lee & Jang	2019	54 parents of high-risk infants (F 24, M 30)	34.93 (F&M)	Parental Stress Nurse communication	Parental Stress Scale (PSS) Nurses' communication ability/type
Lee & Lee	2019	75 parents of premature infants (F 30, M 45)	Not mentioned	Parental anxiety Parental concern	The frequency of perceived anxiety
Moon	2021	83 parents of VLBWI (F 33, M 50) 78 nurses	34.6 (F&M)	Parental stress	Parental Stress Scale (PSS)
Oh	1996	56 parents of high-risk infants (F 25, M 31)	31.2 (F&M)	Parental stress	Parental Stress Scale (PSS)
Oh	2010	57 dyads of parents of high-risk infants	30s	Parental stress	Parental Stress Scale (PSS)
Park	2014	121 parents of infants admitted to NICU (F 52, M 69)	34 (F&M)	Nursing needs	NICU Family Needs Inventory (NFNI)
Park	2017	12 fathers of high-risk infants	Not mentioned	Paternal adjustment	N/A
Sung	2004	85 fathers of high-risk infants	32.6	Parental stress	Parental Stress Scale (PSS)

F = father.  
M = mother.  
Exp = experimental group.  
Con = control group.  
N/A = not applicable.

parental role (Eom & Im, 2019), the nurse-patient partnership (Heo & Oh, 2019), parental anxiety and parental concern (Lee, Lee, et al., 2019), nurse communication (Lee, Jang, et al., 2019), and the father's role (Jeong et al., 2021).

## Results

Four themes were derived after content analysis: (1) paternal stress, (2) paternal attachment, (3) fathers' adaptation, and (4) fathers' needs for support.

### Paternal stress

Eight studies were conducted on fathers' stress (Ahn & Kim, 2007; Eom & Im, 2019; Han & Chae, 2016; Lee, Jang, et al., 2019; Moon et al., 2021; Oh, 1996; Oh et al., 2010; Sung et al., 2004). Fathers experienced moderate-to-high levels of stress when their infants were hospitalized in NICUs (Ahn & Kim, 2007; Eom & Im, 2019; Han & Chae, 2016; Lee, Jang, et al., 2019; Moon et al., 2021; Oh, 1996; Oh et al., 2010; Sung et al., 2004). Fathers' stress was measured using the PSS developed by Miles et al. (1992), which includes four subcategories: the infant's appearance and behavior, the NICU environment, communication with medical staff, and changes in parental roles (Eom & Im, 2019; Han & Chae, 2016; Moon et al., 2021; Oh, 1996; Sung et al., 2004). Fathers experienced high levels of stress in the order of 'changes in parental roles,' 'the infant's appearance and behavior,' 'communication with medical staff,' and 'NICU environment' (Eom & Im, 2019; Han & Chae, 2016; Sung et al., 2004). The fathers' factors affecting higher stress were the father's old age (Oh et al., 2010), when the family type is a nuclear family (Han & Chae, 2016), and lack of information about the infant's prognosis (Eom & Im, 2019). The newborns' factors affecting higher stress were feeding with a tube or fasting (Sung et al., 2004), being diagnosed with a respiratory disease that requires a ventilator and oxygen treatment (Eom & Im, 2019; Oh et al., 2010), higher severity (Han & Chae, 2016), lower birth weight, and gestational age (Eom & Im, 2019).

### Paternal attachment

Three studies (Heo & Oh, 2019; Kim et al., 2017; Kim & Cho, 2017) were conducted on paternal attachment. Fathers of newborns hospitalized in the NICU showed a moderate-to-high level of attachment (Heo & Oh, 2019; Kim et al., 2017; Kim & Cho, 2017). The paternal attachment in this study (Kim et al., 2017; Kim & Cho, 2017) was measured using the tool developed by Kim (1994), which was based on a study by Greenberg and Morris (1974). This tool consists of seven subcategories: visual awareness of the newborn, tactile awareness of the newborn, awareness of distinct characteristics of the newborn, perception of the newborn as perfect, strong attraction of the newborn, extreme elation, and sense of self-esteem. Fathers' attachment increased significantly after participating in the tactile intervention (Kim et al., 2017), Kangaroo care (Kim & Cho, 2017), and a participation improvement program that provides education about feeding, bathing, and holding (Heo & Oh, 2019). Among the subtypes of attachment, fathers' attachment increased, especially in 'perception of the newborn as perfect,' 'tactile awareness of the newborn,' and 'a strong attraction of the newborn' after receiving the intervention (Kim et al., 2017; Kim & Cho, 2017).

