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# CHNR

## Child Health Nursing Research

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## About the Journal

*Child Health Nursing Research* (CHNR) is the official peer-reviewed research journal of the Korean Academy of Child Health Nursing. CHNR is a multidisciplinary, double-blind peer-reviewed, open-access journal that publishes original research, theory, and review papers on health care and nursing from the beginning of life to young adulthood, including both children and their families. It is devoted to all fields of child health, including global and cultural issues, aimed at both domestic and international healthcare professionals. The journal is published quarterly (Jan 31, Apr 30, July 31, and Oct 31) in English. The journal welcomes submissions from healthcare professionals around the world, and encourages the submission of papers dealing with cultural issues and those studied by international research teams.

- Indexed in major databases: PubMed Central, PubMed, Scopus, CINAHL, DOAJ, Crossref Metadata, Google Scholar, ScienceCentral, KCI (Korea Citation Index), RISS, KoreaMed, and KoMCI.
- Its abbreviated title is Child Health Nurs Res.
- Open access: All articles published in the journal are freely available with an open access license for everyone to read and download from the CHNR website (http://www.e-chnr.org/) immediately and permanently after publication.

## Aims and Scope

*Child Health Nursing Research* aims to promote the health, development, and well-being of children and their families in Korea and all over the world by providing research on evidence-based practices.
Its scope includes the most recent clinically and academically relevant topics in health care and nursing from the beginning of life to young adulthood, including both children and their families. The journal deals with articles that address research, theory, and practice in a wide range of child health nursing areas and relevant cultural issues. Its regional scope is mainly Korea, but it welcomes submissions from researchers and nurses worldwide.
The primary readers of this journal are healthcare professionals, administrators and scientists serving newborns, infants, children, adolescents, young adults, and their families, including nurses, midwives, physicians, developmental specialists, public health workers, scientists, educators, epidemiologists, and other health caregivers.
The ultimate goal of *Child Health Nursing Research* is to develop a body of knowledge on the health of newborns, infants, children, adolescents, young adults, and their families while improving the clinical field and community with evidence-based practices to promote the health of children and families all over the world.

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CHNR

# What makes a good reviewer?

Eunyoung Suh

Professor, College of Nursing, Seoul National University, Seoul, Korea

Nursing has existed as an academic field since the beginning of Korea's modernisation and has made remarkable progress. It has been approximately 60 years since Korea started training nurses at universities and about 40 years since the country began producing PhD-prepared nurses equipped with research skills. During this period, the number of nursing schools and clinical facilities in Korea has grown considerably. Currently, there are 196 nursing schools and around 370,000 registered nurses nationwide.

The Korean Society of Nursing Science has followed the same trajectory in terms of its establishment and growth. For 53 years, it has spearheaded research and academic initiatives, with its affiliated professional societies also producing numerous scientific journals, thanks to the dedicated efforts of nurse scholars.

*Child Health Nursing Research* (CHNR), a premier journal among professional societies, was established in 1995 and is now 29 years old. Since its inception, it has published outstanding research in the field of child health nursing. It became a KCI (Korea Citation Index)-listed journal in 2007 and was included in Scopus in 2018.

Just as Korean society is experiencing a slowdown in the growth curve of socio-economic development, many indicators suggest that the nursing community may not see the high growth rates of the past. Several factors contribute to this trend, but a primary concern is the disconnect between research and education in nursing—an applied discipline—and practical application. For nursing to advance as a profession and evolve into the human caring science of the future, it is essential to establish a virtuous cycle. This cycle should involve the direct application of nursing research to clinical practice, alongside the investigation of unresolved clinical issues through further research. Moreover, the insights gained from such research should be integrated into the curricula of educational institutions to benefit nursing students.

However, the overwhelming majority of hospitals still adhere to the 19th-century hospital system, which predominates the practice settings our nursing students are expected to enter upon graduation. Achieving the ideal virtuous cycle of research, education, and practice is challenging within these systems. Nevertheless, the reason we conduct research and publish in esteemed journals like CHNR is that we share the common goal of eventually establishing this ideal framework. We need to develop a system where nurses can design and implement patient-centred care and document the outcomes in CHNR, thereby gathering evidence on the effectiveness of nursing practices.

To make progress toward the above goals, it is crucial for reviewers to be able to discern the best manuscripts from the multitude submitted to CHNR. What characteristics define an effective reviewer?

First, a good reviewer should be knowledgeable about the philosophical and historical background of the discipline of

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nursing. Unlike neighbouring disciplines such as medicine, public health, psychology, and sociology, nursing emerged later and is distinct in its practical orientation, necessitating adaptation to the rapidly evolving healthcare landscape.

Understanding the origins of nursing and its unique philosophical underpinnings is crucial for reviewers to effectively select and assess papers that capture the distinctiveness of the field.

To further refine the discussion, we can ask: what is at the heart of nursing's uniqueness? At its core, nursing is centred on human beings, with the primary goal of nursing research being to explore methods to alleviate human suffering. This focus clearly sets it apart from medicine, its closest related discipline, which aims to identify and treat diseases. The differences between nursing and other fields, such as public health, psychology, and sociology, are so pronounced that they require no additional elaboration. Despite the diversity of specialisations within nursing and the various types of research conducted, the overarching message should remain straightforward: it must aim to alleviate the suffering of the ill. This is the essence of nursing.

The second competency of a good reviewer is the ability to assess the practical applicability of the article under review. Nursing is an academic discipline that scientifically contextualises the caregiving work of nurses for patients. Research that lacks practical application or is disconnected from nursing practice does not contribute meaningfully to the field of nursing research. At the heart of nursing practice is the "compassionate presence" that nurses offer their patients [1]. We should select papers that have the potential to be applied in practice and publish them in CHNR to accumulate evidence of nursing practice.

Finally, an effective reviewer must possess the ability to recognise papers that embody the unstoppable force of transformative change. Nightingale stressed that nursing is a discipline at risk of regression unless we consistently incorporate this transformative change into our daily practice, as expressed by the following quote:

"For us who Nurse, our Nursing is a thing, which, unless in it we are making progress every year, every month, every week, take my word for it we are going back. The more experience we gain, the more progress we can make" [2].

To ensure that the reviewers of CHNR progressively develop the above three competencies, the leaders of the journal should emphasise these competencies through opportunities such as conferences and faculty workshops.

## ARTICLE INFORMATION

### Authors' contribution

All the work was done by Eunyoung Suh.

### Conflict of interest

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# Comparative analysis of nursing students' reflection levels before and after debriefing in simulation training in South Korea: qualitative analysis design

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**Purpose:** To measure the level of reflection, this study analyzes diaries written by third-year nursing students before and after the debriefing stage in simulation training. A qualitative study using diary entries from 15 nursing students to explore reflection depth. **Methods:** Students engaged in simulation training and the debriefing stage, documenting their reflections in diaries. Before and after debriefing, reflections were rated from Level 1 (reflectivity) to Level 7 (theoretical reflectivity). **Results:** The total number of reflection levels rose significantly from 545 to 829 post-debriefing, enhancing higher-order reflection.The shift signifies a move from superficial to deep reflection, highlighting debriefing's role in fostering critical thinking. **Conclusion:** The findings underscore the critical role of debriefing in enhancing reflective thinking in nursing education. There is a demonstrated need for further research into the specific elements of debriefing that are most effective at promoting deep reflection. Future studies should conduct comparative analyses of different debriefing methods and approaches across various educational settings. This research could lay the foundation for designing more effective debriefing strategies that foster critical thinking and improve learning outcomes in nursing education.

**Keywords:** Cognitive reflection; Simulation training; Students; Nursing

## INTRODUCTION

Simulation training has become indispensable to modern nursing education, offering a unique blend of theoretical and practical learning. It provides a controlled environment where nursing students can apply theoretical knowledge to real-world scenarios, effectively bridging the gap between classroom learning and clinical practice. This approach facilitates the acquisition of essential clinical skills and fosters critical thinking and decision-making abilities, which are crucial for nursing professionals. The emphasis on simulation training underscores the evolving nature of nursing education, which increasingly prioritizes experiential learning methods to prepare students for the complexities of healthcare settings.

The structure of simulation training is meticulously designed to encompass three main stages: pre-briefing, scenario, and debriefing, each contributing uniquely to the learning experience. According to Reime et al. [1], simulation training is crucial in enhancing the connection between theoretical knowledge and its application in clinical practice, thus ensuring that nursing students are well-prepared for their roles in healthcare settings. The debriefing stage, highlighted by Shinnick et al. [2] as the cornerstone of the simulation experience, offers a critical reflection period where students analyze their performance, integrate theoretical knowledge with

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practical experience, and identify areas for improvement. This stage is instrumental in developing students' clinical reasoning and judgment capabilities.

Debriefing sessions utilize structured frameworks such as Description, Analysis, Application (DAA), Gather, Analyze, Summarize, Promoting Excellence and Reflective Learning in Simulation, Debriefing for Meaningful Learning, and the 3D Model of Debriefing. These frameworks facilitate a comprehensive analysis of the simulation experience, encouraging a profound reflection on actions, decisions, and outcomes. Fanning and Gaba [3] have shown that such structured approaches to debriefing significantly enhance students' learning experiences by promoting critical thinking, self-assessment, and collaborative learning.

Despite the proven benefits of simulation training, there is an ongoing debate regarding the most effective debriefing methods and their impact on learning outcomes. Lee et al. [4] suggest that learning outcomes can vary significantly depending on the debriefing approach, indicating a need for further research to optimize debriefing strategies.

Integrating student-led debriefings introduces a dynamic aspect to simulation training, emphasizing peer feedback and collective learning. Boet et al. [5] argue that student-led debriefings promote team competency and enable a more thorough review of performance, leading to improved clinical outcomes.

Moreover, Kang and Yu [6] have identified the combination of student-led and educator-led debriefings as a superior method for enhancing problem-solving skills and debriefing satisfaction, underscoring the importance of flexibility and adaptability in debriefing practices.

Reflective writing, such as journals, during debriefing sessions, has contributed positively to developing problem identification, analysis, and solution-finding abilities [7,8]. However, Niu et al. [9] reported that nursing students engage in superficial reflection, underscoring the need for strategies promoting more profound reflective practices.

To address these challenges, this study explores the effectiveness of self-reflection before formal debriefing sessions. It compares with traditional educator-led debriefing to ascertain whether self-reflection alone can promote sufficiently deep reflective practices among nursing students. This research seeks to understand the added value of guided debriefing sessions and to develop foundational data for enhancing self-reflective practices.

Grounded in the educational theories of Dewey [10] and Schön [11] and informed by Jack Mezirow's transformative learning framework, this study employs Mezirow's tool [12] for assessing levels of reflection. Introduced by Mezirow in 1981, the transformative learning theory posits that adult learning is a process of reflecting and transforming pre-existing beliefs. Mezirow's framework includes a classification tool that depicts reflection at several distinct levels, later modified for more streamlined application [13,14].This tool has proven particularly effective in evaluating the depth of reflection in educational settings, revealing various levels of reflective thinking associated with professional development in nursing [15,16]. By utilizing this framework, the research will measure and analyze the depth of reflection induced by debriefing methods, providing insights into how debriefing can be structured to foster profound reflective thinking and improve educational outcomes.

Accordingly, we aimed to gauge reflection levels by analyzing journals third-year nursing students wrote before and after debriefings in simulation training. It explores the students' reflection level and aims to offer critical data for creating practical simulation training.

Ultimately, this study aims to enhance debriefing practices and promote deeper reflection, preparing nursing students more comprehensively for the complexities of clinical practice, aligning educational strategies with professional needs, and improving patient care through more effective training outcomes.

## METHODS

**Ethical statements:** This study was approved by the Institutional Review Board (IRB) of the Public Institutional Review Board (IRB No. P01-202403-01-014). Informed consent was obtained from all participants.

### 1. Study Design

This study is a qualitative analysis designed to evaluate and compare the levels of reflection among nursing students by examining journals written before and after debriefing sessions in simulation training.This study followed the Consolidated Criteria for Reporting Qualitative Research (COREQ) reporting guidelines [17].

## 2. Theoretical Framework

This study's theoretical foundation is grounded in Schön's [11] concepts of reflection-in-action and reflection-on-action, along with Mezirow's [15] transformative learning theory. Schön's work provides a lens through which the reflective processes during and after simulation training can be examined, highlighting the importance of reflective practice in professional development. Mezirow's theory further enriches this framework by delineating how critical reflection on experiences can lead to transformative learning, changing individuals' perspectives and understandings. This study utilizes Mezirow's tool for assessing levels of reflectivity to investigate the depth of reflection in nursing students' journals, focusing on how debriefing influences reflective learning.

## 3. Setting and Participant Recruitment

This study was conducted with third-year nursing students from S University in Seoul. Seventeen participants were initially recruited through social media invitations sent via Kakao Talk, ensuring voluntary participation and accessibility. The recruitment strategy employed a first-come, first-served approach. Eligibility criteria mandated that participants must have completed educational sections on the respiratory system in their health assessment, primary nursing, and pediatric nursing courses. Those who had not fulfill this prerequisite were excluded from the study.

In qualitative research, determining the appropriate sample size is contingent upon various factors, including the research topic, analytical methods, research paradigm, and the specific nature of the study. According to Brantlinger et al. [18], it is crucial to ensure that participants are suitable for the research objectives, representative of the broader population, and effectively recruited to support the study's integrity. Previous research indicates that saturation is typically achieved within a range of participants. Jensen and Joy [16] reported saturation with 15 participants, whereas Silvia et al. [19] identified saturation with 13 participants. Further studies on sample size in qualitative research suggest that 15 to 30 interviews are generally necessary to reach saturation adequately. Based on these precedents and the need to account for potential attrition, this study initially aimed to recruit 15 participants adjusting to 17 to compensate for a projected 10% dropout rate.

Ultimately, 17 participants consented to the study after receiving detailed information through informed consent documents. However, two participants withdrew prior to the start of the study due to health concerns, resulting in a final sample size of 15.

## 4. Data Collection

Data collection was conducted on March 30, 2024, and a co-researcher was an instructor. All individuals were fully briefed on the study's objectives, methodologies, and their rights within the research context. This briefing emphasized their right to anonymity, safeguarding their personal information, and underscored their freedom to disengage from the study at any point without penalty. Informed consent was meticulously obtained from each participant, affirming their understanding and voluntary agreement to partake in the study. This process was instrumental in upholding the principles of autonomy and respect for the individuals involved, ensuring participants were neither coerced into participation nor remained unaware of the extent of their involvement and rights.

The study was conducted in a child simulation lab at the participants'school, with debriefings in a separate classroom. All simulation exercises were videotaped. As part of the simulation training process, participants completed a reflective journal.

We conducted a separate simulation training for research, not regular classes. Based on a pediatric asthma scenario, the simulation training aimed to foster reflective learning through pre-briefing, scenario, and debriefing phases, lasting hours and 30 minutes. It commenced with a 30-minute orientation to familiarize participants with the scenario and simulation tools. The five teams, which randomly consisted of three people in groups, went through technical practice and discussion for about an hour. The scenario, which took about 10 minutes per team, involved a 7-year-old boy who had a history of asthma and complained of difficulty breathing and came to the emergency room. The focus was on achieving pediatric asthma management goals, such as identifying children's symptoms, comprehensive evaluation, communication, drug administration, and providing psychological support. After self-reflection, each group participated in a debriefing session led by an instructor for about 20 minutes. The instructor-led debriefing method used Socratic questioning to enable students to find their own mistakes. They were then asked to fill out the same reflection journal again to

deepen their reflection and complete the comprehensive training program.

In this study, the debriefing reflective journal for the asthma child scenario simulation practice utilized the DAA method. This involved:

Description Stage: Questions like 'What was the situation of the subject?', 'What was my best performance aspect?', 'What was the most challenging aspect for me?', 'How do I evaluate my overall performance in patient care?' to capture the scenario context.

Analysis Stage: Queries such as 'What did I identify as the patient's primary issue?', 'Which nursing action did I prioritize to address this issue?', 'Was this nursing action carried out?', 'If the action was performed, were the results verified?', 'What was the basis for this verification?', 'If the nursing action was not performed, what were the reasons?', 'Were there any additional nursing problems identified apart from the primary issue?'to encourage critical thinking.

Application Stage: Prompts like 'How can I apply what I learned today to real-life situations?', 'What was the most important lesson I learned today?', 'What was the most memorable thing from today's learning?'to foster practical application of knowledge.

A total of 13 open-ended questions facilitated deep reflection across these stages.

Mezirow's seven levels of reflectivity [12] were employed to assess the depth of reflection achieved, enhancing understanding of the learning process (Table 1).

## 5. Data Analysis

The research team is comprised of two experienced professionals. The first author has conducted qualitative research on multiple occasions and has four years of experience in delivering simulation training. The co-researcher has undergone formal training in qualitative research methods during a doctoral program and has over five years of experience in conducting simulation training.

The data analysis methodology involved a participant pool of 15 individuals. Each reflective journal was initially read to identify the general thematic content before employing Mezirow's seven levels of reflectivity to discern the depth of reflection achieved within each entry. This process was repeated to ensure no levels of reflection were overlooked, with identified reflection levels and corresponding statements being systematically tabulated. A frequency analysis was then conducted to ascertain the distribution of reflection levels across the journals. The analysis process was collaboratively executed by two researchers, who engaged in comparative discussions of themes, categories, and codes to reach a consensus on the reflection levels observed.

## 6. Rigor and Reflexivity

To uphold the rigor and reflexivity in this study, several methodological strategies were employed. Firstly, The Consolidated Criteria for Reporting Qualitative Research (COREQ) [17] guided the transparency and comprehensiveness in reporting research procedures, findings, and interpretations. This framework ensured that all aspects of the study were documented in a manner that allowed for reproducibility and scrutiny, contributing to the study's credibility.