### Fathers' adaptation

Adaptation means that the individual level, family level, and community level are balanced and adapted to the stressful situation (McCubbin & McCubbin, 1987). As a result of the analysis, in three studies (Eom & Im, 2019; Jeong et al., 2021; Park & Lee, 2017), the individual level of adaptation at which the father perceives the new role assigned to him and the family level of adaptation at which he perceives his relationship with the child were presented. Two of the three studies were qualitative studies (Jeong et al., 2021; Park & Lee, 2017). Fathers experienced guilt, shock, and frustration when their infants were hospitalized in the NICU because of the unfamiliar NICU environment and different

and fragile appearance of their infants (Jeong et al., 2021; Park & Lee, 2017). In addition, fathers felt confused and burdened as they were given multiple new roles as caregivers, supporters, and decision-makers related to their spouses and infants when their infants were admitted to the NICU (Eom & Im, 2019; Jeong et al., 2021). However, as time passed, fathers overcame difficulties with their responsibilities as householders, caregivers, and beliefs of their infants' recovery (Jeong et al., 2021; Park & Lee, 2017). In addition, fathers adjusted to parental roles through the possibility of their infants' health recovery, support of medical staff, information search, emotional support, and financial aid (Park & Lee, 2017).

### Fathers' needs for support

Five studies were conducted on fathers' needs for support (Eom & Im, 2019; Han & Chae, 2016; Jeong et al., 2021; Park & Bang, 2014; Park & Lee, 2017). The admission to the NICU was an unexpected situation for parents, so they felt stressed and wanted support (Eom & Im, 2019). Fathers felt physically and mentally burdened by the combination of work, household requirements, visiting infants, and lack of information about their infants (Park & Lee, 2017). Accordingly, fathers wanted support and understand from their surroundings, but they experienced frustration because there was no one to ask for help (Park & Lee, 2017). Fathers depend on nurses after their spouses when their infants are admitted to the NICU (Eom & Im, 2019). Fathers received moderate-to-high levels of support from nurses (Eom & Im, 2019; Han & Chae, 2016). Fathers felt supported in one study when they received detailed information directly from medical staff (Han & Chae, 2016), so the fathers thought they received a high level of support in the treatment and condition of their infants. However, fathers recognized that there was little support for their well-being and emotions from nurses (Eom & Im, 2019; Han & Chae, 2016).

## Discussion

The paternal role and fathering should be discussed within the sociocultural context because the parenting role and attitudes are influenced by one's culture and country (Kim & Kim, 2007). In Korea, fathers have been neglected in the medical environment because their roles as householders have only recently been emphasized (Kim & Kim, 2007). However, fathers play a role in alleviating mothers' psychological distress and establishing a healthy maternal role and identity (Han & Chae, 2016; Kim & Tak, 2015). This scoping review was conducted to provide an overview and flow of the previous studies conducted among fathers whose infants have been admitted to NICUs in Korea. Fifteen studies were used for reviewing. As the result of the content analysis, paternal stress, paternal attachment, fathers' adaptation, and fathers' needs for support were derived as important themes.