In addition, a systematic approach to data collection and analysis was meticulously followed to enhance the study's

**Table 1.** Mezirow's Seven Level of Reflectivity

| | |
|---|---|
| Levels of consciousness | |
| Level 1 (reflectivity) | This refers to students' awareness of a specific perception, behavior, habit, experience and ability to describe it. |
| Level 2 (affective reflectivity) | This represents students' ability to recognize and express their feelings or those of others. |
| Level 3 (discriminant reflectivity) | This refers to students' ability to evaluate processes of decision-making, planning or evaluation of activities undertaken during the training period. |
| Level 4 (judgmental reflectivity) | Students are aware of expressing evaluation judgments subjective in nature that can influence practical actions. |
| Levels of critical consciousness | |
| Level 5 (conceptual reflectivity) | This represents the ability to recognize the need for improving their skills. |
| Level 6 (psychic reflectivity) | Students recognize that they tend to express rash judgments on other people based on limited information. |
| Level 7 (theoretical reflectivity) | This includes several elements: awareness that routine or certain fixed practices may not be the proper response in a specific situation; learning following a specific event; a change of perspective, since students follow the perspective that best suits to the situation. |

reliability and validity. This involved employing Mezirow's seven stages of reflection for a structured and consistent analysis of reflective journals, supported by frequency analysis to quantify the levels of reflection observed. Two researchers independently analyzed the data to ensure accuracy and objectivity in data interpretation. This independent analysis facilitated identifying and mitigating potential biases, with subsequent discussions held to reach aconsensus on the themes, categories, and codes derived from the data.

Reflexivity was maintained throughout the research process by continually reflecting on the researchers'assumptions, biases, and potential influences on the study's outcomes. This introspective practice was crucial for acknowledging and addressing the subjective elements inherent in qualitative research, thus enhancing the integrity and trustworthiness of the findings.

Overall, applying the COREQ guidelines, a rigorous methodological approach, and a commitment to reflexivity ensured that this study met high standards of quality and transparency. These efforts aimed at provide meaningful insights into the reflective learning processes of nursing students within simulation training, contributing valuable knowledge to the field of nursing education.

## RESULTS

### 1. General characteristics of participants

The study was conducted with 15 third-year nursing students at S University in Seoul. The participants had an average age of 22.46 years (standard deviation=2.12, ranging from 21 to 25 years). The group consisted of 5 male (33.3%) and ten female (66.7%) participants (Table 2).

### 2. Changes in Nursing Students' Reflection Levels

Reflection levels for each student were measured before and after the debriefing sessions, with detailed data recorded in Table 3. Before the debriefing, the total number of reflection levels was 545, with individual student number of reflection levels ranging from 19 to 59. After the debriefing, the total number of reflection levels increased to 829, with the number of reflection levels per studentranging from 41 to 72.

The changes in reflection level before and after debriefing can be summarized as follows:

Examining the changes in reflection level before and after debriefing, Level 1 (reflectivity) decreased from 61 points to 35, and following this trend, Level 2 (affective reflectivity) dropped from 12 points to 2, and Level 3 (discriminant reflectivity) saw a reduction from 243 points to 114. In contrast, a notable shift occurred with Level 4 (judgmental reflectivity) increasing from 108 points to 148, Level 5 (conceptual reflec-

**Table 2.** General characteristics of participants (*N*=15)

| Characteristics | Categories | n (%) | M±SD |
|---|---|---|---|
| Age (year) | | | 22.46±2.12 |
| Sex | Male | 5 (33.3) | |
| | Female | 10 (66.7) | |

M, mean; SD, standard deviation.

**Table 3.** The total number of reflection levels before and after debriefing in simulation training (*N*=15)

| Participants | Level 1 | | Level 2 | | Level 3 | | Level 4 | | Level 5 | | Level 6 | | Level 7 | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Before | After | Before | After | Before | After | Before | After | Before | After | Before | After | Before | After | Before | After |
| 1 | 4 | 1 | 0 | 0 | 12 | 6 | 16 | 20 | 5 | 0 | 0 | 6 | 0 | 28 | 37 | 61 |
| 2 | 1 | 1 | 4 | 0 | 3 | 6 | 28 | 20 | 10 | 0 | 0 | 12 | 0 | 21 | 46 | 60 |
| 3 | 1 | 1 | 0 | 0 | 9 | 0 | 12 | 12 | 5 | 5 | 18 | 12 | 14 | 42 | 59 | 72 |
| 4 | 2 | 2 | 0 | 0 | 21 | 6 | 12 | 4 | 0 | 0 | 6 | 36 | 0 | 14 | 41 | 62 |
| 5 | 4 | 4 | 0 | 0 | 21 | 9 | 8 | 8 | 0 | 15 | 0 | 6 | 0 | 0 | 33 | 42 |
| 6 | 3 | 2 | 0 | 0 | 27 | 15 | 4 | 8 | 0 | 0 | 0 | 18 | 0 | 7 | 34 | 50 |
| 7 | 1 | 0 | 2 | 0 | 27 | 9 | 4 | 12 | 0 | 5 | 6 | 12 | 0 | 28 | 40 | 66 |
| 8 | 9 | 3 | 4 | 2 | 6 | 3 | 0 | 8 | 0 | 15 | 0 | 6 | 0 | 14 | 19 | 51 |
| 9 | 5 | 3 | 0 | 0 | 18 | 3 | 4 | 16 | 0 | 0 | 0 | 18 | 7 | 14 | 34 | 54 |
| 10 | 4 | 2 | 0 | 0 | 21 | 12 | 0 | 4 | 0 | 5 | 6 | 6 | 7 | 28 | 38 | 57 |
| 11 | 9 | 5 | 0 | 0 | 9 | 3 | 0 | 12 | 0 | 5 | 0 | 12 | 7 | 7 | 25 | 44 |
| 12 | 7 | 4 | 0 | 0 | 12 | 12 | 8 | 8 | 0 | 5 | 0 | 12 | 0 | 0 | 27 | 41 |
| 13 | 5 | 2 | 0 | 0 | 15 | 12 | 4 | 4 | 0 | 0 | 12 | 12 | 0 | 28 | 36 | 58 |
| 14 | 3 | 3 | 2 | 0 | 15 | 9 | 4 | 4 | 0 | 0 | 18 | 24 | 0 | 14 | 42 | 54 |
| 15 | 3 | 2 | 0 | 0 | 27 | 9 | 4 | 8 | 0 | 5 | 0 | 12 | 0 | 21 | 34 | 57 |
| Total | 61 | 35 | 12 | 2 | 243 | 114 | 108 | 148 | 20 | 60 | 66 | 204 | 35 | 266 | 545 | 829 |

tivity) advancing from 20 points to 60, and Level 6 (psychic reflectivity) jumping from 66 points to 204. Finally, Level 7 (theoretical reflectivity) surged from 35 points before debriefing to 266 points after, highlighting the significant impact of debriefing on fostering more profound levels of reflective thinking among students.

The study revealed that after debriefing, there was a noticeable shift in reflection level among participants; reflectivity (Level 1), affective reflectivity (Level 2), and discriminant reflectivity (Level 3) experienced declines, indicating a move away from superficial and emotional reflection towards more analytical and deep-seated introspection, as evidenced by significant increases in judgmental reflectivity (Level 4), conceptual reflectivity (Level 5), psychic reflectivity (Level 6), and theoretical reflectivity (Level 7), highlighting the debriefing process's crucial role in fostering advanced reflective thinking and integrating theoretical knowledge with personal experience.

Specific Examples of Reflection Observed in the Reflection Journals.Students demonstrated various levels of reflection through their reflection journals.

**1) Level 1 (reflectivity)**

Scores decreased from 61 to 35. Pre-debriefing, students described basic situational details such as "The patient had suddenly developed difficulty breathing an hour after playing with friends" (pre-debriefing reflection journal n.5). Post-debriefing, observations became more clinically oriented: "The patient presented with difficulty breathing upon admission, with vital signs showing... blood oxygen saturation at 87% and audible wheezing" (post-debriefing reflection journal n.2).

**2) Level 2 (affective reflectivity)**

Scores dropped from 12 to 2. Emotional reactions were noted with students expressing regret about their actions, "I regret not checking the monitor continuously while providing care" (Pre-debriefing reflection journal n.2). This level of reflection evolved into more reflective regret, considering potential real-world implications, "Thinking about how it would have been in a real situation, I feel regretful for not performing the nursing care well" (Post-debriefing reflection journal n.6).

**3) Level 3 (discriminant reflectivity)**

Scores reduced from 243 to 114. Students initially evaluated their actions positively, "I think it was good to explain to the patient before performing the nursing actions" (pre-debriefing reflection journal n.1), but this evolved into a more collaborative reflection post-debriefing, highlighting team dynamics: "We quickly divided the roles; one performed the physical examination, and another measured the vital signs" (post-debriefing reflection journal n.6).

**4) Level 4 (judgmental reflectivity)**

Scores increased from 108 to 148. Reflections show growth in judgment-related insights, from initial simple improvements, "It would have been better if I had spoken to alleviate the child's anxiety while performing the procedure" (pre-debriefing reflection journal n.2), to more complex clinical decisions post-debriefing, "To ease the patient's breathing, I first put them in a semi-upright position and then provided oxygen and administered the nebulizer" (post-debriefing reflection journal n. 1).

**5) Level 5 (conceptual reflectivity)**

Scores advanced from 20 to 60. Students noted the need for deeper learning, "I think additional learning on precautions for each procedure and preparing for unexpected situations is necessary" (pre-debriefing reflection journal n.2), and post-debriefing, they connected this learning to preventing medication errors, "I administered the entire ample of nebulizer medication, but medication errors are dangerous, so I must always check the 5rights before administration" (post-debriefing reflection journal n.11).

**6) Level 6 (psychic reflectivity)**

Scores jumped from 66 to 204. Initial self-criticisms like "Feeling pressed for time, I failed to check the patient's oxygen saturation to see if their condition improved" (pre-debriefing reflection journal n.8) turned into lessons learned post-debriefing, "I made a mistake by arbitrarily stopping the oxygen supply during nebulizer administration today; I learned that oxygen delivery and nebulizer administration can co-occur and should not arbitrarily stop the oxygen supply" (post-debriefing reflection journal n.13).

**7) Level 7 (theoretical reflectivity)**

Scores surged from 35 to 266. Pre-debriefing insights into the importance of theoretical knowledge, "Seeing the terminology used in actual prescriptions at the hospital made me realize the importance of studying" (pre-debriefing reflection

journal n.9), were deepened by prioritizing clinical actions during emergencies, "In emergencies, it is more important to perform nursing interventions according to priority rather than explaining the purpose and procedure" (post-debriefing reflection journal n.15).

## DISCUSSION

The present study analyzes reflection journals written by 15 nursing students during simulation training utilizing a qualitative research methodology, aiming to provide researchers with a nuanced understanding of the changes in levels of reflection before and after the debriefing stages. Grounded in a profound comprehension of Mezirow's Reflective Theory [15], the findings explicitly illustrate how students who reached theoretical reflection (Level 7) reinterpreted their experiences to facilitate new learning. The study evaluates students'reflective capabilities according to Mezirow's levels of reflection, highlighting differences in these capabilities before and after the debriefing stage of simulation training. Notably, most students reached only the initial three levels of reflection before debriefing with the instructor. This finding aligns with Powell's [13] study, which observed that three levels of reflection were prevalent among nurses in their daily work.This outcome is consistent with previous research that analyzed nursing students'reflection journals during clinical practice using a similar tool, which reported that most exhibited levels of reflection at Level 3 or below [19]. An analysis of reflective journals written by 30 nursing students during their community health management practicums revealed that 94% demonstrated reflection at Level 3 or below. However, 22 of these students also achieved higher levels of conceptual and theoretical reflection [20], similar to this study's findings.

The results of this study suggest that debriefing sessions enhance nursing students' capacity for reflective thinking. The study reveals a significant improvement in reflection levels post-debriefing, particularly an increase in more profound levels of reflection (Level 5 and above). This indicates that debriefing with instructors is crucial in enhancing nursing students' reflective thinking abilities. The impact of instructor-student interaction on the level of reflective thinking was also identified as a critical element in the research by Peltier et al. [21]. Thus, the debriefing stage after the simulation training offers an opportunity to improve the quality of education and stimulate students' reflective thinking.

Furthermore, the results highlight the necessity of developing advanced, scenario-specific debriefing questions for self-report sessions, especially in virtual simulation training where direct instructor-led debriefing is impossible. This need arises from observations that students often focus primarily on the technical aspects of their skills during self-reports, which hinders deeper reflection. To address this, educators need to formulate debriefing questions that address technical proficiency and facilitate a comprehensive evaluation of decision-making, critical analysis, and emotional reactions, ensuring meaningful self-reflection even without direct instructor guidance. Previous research has indicated a deficiency in the questioning techniques of instructors intended to elicit reflection [22].

Overall, this research has significant implications for nursing educators in designing the reporting process. It emphasizes the importance of integrating various realistic scenarios into questions to encourage in-depth analysis and reflection on personal experiences, aiding in the development of student's abilities to effectively tackle complex issues in clinical settings. Thus, nursing educators must effectively design and implement the debriefing process to facilitate more profound reflective experiences and learning for students. The study utilizes Mezirow's Reflective Theory to analyze the reflective thinking process of nursing students, providing significant theoretical and practical contributions. The results underscore the importance of educational strategies and interventions in nursing education to enhance reflective thinking and equip educators with specific methodologies to improve students'reflective capabilities. This study emphasizes the directionsfor deep reflection in self-directed and instructor-led methods during the debriefing process. It presents research results showing that improved teaching techniques and strategies can positively impact the development of students' reflective thinking.These findings offer valuable insights for the enhancing and developing nursing education programs.

## CONCLUSION

This research explored the evolution of nursing students' reflective thinking before and after debriefing sessions in simulation training, aiming to enhance the efficacy of simulation education. Utilizing Mezirow's levels of reflection, the study demonstrated a significant deepening of students' reflective thinking post-debriefing, underscoring the pivotal role of debriefing in cultivating reflective skills essential for

clinical practice.

A primary strength of this research is its detailed application of Mezirow's Reflective Theory to analyze students' reflective journals. This analysis revealed a nuanced understanding of the reflective process and its progression through structured debriefing, with students notably advancing to higher levels of reflection, particularly theoretical reflection (Level 7). This highlights debriefing's critical role in promoting deep learning within nursing education.

The study advocates for integrating structured debriefing into nursing curricula to promote reflective and critical thinking skills actively. It recommends nursing educators develop debriefing questions that encourage deeper reflection and utilize frameworks such as the Debriefing Assessment for Simulation in Healthcare to enhance this process. Additionally, training educators in effective questioning techniques and debriefing strategies is crucial for nurturing higher levels of reflection.

Moreover, this research underscores the necessity of crafting advanced debriefing questions explicitly tailored for scenarios like virtual simulation training, where direct instructor-led debriefing is unavailable. These advanced questions facilitate deep self-reflection independently, addressing the shortcomings of current debriefing practices in online settings and ensuring comprehensive reflective engagement.

In conclusion, this study provides valuable insights into improving reflective thinking in nursing education. The suggested enhancements to debriefing practices, especially for online simulations, are pivotal in ensuring that nursing students are well-equipped with the necessary reflective skills for effective and autonomous clinical practice.

However, the study is limited by its small sample size and the specificity of the educational setting, which may limit the generalizability of the findings. Although the data collection method of debriefing writing allows participants to express their thoughts in a relatively free atmosphere, it is limited to the experiences of students from a single university engaging with a single scenario, potentially excluding various experiences.

Additionally, using self-reported data in reflective journals may introduce biases, as participants might alter their responses based on perceived expectations or social desirability. The study also lacks longitudinal data, which could provide insights into the long-term effects of debriefing on reflective thinking.

Future research should expand the exploration of reflective thinking across a more diverse student population and varied simulation training environments to enhance the applicability of these findings. A mixed-methods approach, triangulating data from self-reported reflective journals, observational data, and interviews, can provide a more comprehensive understanding of the reflective process.

## ARTICLE INFORMATION

### Authors' contribution

Conceptualization: all authors; Data collection, Formal analysis: all authors; Writing-original draft: all authors;Writing-review and editing: all authors; Final approval of published version: all authors.

### Conflict of interest

No existing or potential conflict of interest relevant to this article was reported.

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# Incidence of falls and fall-related characteristics in hospitalized children in South Korea: a descriptive study

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**Purpose:** With the recent increase in interest in patient safety, prevention of falls in hospitalized children has become important. This study aimed to identify the incidence rate of falls among hospitalized children and explore fall-related characteristics. **Methods:** This retrospective descriptive study analyzed the medical information of 18,119 patients aged <18 years admitted to a general hospital in South Korea from electronic medical records and fall event reports between January 1, 2018, and September 30, 2023. The study variables included the general and clinical characteristics of the fall group and fall-related characteristics of the fall events. This study employed descriptive statistics and a chi-square test using IBM SPSS version 26.0. **Results:** Among the patients, 82 fall events were identified. Therefore, the fall incidence rate was 4.5 falls per 1,000 patients. Furthermore, a statistically significant difference was found concerning the type of injury sustained between children >1 year old and those <1 year old, and most cases had no damage or bruises. More cases were found in which falls occurred two days after hospitalization in winter and summer than on the day or the day after hospitalization, which was a statistically significant difference. In addition, fall prevalence was higher between 8 am and 4 pm, and when no caregiver was present. **Conclusion:** Based on the results of this study, education and interventions to prevent fall events in infants and toddlers should persist throughout hospitalization, and it is necessary to guide continuous management and observation of the caregivers.

**Keywords:** Accidental falls; Child, hospitalized; Incidence

## INTRODUCTION

A fall is defined as an unintentional event that results in an individual descending to the bottom or a low level [1]. It is one of the most frequent patient safety issues in hospitals [2]. Fall-related injuries may be nonfatal, with mild clinical symptoms; however, some cases may be fatal, requiring long-term treatment or leading to death [1]. With the recent increase in emphasis on patient safety, hospitals have a responsibility to assess patients' fall risks during hospitalization and provide appropriate fall prevention interventions [3].

Although fall incidences are high in older adult patients with decreased physical and cognitive functions, hospitalized children are no exception [2]. Previous studies in the United States indicated that the fall incidence rate in hospitalized children was 0.84 to 2.19 falls per 1,000 patients per day [4,5]. In Japan, the fall incidence rate was 1.36 falls per 1,000 pediatric patients [6], and that among Saudi Arabia hospitalized pediatric patients in children's hospitals was 9.9

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falls per 1,000 patients [7]. While the reported fall event incidences varied among hospitalized children, the number of falls reported in South Korea from 2008 to 2017 was 0.03% [2]. Another study reported 0.7% fall incidences among hospitalized children at a university hospital in Korea [8]. Dissimilar to adults, children undergo a continuous developmental process, and falls are common, depending on motor development. In other words, falls among children can be considered a natural part of the process of growth and development, but unintended falls in hospitalized children who admitted to hospitals for treatment can decrease quality of care and cause a serious health outcome [4]. If there is no damage, the event may not be recognized as an accident [6]. The reported incidence rate among hospitalized children may not be accurate owing to cases of no damage after a fall and mild cases may not be reported [9]. However, a previous study found that 58.5% of children who fell sustained injuries, and 17% required secondary treatment; therefore, emphasizing the importance of fall prevention, management, and monitoring of hospitalized children [10]. In South Korea, for patient safety, it is included the assessment the risk of falls and fall prevention activities for hospitalized patients, including children, in the medical institution's accreditation criteria [3]. Amid the emphasis on the importance of fall management for hospitalized children, some studies evaluated the fall risk assessment tools for pediatric patients [3,8,11] and studies on fall prevention education are insufficient [12]. Recently, warnings of pediatric falls occurring in medical institutions have been issued, further emphasizing the need for education and publicity on pediatric falls [13].

Several factors increase hospitalized children's risk of falls. Infants fall as they roll, crawl on the bed, or start walking, whereas young children fall as they learn to run or use the toilet. Adolescents may also fall without asking for help when changing clothes or going to the bathroom [7]. In addition to age, movement status after hospitalization, hospital environment, previous fall experiences, convulsion-related conditions, and use of dangerous medications are known to increase the fall risk [3,7]. In a total of 291 pediatric falls reported in the Korea patient safety reporting and learning system, the environmental factors of pediatric falls were related to the bed rails (36.1%), absence of carers (25.7%), pedestrian aids (6.9%), chairs (3.0%), and medical devices (1.2%) [13]. Accordingly, fall risk assessment tools that consider the characteristics of children's developmental age, sex, previous fall experience, medical diagnosis, hospitalized days, and parental cooperation have been developed. Many hospitals use these tools to assess fall risk and implement fall prevention interventions when children are admitted [8]. However, differences in evaluation items are evident among these tools; therefore, some studies analyzing the prediction of tools for the appropriate use of fall risk tools have been introduced [7,11,14]. However, given the number of variables that cannot be limited to specific factors, a multifaceted approach to situational factors related to falls in hospitalized children is required [4].

A study that analyzed fall characteristics in hospitalized children reported that falls occurred in 54% of patients during the day shift, 48% during the first five days after hospitalization, and 74% in the hospital room [7]. In another study, falls were most common on the 3rd day after hospitalization, with one-third occurring in the afternoon [5]. An analysis of the characteristics of hospitalized children who fell in Korea indicated that many boys aged 1–3 or 1–6 years old and those with respiratory diseases who sustained open wounds and bruises were the most common at 35.3% [2,3]. A previous study explored the fall occurrence time and place in hospitalized children in Korea [15]; however, limited to no identifying characteristics were identified from recent data reflecting the latest domestic clinical environment. Furthermore, although the cooperation of the parent was a major factor in pediatric falls, 84% of infants and 82% of all children experienced falls even in the presence of the parent [5,6]. In addition, hospitalized children's falls were accidental during breastfeeding, children fell while moving, or fell from beds or chairs [2,16]. And the unfamiliar environment of a hospital is a cause of falls [2]. Therefore, more detailed consideration and preparation for preventive monitoring are required to prevent falls among hospitalized children by exploring various aspects of the fall risk among the hospitalized children.

Hospitals have supervision and management systems that improve the quality of medical care through patient safety accident reports. However, falls in hospitalized children using these systems have been reported continuously. Therefore, this study aimed to retrospectively analyze the fall event report data of children under the age of 18 over the past five years to determine the actual incidence fall rate of hospitalized children. In addition, this study explored and identified differences in fall-related characteristics according to the age of the children and the time of fall. This study's hypothesis posited that the characteristics of fall events differ according to the age of the child and the day of the fall among hospital-

ized children. The hypothesis was established by considering the developmental age of children in which mobility through walking and by referring to previous studies in which pediatric falls were different depending on the hospitalization day [5,7].

The developmental age in which exercise ability through walking was considered, and a hypothesis was established by referring to the studies in which falls were different depending on the hospitalization date.

Through this study, it could provide evidence for developing more practical and effective intervention plans to prevent and reduce the risk of falls among pediatric inpatients.

## METHODS

**Ethical statements:** This study was approved by the Institutional Review Board (IRB) of Kangwon National University Hospital (No. KNUH-2024-02-007). This study received a consent waiver.

### 1. Study Design

This retrospective descriptive study analyzed the medical information of all patients under the age of 18 years who were admitted to a general hospital in South Korea using electronic medical records and fall event reports. The reporting of this study was based on the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guidelines [17].

### 2. Sample

A total number of 18,119 children under the age of 18 were discharged from the hospital after being admitted to a general hospital located in K province between January 1, 2018, and September 30, 2023. Among them, a total of 82 patients reported fall events among the patient safety accidents and were classified as the fall group, and the remaining 18,037 patients were classified as the non-fall group.

### 3. Variables

#### 1) General characteristics of hospitalized children

The general characteristics of the hospitalized children included the year and season of hospitalization, sex, age, hospitalized days, and diagnosis. Age was classified as <1 year, 1–3 years, 3–5 years, and >5 years. Hospital days were classified as 1–3 days, 3–7 days, and >7 days. Diagnoses were based on the Korean Standard Classification of Diseases (https://kcdcode.kr).

#### 2) Clinical characteristics of fall group

Clinical characteristics of the fall group included previous hospitalization (yes/no), medical equipment, and initial fall risk scale scores. Intravenous lines, nasal cannulas, pulse oximeters, electrocardiogram monitors, and splints for medical equipment were considered duplicates.

#### 3) Fall-related characteristics of fall events

The fall-related characteristics included the day of fall occurrence after hospitalization, time, location, related furniture/ equipment, patient bed side rail, caregiver presence (yes/no), the primary cause of the fall, and type of injury. Day of fall occurrence after hospitalization was classified as "on the day or the next day" and "after the second day." Time of fall was classified as "between midnight and 8 am," "between 8 am and 4 pm," and "between 4 pm and midnight." Locations were classified as "patient rooms," "corridors," "shower rooms/public bathrooms," "other hospital areas," or "outside hospital." Related furniture/equipment were classified as "patient bed," "other bed such as caregiver's or exam room's," "stroller/ wheelchair," or "not applicable." The side rail of the patient bed was classified as "raised," "lowered," "unknown," or "not applicable." The primary cause of fall events was classified as "child-related," "caregiver-related," or "environment-related." Child-related factors included "active behavior of child such as playing, running or standing," "child's immature motor developmental stage," and "child's physiologic condition." Caregiver-related factors included "temporary absence of the caregiver's gaze," "caregiver moving out of bed," and "lack of attention of caregiver such as sleeping." Type of fall-related injury was classified as "only bruise," "abrasion and bruise," hematoma," "laceration," or "no injury."

### 4. Data Analysis

First, fall incidence was calculated as the number of falls per 1,000 patients. Second, descriptive statistics were used to examine the clinical and fall-related characteristics of the fall group. Third, a chi-square test was performed to identify differences in proportions according to age and day of fall oc-

currence among the fall groups. The Fisher's exact test was performed if the expected frequency was <5. All statistical analyses were performed using IBM SPSS Statistics for Windows (version 26.0; IBM Corp.), with the significance level set at .05.

## RESULTS

### 1. Fall Event Incidence Rate among Hospitalized Children

The fall incidence rates in hospitalized children are presented in Table 1. Among the patients (n=18,119), the number of fall events was 82. Therefore, the fall incidence rate was 4.5 falls per 1,000 patients. The incidence rate was high, at 7.1, in 2021, and 6.4 in 2022, with significant differences by year ($p$=.022). Additionally, it was the highest, at 5.2, in spring and fall seasons, and 4.8 for boys, which was higher than 4.2 for girls; however, no significant difference was identified. The fall incidences among 1 to 3 years were very high at 11.4, and in the case of being hospitalized for more than seven days, it was high at 6.6; there were significant differences between age ($p$<.001) and hospitalization days ($p$=.008). Furthermore, fall incidences due to respiratory and mental diseases were high, at 11.2 and 13.9, respectively.

### 2. Clinical and Fall-Related Characteristics in Fall Group

Tables 2 and 3 present the clinical and fall-related charac-

**Table 1.** Incidence Rates of Falls in Hospitalized Children ($N$=18,119)

| Categories | | Fall | Non-fall | Total | Incidence rate[a] | $p$-value |
|---|---|---|---|---|---|---|
| | | n | n | n | | |
| Year of hospitalization | 2018 | 18 | 3,551 | 3,569 | 5.0 | .022 |
| | 2019 | 13 | 3,388 | 3,401 | 3.8 | |
| | 2020 | 6 | 2,262 | 2,268 | 2.6 | |
| | 2021 | 17 | 2,367 | 2,384 | 7.1 | |
| | 2022 | 22 | 3,417 | 3,439 | 6.4 | |
| | 2023 | 6 | 3,052 | 3,058 | 2.0 | |
| Season of hospitalization | Spring (Mar–May) | 24 | 4,632 | 4,656 | 5.2 | .662 |
| | Summer (Jun–Aug) | 19 | 4,893 | 4,912 | 3.9 | |
| | Autumn (Sep–Nev) | 21 | 4,005 | 4,026 | 5.2 | |
| | Winter (Dec–Feb) | 18 | 4,507 | 4,525 | 4.0 | |
| Sex | Male | 47 | 9,664 | 9,711 | 4.8 | .286 |
| | Female | 35 | 8,373 | 8,408 | 4.2 | |
| Age (year) | <1 | 27 | 6,661 | 6,688 | 4.0 | <.001 |
| | 1–3 | 45 | 3,911 | 3,956 | 11.4 | |
| | 3–5 | 3 | 1,833 | 1,836 | 1.6 | |
| | >5 | 7 | 5,632 | 5,639 | 1.2 | |
| HD (day) | 1–3 | 23 | 8,129 | 8,152 | 2.8 | .008 |
| | 3–7 | 46 | 7,965 | 8,011 | 5.7 | |
| | >7 | 13 | 1,943 | 1,956 | 6.6 | |
| Diagnosis | Respiratory/pulmonary | 46 | 4,047 | 4,093 | 11.2 | |
| | Gastrointestinal/digestive | 7 | 1,836 | 1,843 | 3.8 | |
| | Infectious disease | 13 | 1,295 | 1,308 | 9.9 | |
| | Renal/urinary | 5 | 522 | 527 | 9.5 | |
| | Neurologic/nervous system | 3 | 363 | 366 | 8.2 | |
| | Skin/musculoskeletal/orthopedic | 1 | 347 | 348 | 2.9 | |
| | Trauma/injury/poisonings | 1 | 703 | 704 | 1.4 | |
| | Psychological | 3 | 213 | 216 | 13.9 | |
| | Others | 3 | 7,821 | 7,824 | 0.4 | |
| | EENT/craniofacial | 0 | 495 | 495 | 0 | |
| | Endocrine/metabolic | 0 | 262 | 262 | 0 | |
| | Cardiac | 0 | 77 | 77 | 0 | |
| | Hematology/oncology | 0 | 56 | 56 | 0 | |
| Total | | 82 | 18,037 | 18,119 | 4.5 | |

[a]per 1,000 patients; HD, hospital days; EENT, eye ear nose throat.

**Table 2.** Clinical Characteristics of Fall Group in Hospitalized Children (*N*=82)

| Categories | | n (%) |
|---|---|---|
| Year of hospitalization | 2018 | 18 (22.0) |
| | 2019 | 13 (15.9) |
| | 2020 | 6 (7.3) |
| | 2021 | 17 (20.7) |
| | 2022 | 22 (26.8) |
| | 2023 | 6 (7.3) |
| Season of hospitalization | Spring (Mar–May) | 24 (29.3) |
| | Summer (Jun–Aug) | 19 (23.2) |
| | Autumn (Sep–Nev) | 21 (25.6) |
| | Winter (Dec–Feb) | 18 (22.0) |
| Sex | Male | 47 (57.3) |
| | Female | 35 (42.7) |
| Age (year) | < 1 | 27 (32.9) |
| | 1–3 | 45 (54.9) |
| | 3–5 | 3 (3.7) |
| | > 5 | 7 (8.5) |
| HD (days) | 1–3 | 23 (28.0) |
| | 3–7 | 46 (56.1) |
| | > 7 | 13 (15.9) |
| Diagnosis | Respiratory/pulmonary | 46 (56.1) |
| | Gastrointestinal/digestive | 7 (8.5) |
| | Infectious disease | 13 (15.9) |
| | Renal/urinary | 5 (6.1) |
| | Neurologic/nervous system | 3 (3.7) |
| | Skin/musculoskeletal/ orthopedic | 1 (1.2) |
| | Trauma/injury/poisonings | 1 (1.2) |
| | Psych | 3 (3.7) |
| | Others | 3 (3.7) |
| Previous hospitalization experience | Yes | 33 (40.2) |
| | No | 49 (59.8) |
| Medical equipment (multiple response) | Intravenous line | 75 (91.5) |
| | Nasal cannula | 3 (3.7) |
| | Pulse oximeter | 19 (23.2) |
| | EKG monitor | 2 (2.4) |
| | Splint | 1 (1.2) |

HD, hospital days; EKG, electrocardiogram.

**Table 3.** Fall-related Characteristics of Fall Group in Hospitalized Children (*N*=82)

| Categories | | n (%) |
|---|---|---|
| Day of fall after hospitalization | On the day of hospitalization or the next day | 36 (43.9) |
| | After two days | 46 (56.1) |
| Time of fall | Between midnight and 8 am | 20 (24.4) |
| | Between 8 am and 4 pm | 33 (40.2) |
| | Between 4 pm and midnight | 29 (35.4) |
| Location | Patient room | 74 (90.3) |
| | Corridor | 2 (2.4) |
| | Shower room/public bathroom | 3 (3.7) |
| | Other hospital areas | 2 (2.4) |
| | Outside hospital | 1 (1.2) |
| Related furniture/ equipment | Patient bed | 63 (76.8) |
| | Other bed | 4 (4.9) |
| | Stroller/wheelchair | 7 (8.5) |
| | Not applicable | 8 (9.8) |
| Side rail of patient's bed | Raised | 42 (51.2) |
| | Lowered | 8 (9.8) |
| | Unknown | 13 (15.9) |
| | Not applicable | 19 (23.1) |
| Caregiver present | Yes | 64 (78.0) |
| | No | 18 (22.0) |
| Primary cause of fall | Child-related | |
| | Active behavior of child | 25 (30.5) |
| | Child's immature motor developmental stage | 3 (3.7) |
| | Child's physiological condition | 5 (6.1) |
| | Caregiver-related | |
| | Temporary absence of the caregiver's gaze | 24 (29.3) |
| | Caregiver moving out of bed | 10 (12.2) |
| | Lack of attention of caregiver | 6 (7.3) |
| | Environmental-related | 9 (10.9) |
| Type of injury | Bruise | 18 (22.1) |
| | Abrasion and bruise | 9 (10.9) |
| | Hematoma | 2 (2.4) |
| | Laceration | 1 (1.2) |
| | No injury | 52 (63.4) |

teristics of the fall group. The number of falls was the highest in 2022 (26.8%) and in spring (29.3%). Boys accounted for 57.3% and those aged 1 to 3 years accounted for 54.9%. In addition, falls most frequently (56.1%) occurred between days 3 and 7 of hospitalization and accounted for the majority (56.1%) of respiratory diseases. Furthermore, 59.8% of patients had no previous hospitalization experience, 91.1% had venous lines.

A total of 56.1% of the falls occurred on the second day after hospitalization, and 40.2% occurred between 8 am and 4 pm. Most of these occurred in the hospital room, and 76.8% occurred in the patient's bed. At the time of the fall, 51.2% had a raised side rail, and 78.0% had a caregiver present. Among the primary causes of falls, the active behavior of children was the highest at 30.5%, followed by the temporary absence of the caregiver's gaze (29.3%) and the caregiver's movement out of bed (12.2%). After the fall, 63.4% had no injury, while 22.1% had only bruises.