When infants were hospitalized in the NICU, fathers experienced a high level of stress because they did not have enough time to prepare for parenting and caring (Chertok et al., 2014; Turan et al., 2008). Fathers experienced higher stress in changes in parental roles and relationships with their children. The result that fathers experience high stress related to paternal role performance was similar to previous studies (Baía et al., 2016; Joseph et al., 2007) that found the change in paternal roles causes stress for fathers. It can be interpreted that an infant's NICU admission alters the parenting role, which causes stress for parents (Busse et al., 2013). However, this study was contrary to a study conducted in Sweden (Heinemann et al., 2013), where the fathers of premature newborns experienced high levels of stress in the 'NICU environment' due to the sounds of the NICU. As a result of the analysis, the stress of fathers within the nuclear family type increased when the child's weight and gestational age were low and the children were fed with tubes and fasting. This is similar to a previous study (Ichijima et al., 2011) where fathers' stress was higher with the intended time of tube feeding, no other visitors, and newborns with low weight and gestational age. Paternal stress negatively affects the role of parents

and their family function (Miles et al., 1996), whereas fathers' emotional stability encourages fathers to participate in child rearing and promote attachment (Heo & Oh, 2019). Therefore, it is necessary for NICU nurses to understand fathers' stress and try to alleviate it. Given that fathers experienced stress about the NICU environment in the study, it seems necessary to relieve stress on the environment through explanations of the NICU environment and medical devices. In addition, it is recommended to allow fathers to participate in acts such as milk transportation, tube feeding, and diaper changing because they are frustrated by not being able to act as parents.

Attachment is a psychological interaction between infants and primary caregivers through the interaction (Chen et al., 2019). Fathers in this study showed a moderate or higher level of attachment. However, in subcategories, fathers showed low attachment in visual perception, which was similar to a study conducted in New Zealand (Carter et al., 2005), where fathers had difficulty forming attachments and showed low attachment in visual perception when their infants were hospitalized in the NICU. This can be explained in that interactions and attachment between parents and infants were interred with the combination of the parent's unstable psychological status, immature appearance, and premature behaviors (Sannino et al., 2016). As a result of the review, tactile and educational interventions improved fathers' attachment and confidence in caring for their infants. It can be interpreted that during interventions, fathers have sufficient time to contact and interact with their infants (Heo & Oh, 2019). Fathers' participation in caring for their infants in the NICU is an important coping mechanism (Smith et al., 2012) in that it reduces the father's anxiety and helps them form attachments with their newborns (Lee et al., 2013). After the intervention, it was found that 'perception of the newborns as perfect' was most significantly improved among the subitem of attachment. This result may be due to the fact that fathers recognize their newborns as an impersonal object to an object to be loved and protected after physical contact with the newborns (Fegran et al., 2008). As delayed attachment causes problems in infants' physical and emotional development (Sannino et al., 2016), it is necessary to provide opportunities to physically connect with newborns, such as partaking in kangaroo care and bathing and education about the meaning of newborns' behaviors to improve the attachment and interaction with fathers and their newborns. In addition, it is recommended to explain the characteristics of infants' premature appearance and the medical equipment that the newborns have given that fathers show the lowest attachment in 'visual perception.'

Fathers felt frustrated and helpless when their infants were admitted to the NICU. Fathers in this study felt a role burden at first as they were given multiple new roles as caregivers, supporters, and decision-makers related to their spouses and infants. In the NICU environment, fathers have difficulty with role formation as they separate from their children (Busse et al., 2013). A previous study conducted in Ireland (O'Brien & Warren, 2014) found that fathers had to suddenly care for their postpartum spouses and newborns in the NICU while continuing their patriarchal roles of financially supporting their family and maintaining their job. However, fathers adapted to new roles and overcame difficulties through responsibilities in a household, belief in their children, and support of other people, such as medical staff, neighbors, and families. Fathers experience stress about changes in their role early in NICU hospitalization, but this decreases over time (Baía et al., 2016; Joseph et al., 2007). The role adaptation of parents affects the well-being and development of the entire family (Bea & Kim, 2015), attachment formation, and social development of infants (Jeong et al., 2021), thus it is important for fathers to adapt to the new roles and perform the roles appropriately. Educating fathers on specific parenting methods such as feeding and changing diapers can reduce the burden on fathers as caregivers, and insurance systems and subsidies are expected to reduce the burden on fathers as breadwinners. In addition, institutional and policy improvements such as parental leave and flexible work systems can help fathers maintain a work-parenting balance.