### 3. Characteristics of Fall Events According to Child's Age

Table 4 presents the differences between fall events under

**Table 4.** Characteristics of Fall Events According to Child's Age (*N*=82)

| Categories | | < 1 year n (%) | ≥ 1 year n (%) | *p*-value |
|---|---|---|---|---|
| Season | Spring (Mar–May) | 7 (25.9) | 17 (30.9) | .453 |
| | Summer (Jun–Aug) | 9 (33.3) | 10 (18.2) | |
| | Autumn (Sep–Nev) | 5 (18.5) | 16 (29.1) | |
| | Winter (Dec–Feb) | 6 (22.2) | 12 (21.8) | |
| Sex | Male | 18 (66.7) | 29 (52.7) | .168 |
| | Female | 9 (33.3) | 26 (47.3) | |
| Previous hospitalization experience | Yes | 10 (37.0) | 23 (41.8) | .433 |
| | No | 17 (63.0) | 32 (58.2) | |
| Day of fall after hospitalization | On the day of hospitalization or the next day | 14 (51.9) | 22 (40.0) | .350 |
| | After two days | 13 (48.1) | 33 (60.0) | |
| Time of fall | Between midnight and 8 am | 5 (18.5) | 15 (27.3) | .726 |
| | Between 8 am and 4 pm | 12 (44.4) | 21 (38.2) | |
| | Between 4 pm and midnight | 10 (37.0) | 19 (34.5) | |
| Location | Patient room | 26 (96.3) | 48 (87.3) | .718 |
| | Corridor | 0 (0.0) | 2 (3.6) | |
| | Shower room/public bathroom | 0 (0.0) | 3 (5.5) | |
| | Other hospital areas | 1 (3.7) | 1 (1.8) | |
| | Outside hospital | 0 (0.0) | 1 (1.8) | |
| Related furniture/equipment | Patient bed | 23 (85.2) | 40 (72.7) | .127 |
| | Other bed | 2 (7.4) | 2 (3.6) | |
| | Stroller/wheelchair | 2 (7.4) | 5 (9.1) | |
| | Not applicable | 0 (0.0) | 8 (14.5) | |
| Side rail of patient's bed | Raised | 18 (66.7) | 24 (43.6) | .262 |
| | Lowered | 2 (7.4) | 6 (10.9) | |
| | Unknown | 2 (7.4) | 11 (20.0) | |
| | Not applicable | 5 (18.5) | 14 (25.5) | |
| Caregiver present | Yes | 21 (77.8) | 43 (78.2) | .588 |
| | No | 6 (22.2) | 12 (21.8) | |
| Primary cause of fall | Child-related | | | .247 |
| | Active behavior of child | 6 (22.2) | 19 (34.5) | |
| | Child's immature motor developmental stage | 1 (3.7) | 2 (3.6) | |
| | Child's physiological condition | 0 (0.0) | 5 (9.1) | |
| | Caregiver-related | | | |
| | Temporary absence of the caregiver's gaze | 10 (37.0) | 14 (25.5) | |
| | Caregiver's moving out of bed | 6 (22.2) | 4 (7.3) | |
| | Lack of attention of caregiver | 2 (7.4) | 4 (7.3) | |
| | Environmental-related | 2 (7.4) | 7 (12.7) | |
| Type of injury | Bruise | 4 (14.8) | 14 (25.5) | .027 |
| | Abrasion and bruise | 6 (22.2) | 3 (5.5) | |
| | Hematoma | 2 (7.4) | 0 (0.0) | |
| | Laceration | 0 (0.0) | 1 (1.7) | |
| | No injury | 15 (55.6) | 37 (67.3) | |

one year and those over one year. A statistically significant difference was found in the type of damage in children over 1 year old compared with children under 1 year old ($p = .027$), and more cases of no damage (67.3%) or only bruises (25.5%) were found. No significant differences were found between the two groups concerning the other categories.

### 4. Characteristics of Fall Events According to Day of Fall Occurrence

Table 5 presents the differences in the characteristics of the events according to the day of the fall occurrence. More cases were prevalent in which falls occurred two days after hospitalization in winter (32.6%) and summer (26.0%) than on the day or the day after hospitalization, with a statistically signif-

**Table 5.** Characteristics of Fall Events According to Day of Fall Occurrence (*N*=82)

| Categories | | On the day of hospitalization or the next day | After two hospital days | *p*-value |
|---|---|---|---|---|
| | | n (%) | n (%) | |
| Season | Spring (Mar–May) | 14 (38.9) | 10 (21.7) | .022 |
| | Summer (Jun–Aug) | 7 (19.4) | 12 (26.1) | |
| | Autumn (Sep–Nev) | 12 (33.3) | 9 (19.6) | |
| | Winter (Dec–Feb) | 3 (8.3) | 15 (32.6) | |
| Sex | Male | 23 (63.9) | 24 (52.2) | .201 |
| | Female | 13 (36.1) | 22 (47.8) | |
| Previous hospitalization experience | Yes | 14 (38.9) | 19 (41.3) | .503 |
| | No | 22 (61.1) | 27 (58.7) | |
| Age (year) | <1 | 14 (38.9) | 13 (28.3) | .218 |
| | ≥1 | 22 (61.1) | 33 (71.7) | |
| Time of fall | Between midnight and 8 am | 8 (22.2) | 12 (26.1) | .039 |
| | Between 8 am and 4 pm | 10 (27.8) | 23 (50.0) | |
| | Between 4 pm and midnight | 18 (50.0) | 11 (23.9) | |
| Location | Patient room | 32 (88.9) | 42 (91.3) | .941 |
| | Corridor | 1 (2.8) | 1 (2.2) | |
| | Shower room/public bathroom | 2 (5.6) | 1 (2.2) | |
| | Other hospital areas | 1 (2.8) | 1 (2.2) | |
| | Outside hospital | 0 (0.0) | 1 (2.2) | |
| Related furniture/equipment | Patient bed | 26 (72.2) | 37 (80.4) | .166 |
| | Other bed | 3 (8.3) | 1 (2.2) | |
| | Stroller/wheelchair | 5 (13.9) | 2 (4.3) | |
| | Not applicable | 2 (5.6) | 6 (13.0) | |
| Side rail of patient's bed | Raised | 18 (50.0) | 24 (52.2) | .862 |
| | Lowered | 3 (8.3) | 5 (10.9) | |
| | Unknown | 5 (13.9) | 8 (17.4) | |
| | Not applicable | 10 (27.8) | 9 (19.6) | |
| Caregiver present | Yes | 32 (88.9) | 32 (69.6) | .032 |
| | No | 4 (11.1) | 14 (30.4) | |
| Primary cause of fall | Child-related | | | .456 |
| | Active behavior of child | 9 (25.0) | 16 (34.8) | |
| | Developmental state | 2 (5.6) | 1 (2.2) | |
| | Physiologic condition of child | 2 (5.6) | 3 (6.5) | |
| | Caregiver-related | | | |
| | Temporary absence of the caregiver's gaze | 12 (33.3) | 12 (26.1) | |
| | Caregiver's moving out of bed | 2 (5.6) | 8 (17.4) | |
| | Lack of attention of caregiver | 4 (11.1) | 2 (4.3) | |
| | Environmental-related | 5 (13.9) | 4 (8.7) | |
| Type of injury | Bruise | 25 (69.4) | 27 (58.7) | .606 |
| | Abrasion and bruise | 6 (16.7) | 12 (26.1) | |
| | Hematoma | 3 (8.3) | 6 (13.0) | |
| | Laceration | 1 (2.8) | 1 (2.2) | |
| | No injury | 1 (2.8) | 0 (0.0) | |

icant difference ($p$=.022). In addition, fall time was higher between 8 am and 4 am (50.0%) ($p$=.039), and the prevalence was higher when no caregiver was present (30.4%) ($p$=.032).

## DISCUSSION

This retrospective study aimed to identify incidence of falls among children admitted to a general hospital in South Korea over the recent five years and to explore fall-related characteristics in the fall event group. This study's results indicated that the incidence of falls in hospitalized children over the past five years was 4.5 per 1,000 patients, which exceeds the 0.03% reported in a previous study using data from the national hospital discharge in-depth injury survey [2]. Howev-

er, some studies have reported a different incidence than that reported in this study. Another study reported the incidence of falls in children aged under 13 years at a university hospital from July 2017 to January 2018 as 0.7% [8]. The fall incidences in a hospital in Saudi Arabia were reported to be 9.9% [7]. In this study, the hospital from which data was collected required a report about fall events regardless of whether injuries were sustained during hospitalization; since it may include all reported fall events, all actual falls could be calculated. In addition, it is meaningful to understand the average incidence rate of falls over the last five years compared to previous studies that investigated a short period. However, the number of children hospitalized in 2020 and 2021 owing to the COVID-19 pandemic and the inclusion of data only until September 2023 should be considered to determine a more accurate incidence rate. In this study, the fall incidence rate between the ages of 1 to 3 years was the highest, at 11.4. Even in the data reported at Miami children's hospital in the United States, the most falls were reported at 19 to 24 months [16], more falls were reported at 1 to 6 years old in South Korea than in those under the age of one or over the age of seven years [2], similar to the average age of 32.9 months in the fall group [8]. Children in the early childhood developmental stages may experience an increase in their level of activity according to their motor developmental status, which is not sophisticated. Therefore, considering that toddlers' risk of falling is higher than that of infants under the age of one year old, more careful preventive interventions are required when toddlers are admitted to a hospital. In this study, the fall incidences increased with the number of hospitalization days. Similarly, in Turkey, increased length of hospital stays for the children carried a higher risk for pediatric inpatient falls [18]. It should be considered that there were few children hospitalized for more than seven days compared to short-term hospitalization; however, the need to continue fall prevention interventions is raised by considering the condition and treatment of hospitalized children following long-term hospitalization. In this study, the diagnosis with the highest fall incidence rate was respiratory disease, followed by psychiatric disease. Respiratory diseases are the most frequent among hospitalized children; therefore, several children were diagnosed. The high fall incidence rates in psychiatric diseases are comparable to the results of a previous study showing that the risk of falls was the third highest in psychiatric diseases such as attention deficit hyperactivity disorder and impulse control disorders in Children's Memorial samples in the United States [16]. Special consideration of fall risk is required for hospitalized children with psychiatric diseases.

Regarding the fall-related characteristics of the 82 cases in the fall group, 56.1% occurred after two days of hospitalization, indicating that falls occur not only in unfamiliar hospitalization environments but also in familiar environments. In addition, fall events occurred at any time of the day but were mostly prevalent between 8 am and 4 pm, and most of them fell from their hospital beds. Unlike this study, Italian hospitals reported the highest rate of falls in bathrooms from early evening to night time [19]. Therefore, the time of fall occurrence needs to be considered together with the location of the fall and the situation at the time. One of the characteristics of the children's fall events was that they fell even though their beds' side rail was raised; therefore, even if the side rail was raised, the risk of falls may remain. There were fall events in strollers or wheelchairs, most of which were reportedly owed to not wearing seatbelts. Therefore, the emphasis on safety devices when using transportation should continue. Fall events were common even when caregivers were present; however, they were caused by the behavior of the children such as walking or running. Additionally, when caregivers temporarily averted their attention from their child, several instantaneous fall events occurred. Causes of falls in pediatric inpatients were loss of balance of child, lack of attention on behalf of parents, and stumbling [19]. Because most parent were present in fall events of child, parent presence is not protective against the falls of their children in hospital [20,21]. Actually, the parents' knowledge that children may fall during parental presence rated the lowest score in Australia [22]. This emphasizes the importance of evaluating whether parents have accurate knowledge and perception of child falls and educating them. On the other hand, parents or caregiver stress, anxiety, and fatigue affect their care for hospitalized children [18], therefore prior to fall preventive education, it is needed to assess their psycho emotional state. The careful monitoring and management of caregivers are required in consideration of the child's developmental age and parent's caring ability. Regarding fall injury type, 63.4% of the cases had no injury after the fall event, followed by bruises, accounting for 22.1%. However, in addition to the bruise, some have also been reported to occur damages such as fractures and cerebral hemorrhage [2]. In the case of a serious injury related to falls, and in these cases, more long-term treatment is required; therefore, the risk of fall injury should always be noted [10].

To identify the specific characteristics of fall events in toddler, this study compared the fall characteristics of those under 1 year old and those over 1 year old. When comparing fall characteristics according to age, a significant difference was observed concerning the type of injury in the fall group under and over the age of one year. The proportion of abrasions with bruises was higher among children under the age of one year than among those over the age of one year; therefore, it is necessary to examine the degree of injury in fall events in infants under the age of one year and to check for bruises or wounds on the skin or soft tissues.

Lastly, in order to explore how the characteristics of each time the falls occurred are different, it was compared the fall-related characteristics on the date of the fall. A significant difference was observed in the season of occurrence, the time of occurrence, and the presence of a caregiver between the group that experienced a fall on the day of hospitalization or the next day and the group that experienced a fall two days after hospitalization. The group that experienced falls on the day of hospitalization or the next day was common in spring and autumn and between 4 pm and midnight. Conversely, the number of cases that occurred two days after hospitalization was higher in summer and winter, and between 8 am and 4 pm. Even though seasonal difference should be considered together in various aspects, such as the occurrence of acute diseases and increase of children's activity, our result suggests that it has to be noticed the risk of falls considered seasons and hospital days together. The hospitalization day was a related factor influencing falls in hospitalized children [4], fall events time was more in day shift [7]. Depending on our findings, so, it should be taken in to account that the longer hospitalization days, the risk of falls occurring even during the morning and afternoon, when there is more active time. Therefore, intensive observation is required when the risk of fall events is high, depending on hospitalization days. In addition, more cases were found where fall events occurred two days after hospitalization and no caregiver was present. This result suggests that if hospitalization continues, the caregiver is more likely to leave the child's bedside for a while, increasing the number of fall events. This suggests that there is a possibility that falls may occur as the hospitalization date passes, along with the consequences of falling even though the caregiver resides. This can be attributed to the caregivers' complacency according to the familiarity of the hospital environment and lack of awareness of the risk of falls [22,23]. Therefore, fall prevention education for hospitalized children should not be limited to the early stages of hospitalization but should continue throughout hospitalization, and continuous education and observation are required to ensure the awareness and attention of caregivers concerning fall events [12]. Pediatric nurses play an important role in patient safety by observing children and communicating with parents. The fall risk assessment of nurses should be done well [24], and training for preventive education is required [25]. But various methods of promotion and guidance are also needed so that parents continue to recognize and pay attention to the risk of falls for their child.

This study had several limitations. First, this study analyzed data from one general hospital; therefore, the results may not be generalizable to hospitalized children in South Korea. Second, this study did not include all the various clinical characteristics of the children and caregivers; therefore, attention should be paid to the interpretation of the results. Third, this study included changes of inpatients due to restrictions on pediatric wards during the COVID-19 pandemic; therefore, the consideration of these special period is needed.

## CONCLUSION

This study was conducted to identify the incidence rate of falls in hospitalized children in South Korea and to explore the differences in fall-related characteristics according to the age of the children and the date of fall occurrence after hospitalization. The results indicated that the incidence rate of falls in hospitalized children was 4.5 per 1,000 patients, and a significant difference was observed concerning the type of injury in children over the age of one compared with those under the age of one. Additionally, more cases were identified in which no caregiver was present during fall events after the second day of hospitalization than during fall events on the first or second day of hospitalization. Based on the results of this study, education and intervention to prevent falls in infants and toddlers should be conducted throughout hospitalization, and it is necessary to guide the continuous management and observation of caregivers.

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### Authors' contribution

Conceptualization: all authors; Data collection: Hyeyeong

Park; Formal analysis: all authors; Writing-original draft: all authors; Writing-review and editing: Hyunju Kang; Final approval of published version: all authors.

## Conflict of interest

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# Evaluation of a child abuse prevention program for unmarried mothers in South Korea: a single-case experimental design

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**Purpose:** This study aimed to implement a child abuse prevention program and evaluate its effectiveness based on the Nursing Model of Resilience and Coping Skills Training Model for unmarried mothers during pregnancy and puerperium. **Methods:** This study had a prospective single-case, AB design with four repeated self-questionnaire measures and three observational measures. Seven unmarried mothers were provided with 10 sessions child abuse prevention program through individual visits from 32 to 34 weeks of pregnancy to six weeks after childbirth. The questionnaire was composed related to resilience, maternal stress, maternal attitude, parent-child interaction, child abuse potential. The observation was measured by video recording (total 16 times) the interaction of parent-child during feeding and analyzing it by three experts. Data were analyzed by Wilcoxon signed-rank test and Friedman's test. **Results:** Maternal attitude and parent-child interaction were statistically significantly improved after intervention compared to before intervention. However, maternal stress decreased after intervention compared to before intervention, but it was not statistically significant. Additionally, resilience and child abuse potential were not statistically significant. This program is partially effective in preventing child abuse by promoting parenting attitudes and parent-child interactions. **Conclusion:** This study focused on individual resilience and applied systematic intervention as coping skills training to prevent child abuse. This study is meaningful in that interventions were conducted through individual visits to unmarried mothers at high risk of child abuse, and the program was applied, including pregnancy and postpartum periods, to prevent child abuse early.

**Keywords:** Child abuse; Coping skills; Primary prevention; Resilience, psychological; Unmarried mothers

## INTRODUCTION

Child abuse is a worldwide problem, and 300 million children aged 2 to 4 years regularly suffer from child abuse by parents and caregivers [1]. According to the Child Abuse Statistics in Korea, 53,932 child abuse cases were reported in 2021, which is 27.6% higher than in the previous year. In Korea, child abuse is mainly caused by parents (83.7%) [2]. Child abuse has long-term and short-term fatal consequences for children, especially in infants and toddlers, which can have a permanent negative impact on brain development and cause physical disabilities and mental trauma [3].

Previous studies have classified unmarried mothers as a high-risk group for child abuse because of social stigma, low

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socioeconomic status, and loss of social support [4]. Being a parent of an unmarried mother is perceived as a major stressor that leads to sudden, unintended change in life. Unmarried mothers are more vulnerable to stress than normal parents due to financial difficulties, conflict with people around them caused by childbirth and parenting, and worries about their future [4]. In Korea, unmarried mothers experience negative emotions such as frustration, shame, anxiety, and depression due to social prejudice. They also become socially isolated by quitting their jobs, distancing themselves from their families and losing contact with their friends [5]. Social support and family functions affect abusive behavior by relieving or aggravating stress, and the risk of child abuse increases further when socially isolated or having problems with family relationships [6].

However, not all parents with risk factors for child abuse are child abusers due to differences in how individuals manage stressful situations. What should be noted here is individual resilience [7]. Resilience is the ability to effectively handle stressful situations and adapt positively when faced with a crisis [8]. Resilience is an important factor in preventing child abuse because it allows successful management of stress and increases the possibility of engaging in adaptive and approachable coping strategies rather than evasive coping strategies [9]. There is a method of coping skills training as an effective way to enhance the individual's resilience. Coping Skills Training is a professional and systematic cognitive-behavioral method that provides effective coping skills in stressful situations [10]. Coping Skills Training facilitates anger control for high-risk parents of child abuse and reduces negative parenting behavior by applying effective response methods to children's problem behavior [11]. In the first study, we developed a resilience improvement domain considering the four elements of Polk's nursing model of resilience [12] to prevent child abuse by unmarried mothers [13]. Based on the first study, the research aimed to apply and evaluate child abuse prevention programs with the coping skills training method.

Resilience is mentioned as a major factor in child abuse prevention programs because it functions to lower the likelihood of becoming a perpetrator of child abuse to socially and economically vulnerable parents [14]. The Georgia government's child abuse prevention program for high-risk groups of child abuse focuses on emotional regulation, thinking skills, and parental skills to improve parental resilience [15]. Easterbrooks et al. [14] compared the group that did not commit child abuse despite having child abuse risk factors and the group that reported child abuse, emphasizing that resilience is an important factor in preventing child abuse.

As for the approach to child abuse prevention intervention, individual home visit programs are known to be the most effective. This is because home visits have good accessibility and can address individual issues [16]. In addition, 32 to 34 weeks of pregnancy is an important period of maternal role acquisition and attachment, and pregnancy is an important time to prevent child abuse that can detect and correct problems that may arise after delivery [17].

Therefore, in this study, intervention was conducted individual visit method to provide customized education considering unmarried mothers' situations and programs including pregnancy and postpartum periods were applied individually to prevent child abuse early.

## 1. Conceptual Foundation

This study consisted of elements to improve resilience to prevent child abuse [13] based on Polk's [12] Nursing Model of Resilience and applied Cameron and Meichenbaum's [10] coping skills training model as an intervention method.

This study basically assumes that efficient adaptation and recovery can be induced by improving resilience in stressful situations faced by unmarried mothers [18]. The use of healthy stress coping methods in stressful situations increases resilience [7,19], and coping skills training is a way to train effective coping skills that can be applied in stressful situations, and can induce desirable adaptation [20]. Coping skills training teaches parents how to deal with antecedent factors and outcomes more effectively, and is applicable to programs to prevent child abuse by allowing parents to act as desirable and adaptive models of behavior [11].

This study assumed that child abuse prevention programs improve the resilience of unmarried mothers, thereby reducing maternal stress, and improving desirable maternal attitude, and parent-child interaction. Unmarried mothers often show less interaction with their children because their attachment to them is unstable [21], and unstable parent-child interactions act as stressors, leading to the use of physical corporal punishment [22]. Negative maternal attitude and parent-child interaction are closely related to child abuse [23], and child abuse can be caused by inappropriate coping with stressful situations [22]. In particular, parenting stress can increase the mother's helplessness and aggression, resulting in

negative consequences such as child abuse and neglect [24]. Ultimately, we assume that this program will lead to positive adaptation and recovery that will reduce child abuse potential by adequately coping with stressful situations.

This study composes the content of child abuse prevention programs around four components of Polk's [12] Nursing Model of Resilience: philosophical pattern, dispositional pattern, situational pattern, and relational pattern. The application of intervention shall be carried out in accordance with the three stages of coping skills training: conceptualization, skill acquisition and rehearsal, and application [10].

This study's conceptual foundation and the relationship between the study variables are shown in Figure 1.

### 2. Aim

This study aims to apply and evaluate the child abuse prevention program based on coping skills training and the nursing model of resilience for unmarried mothers during pregnancy and puerperium.

## METHODS

**Ethical statements:** This study was approved by the Institutional Review Board (IRB) of Korea university (IRB No. KU-IRB-16-153). Informed consent was obtained from all participants.

We explained that the results of the study would not be used anywhere but for research purposes. We assured complete anonymity and confidentiality of personal information. Additionally, they were informed that they could drop out of the study at any time without any consequences.

### 1. Design

This study had a prospective single-case, AB design with four times repeated self-questionnaire measures and three phases observational measures with each participant (Figure 2). A single-case design is an experimental research method of measuring and evaluating behavioral characteristics and behavioral changes of individuals with specific problems,

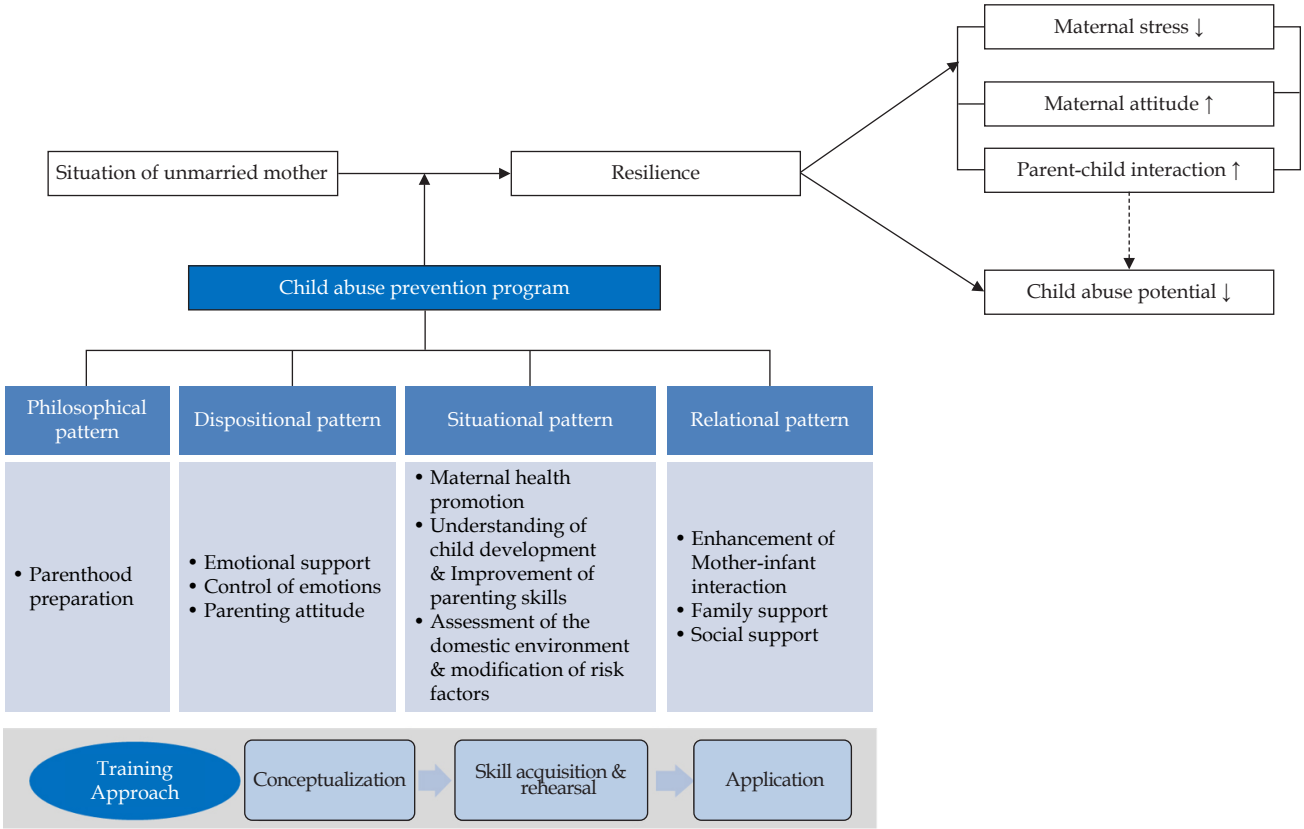
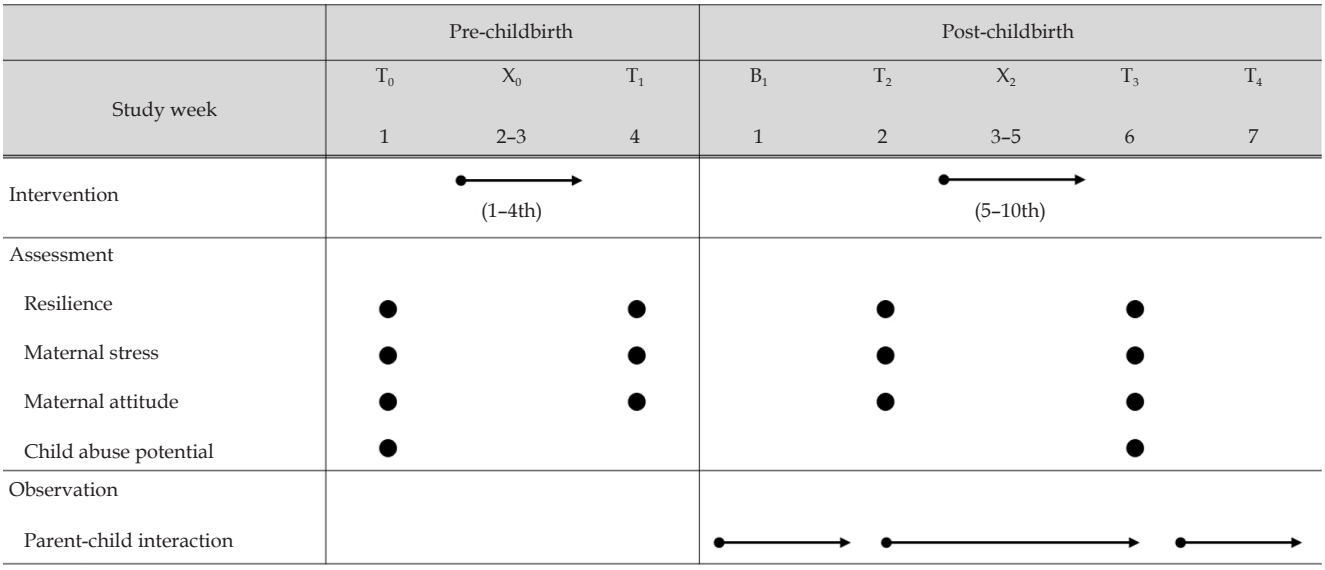



**Figure 1.** Conceptual framework and relationship with research variables.




Pre-childbirth : $T_0$ (Pre-intervention), $X_1$ (Intervention), $T_1$ (Post-intervention)
Post-childbirth : $B_1$ (Baseline), $T_2$ (Pre-intervention), $X_2$ (Intervention), $T_3$ (Post-intervention), $T_4$ (Post-intervention)

**Figure 2.** Data collection and progress procedure.

and is a research method used when it is necessary to deal with a small number of cases with practical problems in depth [25]. The reporting of this study was based on the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guidelines [26].

## 2. Participants

The participants were recruited from two facilities for unmarried mothers in Seoul from October 2018 to July 2019. The targets were unmarried mothers who were 32 to 34 weeks pregnant, when they decided to raise their children were included in the study. Unmarried women were selected based on who had not given birth before, were pregnant for 32-34 weeks, and planned to raise their children. Eight people participated in the program, but one of them was dropped due to early contractions. Therefore, seven participants finally participated in this study.

## 3. Intervention

This program consists of four pre-childbirth and six post-childbirth education sessions. The content is organized in terms of four patterns of Polk's [12] resilience model: philosophical pattern (one session), dispositional pattern (three sessions), situational pattern (three sessions), and relational pattern (three sessions) [13]. Park and Oh [13] divided the components for each pattern into 10 domains and 24 subdomains. The intervention consisted of lowering the risk factors of abuse in unmarried mothers and appropriately dealing with stress cases that could increase the risk of abuse. The main contents are parenthood preparation, control of emotions, parenting skill and enhancement of mother-infant attachment.

The program applied the three-step approach of the coping skills training model of Meichenbaum and Cameron [10]: conceptualization, skill acquisition and rehearsal, and application. During the conceptualization phase, the participants' cognitive, emotional, and physiological factors were clarified through interviews to identify the participants' problems. Second, in the skills acquisition and rehearsal phase, the participants were required to practice adaptive skills related to problem-solving to acquire the appropriate methods and skills. In the final application phase, an example of a problem situation that could actually occur was given to the participants, and the participants were asked to apply the acquired problem-solving skill to that situation. Intervention was applied individually according to the situation and request of the subjects.

## 4. Measure

### 1) Resilience

Resilience was measured with a Korean version of the Conner-Davidson Resilience Scale developed by Connor and Davidson [27]. This tool includes items such as control, commitment, and change viewed as challenge. The tool totals 25 items, consisting of a five-point scale ranging from 0 points to 5 points. The full range is from 0 to 100, with higher scores reflecting greater resilience. The Cronbach's alpha was .947.

### 2) Maternal stress

Maternal stress was measured by Chun [28]. This tool consists of questions such as 'feeling frustrated' and 'feeling nervous' when looking back on the role of parents. Each item ranges from 1 point to 4 points, and the overall score ranges from 7 points to 28 points, with higher scores reflecting higher stress. The Cronbach's alpha was .911.

### 3) Maternal attitude

The maternal attitude was measured as a tool by Han and Park [29]. In this study, 20 of the 23 items of this tool were used except for 3 breastfeeding items. Each question consists of questions that measure thoughts on parenting, such as "a baby has his or her personality from birth" and "It is better to hug or take care of a baby whenever he or she cries." Each item ranges from 1 point to 5 points, and the overall score ranges from 20 points to 100 points. A higher score means a higher degree of agreement on positive statements relating to infant rearing. The Cronbach's alpha was .838.

### 4) Parent-child interaction

The parent-child interaction was measured on the Nursing Child Assessment Feeding Scale of Barnard [30]. The tool measures parent-child interaction in feeding through observation, consisting of a total of 76 items. The score is the sum of "yes" for each question consisting of "yes" and "no," and a higher score means a higher interaction level of mother and infant. The video data (total 16: baseline 5, intervention 6, post-test 5 times) taken with an action-cam in the feeding situation (breast and bottle feeding) was measured by a qualified expert, researcher, and research assistant. The qualified expert, who was trained and certified by Nursing Child Assessment Satellite Training (NCAST), supervised the researcher and research assistant.

A video of approximately 20 minutes of each individual contains the entire process from the start to the end of the feeding. The researcher, qualified expert, and research assistant divided 25 images each and analyzed them without duplication. The kappa analysis tested the reliability between the measurers. The kappa coefficient between researcher and qualified expert was .915, and the kappa coefficient between researcher and research assistant was .889. The Cronbach's alpha was .833.

### 5) Child abuse potential

Child abuse potential was measured using a 77-item child physical abuse scale of the 160 Child Abuse Potential Inventory (CAPI) developed by Milner [31]. This tool was translated and modified by Ahn et al. [32]. CAPI measure "yes" and "no," whether they agree or disagree with each question. The overall score ranges from 0 points to 483 points, and a higher score means a higher degree of the potential of child abuse. Each item's weight is between a minimum of 1 point and a maximum of 23 points. The Cronbach's alpha was .868.

## 5. Procedure

Specific procedures are as follows (Figure 2).

### 1) Pre-childbirth

The pre-childbirth phase begins between 32 and 34 weeks of pregnancy and consists of $T_0$ (pre-test), $X_1$ (intervention), and $T_1$ (post-test). In $T_0$ (pre-test) and $T_1$ (post-test), surveys and interviews were conducted to assess child abuse risk factors. In $X_1$ (intervention), four educations consisting of 40 minutes per session were provided.

### 2) Post-childbirth

The post-childbirth phase consists of $B_1$ (baseline), $T_2$ (pre-test), $X_2$ (intervention), $T_3$ (post-test), and $T_4$ (post-test). In $B_1$ (baseline), $X_2$ (intervention), and $T_4$ (post-test), parent-child interaction variables as observation were measured. In $T_2$ (pre-test) and $T_3$ (post-test), surveys and interviews were conducted. In $X_2$ (intervention), six educations were provided.

## 6. Data Analysis

The collected data were analyzed by quantitative analyses. Quantitative analysis was conducted using the statistical program IBM SPSS Statistics 24.0 (IBM Corp.) and a visual anal-

ysis was conducted on graphical data. Data were analyzed by Wilcoxon signed-rank test and Friedman's test, a nonparametric method of analyzing repeated measured data that does not follow normal distribution [33]. Resilience, maternal stress, maternal attitude and parent-child interaction were analyzed by Friedman's test. The post-hoc analysis was verified using the Bonferroni Correction Method. Child abuse potential was analyzed by Wilcoxon signed-rank test.

## RESULTS

### 1. Participants' Characteristics

There were a total of seven participants; three in teens, three in 20s, and one in 30s, with three graduating from middle school and four graduating from high school.

The CAPI score, measured before the intervention, was the highest at 246 points for participant G, followed by 226 points for participant D and 201 points for participant A. All three were diagnosed and treated for general anxiety disorder and depression. Participant A and D experienced neglect in childhood and participant G was physically abused. Milner [31] classifies CAPI 166 points and above as a high-risk group of child abuse. The general characteristics of the participant are shown in Table 1.

### 2. Quantitative Analysis Results

The statistical analysis results are as follows (Table 2, Figure 3).

#### 1) Resilience

Resilience increased from $T_0$ 60.86 to $T_1$ 65.86, followed by $T_2$ 64.00 and $T_3$ 63.71. However, the effect of this program on resilience was not statistically significant. By participant, the $T_3$ resilience score was higher than $T_0$ in all participants except participant G.