Fathers in this study had demands for support due to a lack of resources when their newborns were admitted to the NICU and needed someone to support them and satisfy their needs. Fathers recognized nurses as their supporters when their newborns were admitted to the NICU. Fathers felt supported by the nurses when they received information about their infants directly from the nurses and wanted to receive more information about the prognosis and conditions of their infants. This is similar to previous studies conducted in Australia that found fathers wanted knowledge about the infants' care and prognosis (Turner et al., 2014) and recognized the nurses as "the best source of information" (Govindaswamy et al., 2020). However, fathers received less support for their well-being and emotions from nurses. Fathers experience alienation as nurses pay a lot of attention to infants and their mothers, and fathers have difficulty expressing their feelings to medical staff (Hagen et al., 2016). Supporting a father reduces parental stress and improves fathers' coping abilities (Han & Chae, 2016). NICU nurses play a role in providing family-centered nursing, and nurses' support plays a role in helping parents create attachment and bonding, thereby helping them experience positive parenting (O'Brien & Warren, 2014). Therefore, it is necessary for NICU nurses to assess and understand the needs of fathers and support them. Given that fathers received informational support for the baby's condition but do not receive their own emotional support, NICU nurses must provide fathers with an opportunity to express their feelings and provide an appropriate intervention.

The number of premature and high-risk newborns in Korean society continues to increase. In addition, due to the rise of socioeconomic development and feminism, the father's participation in parenting is emerging instead of the patriarchal culture of Confucianism. This study analyzed literature since 1996 when the study of fathers whose infants were admitted to the NICU was first presented in Korea. This study is meaningful in that it identified the common experience of NICU fathers in Korea using a scoping review method, which was useful to map and organize previous studies.

#### *Limitations*

This study did not evaluate the quality of reviewed studies as an integrative study and did not measure the intervention's effectiveness as a meta-analysis (Bunn et al., 2014). Thus, future scholars should conduct a meta-analysis, systematic review, and integrative review based on this study. This study has the limitation that most of the included studies are cross-sectional studies, thus it was hard to identify the changes over time. Therefore, longitudinal studies that identify changes in paternal stress, attachment, role adaptation, and needs for support over time are recommended. The subjects of included studies were fathers who have Korean spouses. In Korea, due to social change, single fathers and multicultural fathers are continuously increasing (National Assembly Budget Office, 2018), thus further studies targeted at unwed fathers and multicultural fathers are recommended.

#### *Implications for clinical practice and future research*

Fathers lack knowledge and need education about caring for their newborn who is admitted to the NICU. Information about infants increases confidence in parenting by giving control of the situation to fathers and fathers feel supported when they have received information directly from nurses. Thus, it is necessary for nurses to provide accurate information to fathers on the conditions of infants and ways of caring, such as feeding and bathing. In addition, it is recommended to increase opportunities to meet fathers and infants, which promotes interaction and attachment between fathers and newborns. It is also necessary to improve national policies and systems such as subsidies, flexible work systems, and parental leave to ease the burden of fathers playing many roles at the same time. Finally, it is necessary to support fathers to overcome and adapt to the crisis of their child's NICU hospitalization by understanding their emotions and needs.

## Conclusion

This study was a scoping review conducted according to Arksey and O'Malley (2005) methodological framework. This study reviewed and mapped previous studies conducted among fathers whose newborns were admitted to the NICU in Korea since 1996. Five databases were used for the data search and the final 15 studies were included in the review. Paternal stress, paternal attachment, fathers' role adaptation, and fathers' support needs were derived as the main themes from the content analysis. When infants are hospitalized in the NICU, nurses must understand fathers' stress and needs and help them alleviate their stress and adapt to new roles. In addition, it is recommended to develop interventions to improve fathers' attachment and support fathers' emotions and well-being.

## CRediT authorship contribution statement

**Jiyeon Lee:** Methodology, Writing – review & editing, **Sunyeob Choi:** Writing – original draft, Conceptualization, Methodology, Writing – review & editing.

## Declaration of Competing Interest

I have no conflict of interest.

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## Appendix A. Supplementary data

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