#### 2) Maternal stress

Maternal stress decreased from $T_0$ 12.43 to $T_1$ 11.71 and continued to decrease to $T_2$ 11.57 and $T_3$ 10.29. However, it was not statistically significant. The scores for maternal stress of participants A, B, and C were the highest in $T_1$ but decreased after childbirth. Participants D and G had the highest maternal stress scores at the time of $T_2$ after birth, and participant E had little change in the maternal stress score at the time of measurement.

#### 3) Maternal attitude

The effect of this programs on maternal attitude was statistically significant ($\chi^2=8.631$, $p=.035$). The maternal attitude was 65.71 for $T_1$, 67.71 for $T_2$, and 66.71 for $T_3$. By participant, the $T_3$ score was higher than $T_0$ in all participants except participant G.

#### 4) Parent-child interaction

The effect of this programs on parent-child interaction was statistically significant ($\chi^2=8.54$, $p=.008$). Parent-child interaction continued to increase from $B_1$ 33.14 to $X_2$ 38.79 and $T_4$ 45.19. Parent-child interaction increased continuously in participants A, B, D, and E. However, there were no significant changes in the parent-child interaction scores for participants C ($B_1$ 42.80, $X_2$ 42.00, $T_4$ 42.80) and F ($B_1$ 32.00, $X_2$ 35.67, $T_4$ 35.50).

#### 5) Child abuse potential

Child abuse potential decreased from $T_0$ 144.71 to $T_3$ 115.14 but was not statistically significant. By participant, the potential score for child abuse in participants A, C, D, and G was all lower at $T_3$ than $T_0$. However, participants B, E, and F had an increase in child abuse potential scores at the time of $T_3$ over $T_0$.

**Table 1.** General Characteristics of Participants (*N*=7)

| Participant | Age (year) | Educational level | Experience of child abuse (type) | Health problem (diagnosis) | CAPI score |
|---|---|---|---|---|---|
| A | 33 | High school | Neglect | Nervousness | 201 |
| B | 23 | High school | - | - | 83 |
| C | 20 | High school | - | - | 44 |
| D | 18 | Middle school | Neglect | Bipolar disorder, Generalized anxiety disorder | 226 |
| E | 18 | Middle school | - | - | 68 |
| F | 18 | Middle school | Verbal abuse | - | 145 |
| G | 27 | High school | Physical abuse | Generalized anxiety disorder, Depression | 246 |

CAPI, Child Abuse Potential Inventory.

**Table 2.** Scores of Variables

| Variables | Pre-childbirth | | | | Post-childbirth | | | | $\chi^2$ | $p^*$ | Post hoc |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | $T_0$(a) | $X_1$ | $T_1$(b) | $B_1$(c) | $T_2$(d) | $X_2$(e) | $T_3$(f) | $T_4$(g) | | | |
| | M±SD | M±SD | M±SD | M±SD | M±SD | M±SD | M±SD | M±SD | | | |
| Resilience | 60.86±13.26 | | 65.86±18.38 | | 64.00±14.33 | | 63.71±15.54 | | 3.44 | .345 | |
| Maternal stress | 12.43±3.95 | | 11.71±4.27 | | 11.57±3.74 | | 10.29±2.43 | | 2.65 | .470 | |
| Maternal attitude | 62.29±4.79 | | 65.71±4.89 | | 67.71±3.99 | | 66.71±5.59 | | 8.63 | .035* | a<d |
| Child abuse potential | 144.71±81.52 | | | | | | 115.14±54.13 | | 0.68 | .578 | |
| Parent-child interaction | | | | 33.14±6.36 | | 38.79±6.55 | | 45.19±6.90 | 8.54 | .008* | c<g |

*$p$<.05; M, mean; SD, standard deviation; Pre-childbirth: $T_0$ (Pre-intervention), $X_1$ (Intervention), $T_1$ (Post-intervention); Post-childbirth: $B_1$ (Baseline), $T_2$ (Pre-intervention), $X_2$ (Intervention), $T_3$ (Post-intervention), $T_4$ (Post-intervention); Post hoc: a=$T_0$, b=$T_1$, c=$B_1$, d=$T_2$, e=$X_2$, f=$T_3$, g=$T_4$.

## DISCUSSION

This study was conducted to test the effectiveness of a child abuse prevention program based on the nursing model of resilience and coping skills training. This study consisted of 10 sessions to improve the resilience of unmarried mothers [13], and applied child abuse programs to unmarried mothers based on the coping skills training model.

Existing child abuse prevention programs were mainly implemented in terms of improving the health of individual parents and improving the relationship between parents and children [1]. However, there is a lack of child abuse prevention programs for unmarried mothers only and child abuse prevention studies focusing on improving individual resilience [17]. Unmarried mothers are different from single parents due to bereavement or separation [13]. They are more likely to be unprepared to be parents due to sudden pregnancy, feelings of anger and depression toward their boyfriends, and decreasing and shrinking self-esteem because of social stigma [13]. Therefore, it is considered important that the child abuse prevention program of unmarried mothers can develop resilience to effectively deal with stress situations and show desirable recovery and adaptation. This program is meaningful in that it consists of interventions with elements that improve the resilience of unmarried mothers and applies coping skills training as an intervention principle to enhance the specificity of the application of the program.

The discussion based on the main findings is as follows. The child abuse prevention program had significantly affected the promotion of maternal attitude and parent-child interaction of unmarried mothers. The previous studies have reported that child abuse programs, which focus on child-rearing knowledge education and providing child-rearing skills, positively impact maternal attitude [34]. Khosravan et al. [34] support the results of this study by reporting that positive parenting attitudes increased and abuse behavior decreased significantly compared to the control group when providing parenting education for mothers in high-risk child abuse for eight weeks.

The previous studies have also reported that programs with video feedback of mother-child interaction and maternal sensitivity improvement have a positive effect on parent-child interaction in high-risk groups of child abuse [35]. Moss et al. [35] reported that when video feedback programs on mother-child interaction were provided for eight weeks for high-risk mothers of child abuse with children aged 1 to 5

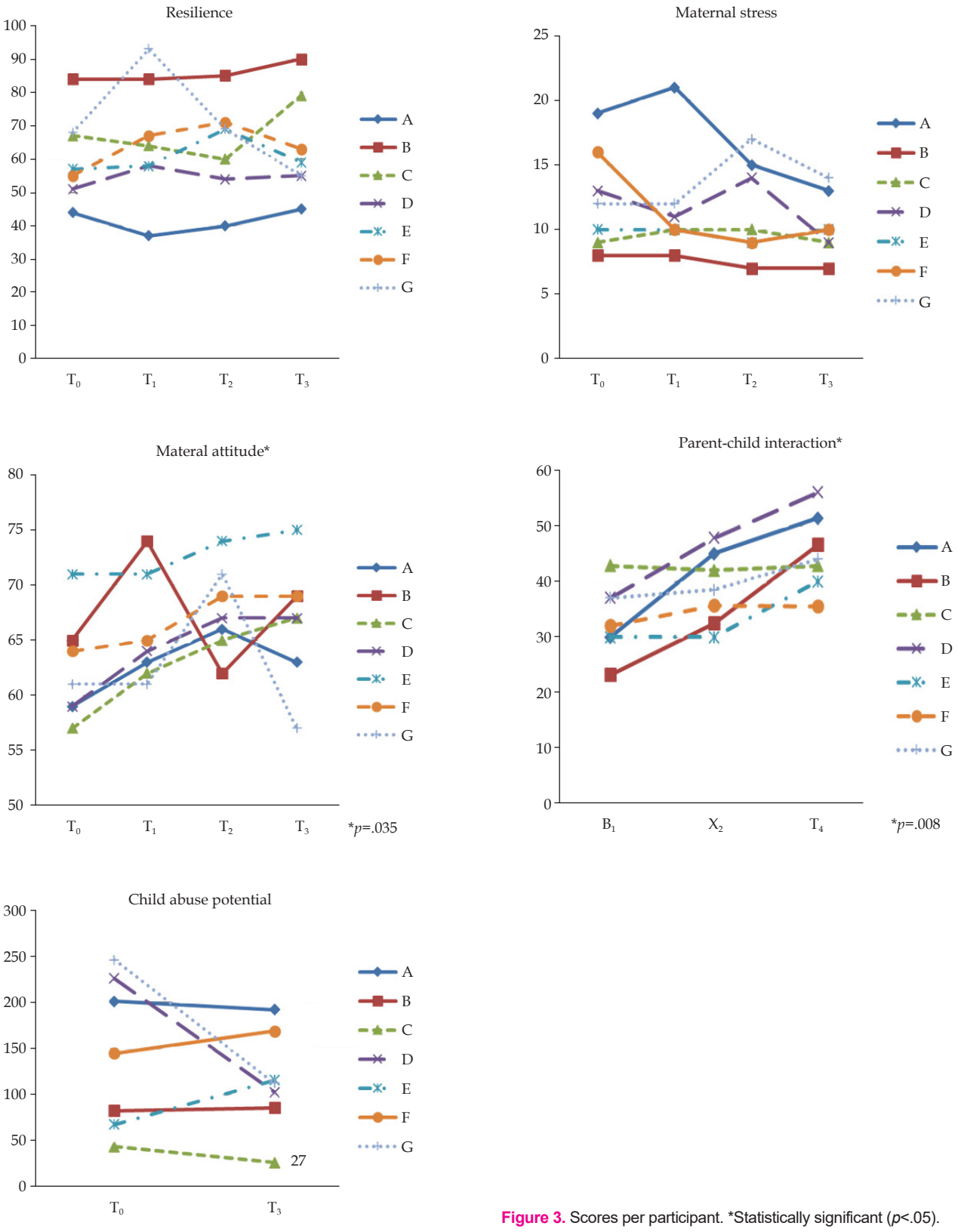



**Figure 3.** Scores per participant. *Statistically significant ($p$<.05).

years, maternal sensitivity and child stability affection increased, and the quality of mother-child interaction improved. Thomas et al. [36] reported that providing a parent-child interaction program to mothers in high-risk child abuse groups for 12 weeks to increase maternal sensitivity to children's signals is effective not only in enhancing parent-child interaction but also in reducing child abuse potential. Our program is a useful program in that it has shown statistical significance in promoting positive parenting attitudes and parent-child interactions, which are mentioned as essential factors in preventing child abuse of high-risk mothers.

However, the child abuse prevention program's effect on resilience in this study was not statistically significant. Given that resilience is a concept that can be defined over a long period and is gradually formed throughout the entire life process [19], it is thought that the intervention period of fewer than three months in this study would not have been sufficient for the enhancement of resilience to be significant. In addition, resilience is a response to a crisis that occurs between individuals and the environment, which varies depending on the situation and the resources available [9]. The changes in resilience shown in this study are also believed to have been caused by individual environmental factors. In particular, economic factors and conflict factors with boyfriends were difficult to control, and changes existed at different measurement points. Subject G's resilience increased at the time of $T_0$ and $T_1$ before childbirth, but the resilience decreased significantly at $T_2$ and $T_3$ after childbirth, and it is thought that the change of mind of the trusted boyfriend greatly influenced the resilience. To minimize external influences, such as family and boyfriend relationships, future studies should include them as factors in the intervention. Additionally, the effectiveness of the program through comparison with the control group needs to be measured. It is also necessary to expand the application period of the program to be studied repeatedly.

The program's effects on maternal stress, and child abuse potential were not also statistically significant. Existing studies emphasize resilience as an important prerequisite to reducing the potential of child abuse in high-risk groups [9]. However, in this study, it is believed that the above variables did not have significant effects because the improvement in the resilience of unmarried mothers was not significant as a leading factor in reducing child abuse potential.

In this study, 4 out of 7 subjects had a lower child abuse potential score after intervention than before intervention, but the remaining 3 increased. In a study by Baggett et al. [37], when the coaching intervention program was applied to the high-risk group of child abuse with a child abuse potential score of 166 or higher and the low-risk group with a child abuse potential score of less than 166, a significant reduction in the potential score of child abuse was found in the high-risk group with a high child abuse potential score. In this study, the high-risk group with a child abuse potential score of 166 or higher before intervention also had a decrease in scores after intervention. However, the participants with a child abuse potential score of 166 or less had higher scores after the intervention. This may be because the items of the child abuse potential tool included psychological condition factors and were thus influenced by external elements. Since the CAPI comprised 77 questions, the participants, especially those with a lack of sleep and those who are tired, may have had difficulties concentrating and accurately checking in at the early stages of childbirth.

In addition, the reduction in limited maternal stress is thought to be related to the timing of the measurement. The measurement period of this study is the end of pregnancy and postpartum period, with the greatest changes in women's lives, during which women experience significant challenges and stress [38]. Especially for primigravida, parental role stress increases further during this period [38]. Considering that the end of pregnancy and postpartum period are periods of high change and increased stress, although there was no statistical significance, it can be considered that the reduction in maternal stress during this period was the effect of this program.

This study is meaningful in that it focuses on individual resilience to prevent child abuse by unmarried mothers. In addition, this program is meaningful in that it is a one-on-one intervention considering the individual situation of single mothers and that it has increased the accessibility of participants through individual visits. However, there is a limitation in that the number and duration of interventions could not be differentiated according to the individual characteristics of the subject and the needs. In particular, it is thought that the above limitations of the study affect the research results in that variables such as resilience have large individual differences and are influenced by the environment.

Despite the above limitations, it is of great significance that it can be prevented before child abuse occurs by providing the required intervention to high-risk groups of child abuse.

This study can be considered important that it provided a basis for a strategy to prevent child abuse by unmarried mothers with babies for six weeks after childbirth from pregnancy.

## CONCLUSION

The child abuse prevention program in this study has been proven to be partially effective in preventing child abuse because it promotes maternal attitude and parent-child interaction. However, the end of pregnancy is the period of puerperium and many changes; it is difficult to distinguish between changes according to the characteristics of timing and changes due to intervention. It is necessary to look at the effectiveness of intervention by distinguishing change through comparison with the control group, noting the timing. In addition, it is necessary to study it by increasing the number of participants and the measurement period.

In the future, the child abuse prevention program of this study can be used not only for unmarried mothers living in facilities but also for unmarried mothers staying at home. In addition, based on the results of this study, the application period of the program should be expanded to develop and apply detailed programs for each stage of child development.

## ARTICLE INFORMATION

### Authors' contribution

Conceptualization: all authors; Data collection, Formal analysis: Il Tae Park; Writing-original draft: Il Tae Park; Writing-review and editing: all authors; Final approval of published version: all authors.

### Conflict of interest

Won-Oak Oh has been an editor of *Child Health Nursing Research* since 2022. She was not involved in the review process of this article. No existing or potential conflict of interest relevant to this article was reported.

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### Data availability

Please contact the corresponding author for data availability.

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# South Korean first-time mothers' knowledge of digestive health problems in infancy and their utilization of health care facilities for digestive health concerns: a descriptive study

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**Purpose:** This study aimed to assess the knowledge level of first-time mothers regarding digestive health issues in infancy and to examine the utilization of healthcare facilities for such problems. **Methods:** Data from 119 first-time mothers of infants under 6 months of age were analyzed. Descriptive statistics, t-test, and one-way analysis of variance (ANOVA) were conducted using the SPSS software. **Results:** The average correct response rate for first-time mothers' knowledge of digestive health problems in infancy was 61.9%. The highest correct response rate was observed for infantile colic, while diarrhea had the lowest. Less than 50% of mothers received education on infant digestive health problems across all categories. Among digestive health problems in infancy, diarrhea exhibited the highest rate of healthcare utilization, whereas infantile colic had the lowest. First-time mothers' knowledge of digestive health problems in infancy varied based on maternal age (t=-3.66, $p$<.001), education level (t=-2.26, $p$=.026), and planned pregnancy (t=3.24, $p$=.002). Moreover, mothers who received education on infant digestive health problems demonstrated better overall knowledge of digestive health problems. **Conclusion:** The rate of education regarding digestive health problems during infancy among first-time mothers was < 50%. Furthermore, mothers educated on infant digestive health issues exhibited improved knowledge. Therefore, it is necessary to provide appropriate pre-education to primiparous common gastrointestinal health issues in infants.

**Keywords:** Digestive system; Health services; Infant; Mothers

## INTRODUCTION

Infancy is a period of rapid growth and development that presents parents with numerous questions as they nurture their children. Owing to the immaturity of their digestive, nervous, and immune systems, infants commonly experience mild digestive health issues stemming from deficiencies in digestive juices and enzymes [1]. While these issues may seem minor, they can manifest in a variety of forms, ranging from acute to chronic, and occasionally pose serious threats to well-being such as severe dehydration, aspiration, bowel obstruction, acute bilirubin encephalopathy, and nuclear jaundice. Moreover, digestive health problems often lead to emotional distress in parents, resulting in frequent changes in formula and visits to healthcare facilities [2].

Studies conducted in Australia have highlighted that di-

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gestive health problems are the third most common cause of hospitalization among infants under one year of age [3]. Similarly, according to a survey on treatment experiences in healthcare facilities during infancy conducted in Korea, jaundice (20.2%) and gastrointestinal infections (17.2%) have been identified as heightened following respiratory infections [4].

In most instances, mothers play a pivotal role in discerning early indicators of illness in infants because of their prolonged and intimate interactions with the baby, enabling them to monitor their well-being consistently. Consequently, mothers must possess adequate knowledge and awareness to recognize the potential risk factors in their infants and undertake appropriate actions [5,6]. Specifically, to address digestive health issues during infancy, a solid foundation in parental education is essential, with family education serving as a cornerstone for preventing ailments from escalating into emergencies [7,8]. Thus, mothers require a comprehensive understanding of digestive health concerns in infants to safeguard their offspring's health and welfare [9,10].

In particular, novice mothers require increased social support and expert guidance in navigating the complexities of childcare alongside access to numerous childcare resources [11]. Furthermore, maternal confidence in infant care flourishes upon receiving professional guidance, feedback on caregiving practices, and precise responses to their inquiries [12]. Specifically, caregivers demonstrated a notable demand for education beyond fundamental infant care, encompassing aspects such as jaundice recognition, identification of abnormal symptoms, and acquisition of skills to manage sudden infant illnesses, including familiarity with emergency procedures [9,13,14].

Understanding digestive health issues in infants is paramount, given the nuanced presentation of symptoms compared to other ailments, underscoring the indispensable role of maternal knowledge in discerning the baby's condition. Moreover, maternal awareness regarding infantile digestive health problems is anticipated to impact the infant's well-being and shape patterns of healthcare utilization. A recent study in India focused on maternal knowledge of digestive health problems in infants [15]. Studies conducted in Korea on mothers' knowledge of infant care have mostly focused on general infant care skills, such as bathing, umbilical cord management, diaper changing, temperature measurement, feeding, and observation of abnormal signs. However, research specifically examining mothers' knowledge of digestive health issues in infants is scarce [13,14,16]. Consequently, this study endeavored to explore the knowledge of first-time mothers concerning infantile digestive health problems and their utilization of healthcare services in response to such issues.

This study aimed to investigate the knowledge levels of first-time mothers concerning digestive health problems in infants and to determine healthcare utilization patterns related to these concerns. The specific aims of this research were as follows: 1) evaluate participants' knowledge levels regarding digestive health problems during infancy; 2) ascertain healthcare utilization trends concerning digestive health problems in infants among the participants' babies; 3) identify differences in knowledge regarding infantile digestive health problems according to participants' demographic characteristics; 4) determine differences in knowledge regarding infantile digestive health problems according to whether participants have received education specifically addressing these issues.

## METHODS

**Ethical statements:** This study was approved by the Institutional Review Board (IRB) of Seoul National University (IRB No. 2302/001-011). This study received a consent waiver.

### 1. Study Design

This descriptive study aimed to investigate the knowledge level of first-time mothers regarding digestive health problems in infancy and elucidate their utilization of healthcare facilities in response to infantile digestive issues. The reporting of this study was based on the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guidelines.

### 2. Setting and Samples

The target population of this study comprised first-time mothers who had given birth within the last six months. The inclusion criteria stipulated that participants must (a) have delivered their first baby with a gestational period of 37 weeks or more or a birth weight of 2,500 g or more and (b) be legal adults. The exclusion criteria were as follows: (a) mothers raising babies with congenital disorders and (b) mothers raising babies with genetic disorders.

Using G*power 3.1, accounting for one-way ANOVA, α=.05, power of 80%, effect size 0.3 [17], and three groups, a priori sample size was calculated to be 111. Considering an expected incomplete response rate, 131 participants were recruited for this study. Among 131 sets of questionnaires collected, 119 were deemed suitable for analysis, and 12 sets of responses were excluded because they did not meet the research criteria.

## 3. Measurements and Instruments

### 1) Demographic variables

The questionnaire included sociodemographic factors such as age, marital status, education level, employment status, and income level. It also inquired about the place of delivery, planned pregnancy status, and high-risk pregnancy status. Moreover, the survey assessed whether the participants had received education regarding digestive health problems in infancy, specifying the source of education, and inquired about any digestive system health issues experienced while caring for their babies. Furthermore, the survey collected data on infant age, singleton/multiple birth status, and birth weight.

### 2) Knowledge of digestive health problems in infancy

The authors conducted an extensive literature review to develop a questionnaire to assess mothers' knowledge of digestive health problems in infancy [7,18-20]. Each item in the questionnaire was designed to measure general knowledge about common digestive health problems in infancy, such as diarrhea, constipation, infantile colic, neonatal jaundice, vomiting, gastroesophageal reflux, and coping skills. Scores were assigned as follows: one point for a correct answer and zero points for responses marked as "I do not know" or incorrect answers. The possible score range was 0–53 points, with higher scores indicating a higher level of maternal knowledge of infant digestive system health problems.

To ensure content validity, the tool was scrutinized by five experts, including two pediatricians, two pediatric nursing professors, and a nurse with more than 10 years of experience in the neonatal intensive care unit. They evaluated the appropriateness of each item using a 4-point Likert scale. Items that received a rating of 3 points (appropriate) or 4 points (very appropriate) from 80% or more of the experts were retained. Consequently, 6 of the initial 60 items were excluded, resulting in 53 final items. Some sentences have been revised based on expert feedback to enhance clarity and coherence. The final content validity index for the tool's content validity verification was 0.96. Furthermore, a pilot study involving ten first-time mothers was conducted to assess face validity. The feedback indicated difficulties and unfamiliarity with certain terms, prompting the inclusion of additional explanations. The final version of the tool had a KR20 reliability coefficient of 0.89. The reliability coefficients (KR20) for each item were as follows: neonatal jaundice 0.57, infantile colic 0.68, vomiting 0.59, gastroesophageal reflux 0.56, diarrhea 0.42, and constipation, 0.66.

### 3) Utilization of health care facilities due to infants' digestive system health problem

A survey on the utilization of healthcare facilities due to infants' digestive system health problems assessed whether parents sought medical assistance from local clinics, general hospitals, public health centers, or emergency rooms or required hospitalization for their infants with digestive health problems.

## 4. Data Collection and Research Procedures

The data collection period for this study spanned two days: February 23 and 24, 2023. For offline surveys, access was limited to certain regions, and due to the ongoing COVID-19 pandemic, face-to-face interactions were challenging. Therefore, a non-face-to-face online survey was conducted using a Google Survey Form (https://docs.google.com/forms/d/1tj6cvm6msh1Zl4F21KZb3-ccBh3rFXODxyh3W6b0vK0/edit).

The researcher facilitated recruitment for the study by posting announcements and recruitment documents on the Naver Cafe "Mom's Holick." Participation was voluntary, and interested individuals agreed to participate by completing the self-report survey. A total of 131 first-time mothers were surveyed, and subsequent analyses excluded 12 participants who did not meet the research criteria.

## 5. Data Analysis

The data were analyzed using SPSS WIN version 23.0(IBM Corp.). Characteristics of the subjects and infants, knowledge about digestive system health problems in infancy, utilization of health care facilities due to digestive system health problems in infancy among the participants' infants were analyzed using descriptive statistics, including mean, standard

deviation, maximum and minimum values, and percentage. Differences in knowledge about digestive system health problems in infancy among first-time mothers based on the characteristics were analyzed using independent t-tests and one-way ANOVA. Post-hoc analysis was conducted using Scheffe's test when the assumption of homogeneity of variance was met, and Dunnett's T3 test when the assumption was violated.

## RESULTS

### 1. Characteristics of the Participants

The average age of the sample was 32.87 years (standard deviation [SD] = 3.63), and 69.8% of the samples were university graduates. Regarding employment status, 59.7% were on childcare leave, and the monthly household income ranged most frequently range between 3 and 4 million won, representing 32.0%. Moreover, 71.4% gave birth in private hospitals, women's hospitals, or midwives. Among the 119 first-time mothers, 66.4% reported planned pregnancies, and the incidence of high-risk pregnancies was 39.5%. The average age was 3.79 months, and the average birth weight was 3,189.25 g (SD = 283).

Participants' education on infant digestive system health problems varied, with less than 50% reporting Participants' education on infant digestive system health problems varied, with less than 50% reporting having received education on each specific issue. Among the topics, diarrhea had the lowest educational experience, with only 30.3% of the participants reporting having received education on it. Conversely, infantile colic patients had the highest educational experience, with 45.4% of participants reporting education on this topic. Regarding the educational places, hospitals where infants were delivered and postpartum care centers emerged as the primary locations where participants received education on infant digestive system health problems (Table 1).

### 2. Participants' Experiences and Knowledge of Infants' Digestive Health Problems

The participants' average overall knowledge score regarding digestive system health problems in infancy was 33.08 ± 9.35, with a range of 11–48. The correct answer rates for each health issue were as follows: infantile colic (69.6%); vomiting (68.6%); constipation (66.6%); gastroesophageal reflux (59.3%); neonatal jaundice (53.8%); diarrhea (53.7%). The overall correct answer rate for all items was 61.9% (Table 2).

### 3. Healthcare Facility Utilization Due to Infants' Digestive Health Problems

When infants encounter digestive system health problems, they predominantly seek medical care at local clinics. Furthermore, among the six identified digestive system health problems, diarrhea had the highest healthcare facility utilization rate (14.3%), whereas infantile colic had the lowest utilization rate (2.5%) (Table 3).

### 4. Differences in Mothers' Knowledge of Digestive Health Problems in Infancy by Characteristics

Participants aged 35 years and above demonstrated significantly higher knowledge scores regarding digestive system health problems in infancy than those below 35 years (t = -3.66, $p < .001$). Mothers with a final education level of university graduation or above exhibited statistically significantly higher knowledge scores than those with education levels below university graduation (t = -2.26, $p = .026$). Knowledge scores regarding digestive system health problems in infancy were

**Table 1.** Education on Digestive Health Problems in Infancy of the Participants (*N*=119)

| Health problems | Education | Education place[a,b] | | | |
|---|---|---|---|---|---|
| | | Hospital[d] | Postpartum care center[d] | Public health center[d] | Others[c,d] |
| | n (%) | n (%) | n (%) | n (%) | n (%) |
| Infantile colic | 54 (45.4) | 20 (33.3) | 37 (61.7) | - | 3 (5.0) |
| Vomiting | 53 (44.5) | 30 (47.6) | 30 (47.6) | 3 (4.8) | - |
| Gastro-esophageal reflux | 51 (42.9) | 22 (38.6) | 34 (59.6) | - | 1 (1.8) |
| Neonatal jaundice | 51 (42.9) | 33 (56.9) | 23 (39.7) | 1 (1.7) | 1 (1.7) |
| Constipation | 38 (31.9) | 22 (53.7) | 17 (41.5) | 1 (2.4) | 1 (2.4) |
| Diarrhea | 36 (30.3) | 19 (48.7) | 19 (48.7) | 1 (2.6) | - |

[a]Including multiple responses; [b]Missing values were excluded; [c]Including internet, local clinic; [d]Percentage based on answers.

**Table 2.** Participants' Knowledge of Digestive Health Problems in Infancy (*N*=119)

| Health problems | Question | Number of correct answer | Correct answer rate (%) |
|---|---|---|---|
| Infantile colic | 19. Infantile colic begins around 3 to 6 weeks and lasts until 3 to 4 months | 93 | 78.2 |
| | 22. If the mother is breastfeeding, it is good to avoid eating irritating foods to prevent infantile colic | 93 | 78.2 |
| | 21. There is no clear treatment for infantile colic | 89 | 74.8 |
| | 26. If your baby cries continuously for more than two hours, he (she) should see a doctor | 89 | 74.8 |
| | 24. For infants suffering from colic, it is recommended to increase the amount of milk at one time[a)] | 85 | 71.4 |
| | 23. Infants with colic should be rocked vigorously to sleep[a)] | 81 | 68.1 |
| | 20. Infantile colic is an abnormal symptom[a)] | 79 | 66.4 |
| | 25. Babies with colic cry weakly[a)] | 65 | 54.6 |
| Sub-total score of infantile colic 5.66±2.01 (min: 0, max: 8) | | | 69.6 |
| Vomiting | 30. If your baby vomits repeatedly and spasmodically, he (she) should see a doctor | 104 | 87.4 |
| | 27. If your infant vomits greenly, it is a danger sign | 95 | 79.8 |
| | 32. You can prevent the baby from vomiting by lying him (her) up about 30 degrees after feeding | 86 | 72.3 |
| | 29. If a vomiting baby does not urinate for more than 8 hours, he (she) should see a doctor | 86 | 72.3 |
| | 34. It is important to treat the cause of vomiting in babies | 84 | 70.6 |
| | 33. If your baby vomits, it is good to lay them on their side | 72 | 60.5 |
| | 28. If your baby vomits, it is good to give him (her) an antiemetic right away[a)] | 69 | 58.0 |
| | 31. If your baby vomits, it is better not to feed at least 1 to 2 hours | 68 | 57.1 |
| Sub-total score of vomiting 5.58±1.84 (min: 1, max: 8) | | | 68.6 |
| Constipation | 56. If there is blood on your baby's diaper, he (she) should see a doctor | 102 | 85.7 |
| | 55. If your baby is losing weight due to constipation, he (she) should see a doctor | 91 | 76.5 |
| | 54. After 6 weeks of age, the number of stools per day decreases and the volume of stools increases | 89 | 74.8 |
| | 61. If the baby is underfed, he (she) may become constipated | 86 | 72.3 |
| | 59. Constipation may occur if your baby is breastfed and switched to formula feeding | 85 | 71.4 |
| | 58. A baby not excreting meconium 24 hours after birth is a danger sign | 83 | 69.7 |
| | 57. Babies should have at least one bowel movement per day in the first week of life | 74 | 62.2 |
| | 60. Stool softeners can be given to babies under 6 months of age[a)] | 35 | 29.4 |
| Sub-total score of constipation 5.42±1.92 (min: 0, max: 8) | | | 66.6 |
| Gastro-esophageal reflux | 42. If your baby regurgitates milk containing blood, he (she) should see a doctor | 101 | 84.9 |
| | 35. Gastro-esophageal reflux (regurgitation) is a common phenomenon in the infant period | 95 | 79.8 |
| | 43. Gastro-esophageal reflux (regurgitation) can be prevented by burping the baby more frequently during feeding | 88 | 73.9 |
| | 36. If your baby has frequent gastro-esophageal reflux (regurgitation), it is better to reduce the amount of milk per feeding | 79 | 66.4 |
| | 41. If your baby's gastro-esophageal reflux (regurgitation) symptoms progress to vomiting, you should see a doctor | 78 | 65.5 |
| | 38. If your baby has frequent severe coughs after feeding, your baby should see a doctor | 77 | 64.7 |
| | 44. Normal gastro-esophageal reflux (regurgitation) does not affect the baby's weight gain | 73 | 61.3 |

(Continued to the next page)

**Table 2.** Continued

| Health problems | Question | Number of correct answer | Correct answer rate (%) |
|---|---|---|---|
| | 37. Gastro-esophageal reflux (regurgitation) in infancy requires immediate treatment because most of it progresses to disease[a)] | 68 | 57.1 |
| | 40. If a formula-fed infant has frequent gastro-esophageal reflux (regurgitation, it is recommended to thicken the formula) | 46 | 38.7 |
| | 39. If your baby is regurgitating frequently, it is better to put him (her) in a sitting position[a)] | 12 | 10.1 |
| Sub-total score of gastro-esophageal reflux 6.03±2.0 (min: 1, max: 9) | | | 59.3 |
| Neonatal jaundice | 17. If your baby has jaundice that lasts longer than 2 weeks, he (she) should see a doctor | 92 | 77.3 |
| | 13. Neonatal jaundice is a common symptom in the neonatal period | 81 | 68.1 |
| | 14. Neonatal jaundice usually goes away harmlessly | 77 | 64.7 |
| | 18. Physiological jaundice peaks on the 4th or 5th day after birth | 74 | 62.2 |
| | 15. Jaundice starts on the face and moves downward | 71 | 59.7 |
| | 10. Severe jaundice can cause brain damage | 71 | 59.7 |
| | 11. Neonatal jaundice can occur when breastfeeding is not sufficient | 66 | 55.5 |
| | 16. Breastfeeding is possible when the baby is receiving phototherapy | 47 | 39.5 |
| | 9. Most physiologic neonatal jaundice appears within the first 24 hours of life[a)] | 36 | 30.3 |
| | 12. If breast milk jaundice occurs, breastfeeding should be stopped immediately[a)] | 36 | 30.3 |
| Sub-total score of neonatal jaundice 5.47±2.15 (min :1, max: 9) | | | 53.8 |
| Diarrhea | 51. Washing your hands before feeding can help prevent diarrhea in babies | 98 | 82.4 |
| | 49. If a baby with persistent diarrhea has a depressed fontanelle, the baby should see a doctor immediately | 89 | 74.8 |
| | 52. Breastfed infants usually have looser stools than formula-fed infants | 88 | 73.9 |
| | 53. Rotavirus remains contagious for up to two weeks after symptoms disappear | 73 | 61.3 |
| | 47. If your baby has mild diarrhea, you may need to feed them more often to prevent dehydration | 62 | 52.1 |
| | 45. The most common cause of diarrhea is parasites[a)] | 51 | 42.9 |
| | 50. If a breastfed infant has diarrhea, breastfeeding should be discontinued immediately[a)] | 45 | 37.8 |
| | 46. If a baby under 6 months of age has diarrhea and their body temperature exceeds 39 degrees, you can give them ibuprofen[a)] | 44 | 37.0 |
| | 48. It is normal for babies with diarrhea to have dark yellow urine, so you can just observe them without treatment[a)] | 35 | 29.4 |
| Sub-total score of diarrhea 4.92±1.76 (min: 0, max: 8) | | | 53.7 |
| A total score of digestive problems in infancy 33.08±9.35 (min: 11, max: 48) | | | 61.9 |

[a)]Reverse questions.

significantly higher for mothers with planned pregnancies than for those with unplanned pregnancies (t=3.24, $p$=.002) (Table 4).

## 5. Differences in Mothers' Knowledge of Digestive Health Problems in Infancy According to Education on Infants' Digestive Health Problems

Participants who received education on each infant digestive system health problem demonstrated significantly higher knowledge scores in the respective categories of diarrhea (t=4.29, $p$<.001), constipation (t=3.30, $p$=.001), gastro-esophageal reflux (t=3.16, $p$<.002), infantile colic (t=5.51, $p$<.001), and neonatal jaundice (t=5.03, $p$<.001) compared to those who did not. Moreover, the overall knowledge about infants' digestive system health problems was significantly higher for participants who received education on diarrhea (t=5.24, $p$<.001), constipation (t=3.58, $p$<.001), vomiting (t=2.37, $p$=.019), gastroesophageal reflux (t=5.26, $p$<.001), infantile colic (t=6.71, $p$<.001), and neonatal jaundice (t=7.58, $p$<.001)

**Table 3.** Health Care Facility Utilization Due to Infants' Digestive Health Problems (*N*=119)

| Categories | Health care facility utilization | Health care facility[a,b] | | | | |
|---|---|---|---|---|---|---|
| | | Local clinic[c] | General hospital[c] | Community health center[c] | Emergency room[c] | Hospital admission[c] |
| | n (%) | n (%) | n (%) | n (%) | n (%) | n (%) |
| Diarrhea | 17 (14.3) | 17 (71.0) | 2 (8.3) | 2 (8.3) | 2 (8.3) | 1 (4.1) |
| Vomiting | 14 (11.8) | 13 (72.2) | 1 (5.6) | 1 (5.6) | 2 (11.0) | 1 (5.6) |
| Gastro-esophageal reflux | 7 (5.9) | 6 (54.5) | 3 (27.3) | - | 2 (18.2) | - |
| Neonatal jaundice | 6 (5.0) | 4 (40.0) | 2 (20.0) | - | 1 (10.0) | 3 (30.0) |
| Constipation | 5 (4.2) | 5 (71.4) | 1 (14.3) | - | 1 (14.3) | - |
| Infantile colic | 3 (2.5) | 2 (66.7) | 1 (33.3) | - | - | - |

[a]Missing values were excluded; [b]Including multiple responses; [c]Percentage based on answers.

**Table 4.** Differences in Mothers' Knowledge of Digestive Health Problems in Infancy by Characteristics (*N*=119)

| Variables | Category | n | Overall knowledge of digestive health problems in infancy | |
|---|---|---|---|---|
| | | | M±SD | t/F (*p*) |
| Mother | | | | |
| Age (year) | <35 | 81 | 31.19±9.56 | -3.66 (<.001)* |
| | ≥35 | 38 | 37.11±7.53 | |
| Education level | High school | 31 | 29.87±7.26 | -2.26 (.026)* |
| | University & graduated school | 88 | 34.20±9.77 | |
| Current working status | Working | 10 | 32.60±9.08 | |
| | Maternity leave | 71 | 34.68±9.78 | 2.93 (.057) |
| | Not working | 38 | 30.21±8.02 | |
| Monthly income (10,000 KRW) | <300 | 18 | 30.89±8.61 | |
| | ≥300–<400 | 38 | 33.92±11.79 | 1.52 (.213) |
| | ≥400–<500 | 33 | 31.18±8.17 | |
| | ≥500 | 30 | 35.40±6.87 | |
| Planned pregnancy | Yes | 79 | 35.22±7.44 | 3.24 (.002)* |
| | No | 40 | 28.85±11.23 | |
| Diagnosis of high-risk pregnancy[a] | Yes | 47 | 32.82±10.20 | 0.25 (.802) |
| | No | 72 | 33.25±8.82 | |
| Infant | | | | |
| Babies current age (month) | <3 | 51 | 31.92±8.85 | -1.17 (.245) |
| | ≥3 | 68 | 33.94±9.68 | |

[a]Diagnosed one of preterm labor, severe preeclampsia, premature rupture of membranes, bleeding related to delivery, placental abruption, placenta previa, polyhydramnios, oligohydramnios, bleeding before delivery, cervical incompetence, gestational hypertension, gestational diabetes, multiple pregnancies, excessive vomiting of pregnancy with metabolic disorders, kidney disease, heart failure, intrauterine growth restriction, diseases of the uterus and its appendages; *$p$<0.05; M, mean; SD, standard deviation; KRW, South Korean Won.

compared to those who did not (Table 5).

## DISCUSSION

This study aimed to evaluate the knowledge levels of first-time mothers concerning digestive health problems in infancy and explore healthcare utilization patterns related to these issues.

The average correct answer rate for knowledge of digestive health problems during infancy among first-time mothers was 61.9%. This result showed a higher overall correct answer rate compared to a previous study conducted with Indian mothers, where the average correct answer rate was 48.3% [15]. Another study conducted in India reported correct answer rates of 45.0% for vomiting, 45.6% for diarrhea, 51.0% for constipation, and 32.0% for neonatal jaundice [21]. While a direct comparison is limited because of differences in the items used to measure knowledge, this study indicates a higher level of maternal knowledge. This difference could be attributed to the higher education level of mothers in this study, with 74.8% having a university degree or higher, contrary to the majority being elementary or high school gradu-

**Table 5.** Differences in Mothers' Knowledge of Digestive Health Problems in Infancy According to Education on Infants' Digestive Health Problems (*N*=119)

| Education | | n | Specific knowledge of individual digestive health problems in infancy | | Overall knowledge of digestive health problems in infancy | |
|---|---|---|---|---|---|---|
| | | | M±SD | t/F (*p*) | M±SD | t/F (*p*) |
| Diarrhea | Yes | 36 | 5.78±1.25 | 4.29 (<.001)* | 38.56±6.53 | 5.24 (<.001)* |
| | No | 83 | 4.54±1.82 | | 30.70±9.41 | |
| Constipation | Yes | 38 | 6.24±1.76 | 3.30 (.001)* | 37.34±8.50 | 3.58 (<.001)* |
| | No | 81 | 5.02±1.89 | | 31.07±9.07 | |
| Vomiting | Yes | 53 | 5.91±1.82 | 1.75 (.083) | 35.30±9.35 | 2.37 (.019)* |
| | No | 66 | 5.32±1.82 | | 31.29±9.02 | |
| Gastro-esophageal reflux | Yes | 51 | 6.65±1.60 | 3.16 (<.002)* | 37.51±5.89 | 5.26 (<.001)* |
| | No | 68 | 5.56±2.15 | | 29.75±10.01 | |
| Infantile colic | Yes | 54 | 6.63±1.35 | 5.51 (<.001)* | 38.26±5.32 | 6.71 (<.001)* |
| | No | 65 | 4.86±2.12 | | 28.77±9.80 | |
| Neonatal Jaundice | Yes | 51 | 6.55±2.24 | 5.03 (<.001)* | 38.94±5.34 | 7.58 (<.001)* |
| | No | 68 | 4.66±1.70 | | 28.68±9.31 | |

*$p$<0.05; M, mean; SD, standard deviation.

ates in previous Indian studies [15].

When examining the differences in knowledge about digestive health problems in infants based on the general characteristics of the participants, we found that mothers aged 35 years and older had a higher level of knowledge than those under 35 years. This finding is consistent with the results of a study assessing maternal knowledge of neonatal jaundice, in which older maternal age was associated with higher knowledge [17]. Similar results were observed in a previous study that investigated mothers' knowledge of digestive health problems in infants [15].

Furthermore, participants with a higher level of education, specifically university graduates or higher, had a higher level of knowledge about digestive health problems in infants. This finding is consistent with the results of previous studies assessing mothers' knowledge of neonatal jaundice and diarrhea [15,17,22-24]. Based on the results of this study, more detailed information on digestive health problems in infancy should be provided to mothers with lower educational levels.

Regarding socioeconomic characteristics, mothers with planned pregnancies showed a higher level of knowledge about digestive health problems in their infants than those with unplanned pregnancies. This finding aligns with previous research suggesting that mothers with planned pregnancies tend to be better prepared for infant care [25]. Therefore, it is important to provide more detailed education on infant digestive health problems to mothers with unplanned pregnancies.

When examining the differences in mothers' knowledge of infant digestive health problems according to education on infants' digestive health problems, statistically significant disparities were found for diarrhea, constipation, gastro-esophageal reflux, jaundice, and infantile colic, excluding vomiting. Mothers who received education on each digestive health problem demonstrated significantly higher knowledge levels on each item compared to those who did not. Additionally, regarding overall knowledge of digestive health problems in infants, mothers who received education on each digestive health problem were significantly more knowledgeable than those who did not. This aligns with findings from previous studies in which mothers and pregnant women who received education about jaundice demonstrated higher knowledge than those who did not [17,26,27]. These results suggest that education on digestive health problems in infants can enhance mothers' knowledge of these health concerns.

In this study, mothers' educational experience with digestive health problems in infancy averaged 40%. Among the health problems, infantile colic (45.4%) and vomiting (44.5%) had the highest educational experience, while diarrhea (30.3%) had the lowest. Although diarrhea is one of the most common digestive health problems in infancy, with a relatively high experience rate (62.2%) and the highest healthcare utilization rate (14.3%), the education level for this problem was the lowest. Based on these findings, notably, education on common and frequently occurring health problems is being overlooked. Therefore, providing basic education on everyday health problems is crucial for helping mothers understand their infants' conditions accurately.

Furthermore, hospitals where mothers delivered their babies and postpartum care centers were identified as the primary sources where mothers received the highest proportion of education on infant digestive health problems. Therefore, it is crucial to provide basic education on infant digestive health problems through specialized medical professionals in maternity hospitals and postpartum care centers, especially during the prenatal and postnatal periods. Conversely, participants who received education on digestive health problems in infancy from public health centers showed a lower proportion than those from maternity hospitals and postpartum care centers because the maternal education provided by public health centers tends to focus more on breastfeeding and postpartum depression than on the management of infant health problems. Based on these findings, public health centers should provide specific education on digestive health problems in infancy during maternal education sessions.

Outpatient visits to private hospitals accounted for the highest proportion of healthcare utilization for digestive health problems in infants. When investigating the reasons for the low healthcare utilization compared to the digestive health problems experienced in infants, most mothers stated that this was because the baby's symptoms were not severe (84.9%), with financial burden being the second most common reason. This aligns with the findings of a previous study in which mothers often did not seek medical attention for infant diarrhea because they perceived the symptoms as not requiring nursing care [28].

Recognizing and taking appropriate medical-seeking actions for serious illnesses in infants are crucial for maintaining their health. While most digestive health problems in infancy do not have a significant impact on the infants' health and are part of the normal growth process, neglecting serious health problems may worsen the baby's health outcomes if they do not receive timely treatment. Therefore, it is essential to educate caregivers on potential risk symptoms that require medical attention through education on digestive health problems during infancy.

This study, focusing on infant digestive health problems for the first time in Korea, aimed to assess mothers' knowledge and healthcare utilization. As a foundational study, this study contributes to future research on digestive health problems in infants. Furthermore, this study identifies differences in mothers' knowledge levels based on whether they received education on digestive health problems during infancy. This highlights the importance of providing education on infant digestive health issues, specifically to first-time mothers.

Although this study has significant value, it has several limitations. First, the data were collected from specific users of the internet community, necessitating caution when generalizing the research results. Second, the researchers developed the tool used to measure mothers' knowledge of digestive health problems in infants, indicating the need for potential enhancement of this tool. Third, this study was the first attempt in South Korea to assess mothers' knowledge levels regarding digestive health problems in infants, making it challenging to compare it with other studies. Consequently, there are limitations to generalizing the findings, and future repeated studies are necessary.

## CONCLUSION

This study assessed the knowledge levels of first-time mothers regarding digestive health problems during infancy. The researchers also investigated the factors influencing this knowledge and confirmed healthcare facility utilization due to digestive health problems in infants. This study revealed that first-time mothers had an average knowledge level of 61.9% regarding digestive health problems during infancy. Factors such as maternal age, educational level, planned pregnancy, and previous education about digestive health problems in infants significantly influenced knowledge of digestive health problems in infancy. Infants with colic had the highest educational level among infants with digestive health problems, whereas those with diarrhea had the lowest. Most mothers received education on these health problems in hospitals where they delivered their babies and postpartum care centers. However, among digestive health problems in infants, diarrhea showed the highest healthcare facility utilization, whereas infantile colic had the lowest. Ultimately, based on the results of this study, it is necessary to develop and implement a comprehensive and systematic educational program on digestive health problems in infants, targeting first-time mothers.

## ARTICLE INFORMATION

### Authors' contribution

Conceptualization: all authors; Data collection, Formal analy-

sis: all authors; Writing-original draft: all authors; Writing-review and editing: all authors; Final approval of published version: all authors.

### Conflict of interest

No existing or potential conflict of interest relevant to this article was reported.

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### Data availability

Please contact the corresponding author for data availability.

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# Author Guidelines

CHNR
Child Health Nursing Research

*Child Health Nursing Research*
Enacted in April 2006 and most recently revised in February 2023 and applied from Vol 29, No 2 (April 2023)

## I. General Information

### 1. About the Journal

*Child Health Nursing Research* (CHNR) is the official peer-reviewed research journal of the Korean Academy of Child Health Nursing. CHNR is a multidisciplinary, double-blind peer-reviewed, open-access journal that publishes original research, theory, and review papers on health care and nursing from the beginning of life to young adulthood, including both children and their families. It is devoted to all fields of child health, including global and cultural issues, aimed at both domestic and international healthcare professionals. The journal is published quarterly (Jan 31, Apr 30, July 31, and Oct 31) in English. The journal welcomes submissions from healthcare professionals around the world, and encourages the submission of papers dealing with cultural issues and those studied by international research teams.

**- Indexed in major databases:** PubMed Central, PubMed, Scopus, CINAHL, DOAJ, Crossref Metadata, Google Scholar, ScienceCentral, KCI (Korea Citation Index), RISS, KoreaMed, and KoMCI.
**- Its abbreviated title is *Child Health Nurs Res*.**
**- Open access:** All articles published in the journal are freely available with an open access license for everyone to read and download from the CHNR website (http://www.e-chnr.org/) immediately and permanently after publication.

### 2. Aims and Scope

*Child Health Nursing Research* aims to promote the health, development, and well-being of children and their families in Korea and all over the world by providing research on evidence-based practices.

Its scope includes the most recent clinically and academically relevant topics in health care and nursing from the beginning of life to young adulthood, including both children and their families. The journal deals with articles that address research, theory, and practice in a wide range of child health nursing areas and relevant cultural issues. Its regional scope is mainly Korea, but it welcomes submissions from researchers and nurses worldwide.

The primary readers of this journal are healthcare professionals, administrators and scientists serving newborns, infants, children, adolescents, young adults, and their families, including nurses, midwives, physicians, developmental specialists, public health workers, scientists, educators, epidemiologists, and other health caregivers.

The ultimate goal of *Child Health Nursing Research* is to develop a body of knowledge on the health of newborns, infants, children, adolescents, young adults, and their families while improving the clinical field and community with evidence-based practices to promote the health of children and families all over the world.

### 3. Readership

This journal is published for health care professionals and administrators serving infants, children, adolescents, and families, working to promote child care and welfare. Through CHNR, readers obtain information on the most recent clinically and academically relevant topics in health care and nursing for the life span from the beginning of life to young adulthood, including both children and their family members. Specifically, nurses, midwives, physicians, developmental specialists, and public health workers in the field can obtain the most recent information about health problems and nursing strategies for children and families. Administrators of healthcare facilities and public health centers can access various data regarding health problems and obtain insights into healthcare planning for children and families. Social scientists and epidemiologists can access and utilize data on recent health problems of infants, children, adolescents, and families. Child health educators can obtain the

most up-to-date information on child health to convey that knowledge to students in the field of child health care and nursing. Researchers can learn about state-of-the-art research methodology for child health care.

## II. Research and Publication Ethics

### 1. Research Ethics

**1) Statements of Human and Animal Rights and Protection:** CHNR endorses and follows international standards of ethical practice in human rights and protection and the principles addressed in the Declaration of Helsinki (Ethical Principles for Medical Research Involving Human Subjects, https://www.wma.net/wp-content/uploads/2016/11/DoH-Oct2013-JAMA.pdf). According to the Bioethics and Biosafety Act of Korea and in order to meet international standards for ethical practice in human rights and protection, any research involving human subjects must be approved by an Institutional Review Board (IRB). When animals are used as research subjects, the study must be conducted in correspondence with related regulations, such as those of the Institutional Animal Care and Use Committees (IACUCs, https://ori.hhs.gov/education/products/ncstate/iacuc.htm), or National Institutes of Health (NIH) Guide for the Care and Use of Laboratory Animals (https://grants.nih.gov/grants/olaw/guide-for-the-care-and-use-of-laboratory-animals.pdf). Any treatment methods in conflict with the regulations must be described and may be grounds for rejection of the paper.

**2) Statements of Informed Consent:** The researcher(s) must also obtain written voluntary informed consent from the participants or their parents or legal guardian. If the research involves a child or any vulnerable subject in any way, special and sensitive protection is needed to ensure the safety and human rights of the subject. When necessary, the editor of CHNR may ask the author(s) to present the relevant document(s) on the human rights and protection issues related to the manuscript, such as the informed consent form or the evidence for the IRB approval of the study.

### 2. Submission declaration and verification

Duplicate publication or duplicate submission is prohibited in accordance with the ICMJE recommendations (https://publicationethics.org/resources/flowcharts/redundant-duplicate-publication-published-article). Manuscripts that have been published or are being submitted to other journal(s) should not be submitted to CHNR. Manuscripts that have been published or are currently under consideration for publication in CHNR must not be submitted to another journal. Upon notice of a duplicate submission, submission privileges to CHNR will be suspended for 2 years.

1) Decision criteria for duplicate publication
   The manuscript has never been published in another language or any medium—print, electronic media, or an academic journal.
2) The corresponding author must obtain approval from the editor-in-chief of each related journal if she or he wishes to reprint the published manuscript in another language.
3) The editorial board will determine the nature and degree of the manuscript's duplicate publication or duplicate submission.

### 3. Publication Ethics and Malpractice Statements

The publication and research ethics of CHNR strictly follow the ICMJE guidelines (http://www.icmje.org/).

**1) Reporting standards:** Authors should report on their work accurately and objectively without inappropriate manipulation. Authors should describe their methods and procedures in enough detail and present sufficient references so that others can replicate the work. Authors should not produce, record, or report non-existent data and results and should not change or omit data. Authors should also avoid producing multiple publications ("salami slicing") from content that should be only one substantial manuscript. Manuscripts that do not follow the international ethical standards of research and publication (i.e., those that involve fabrication, falsification, salami slicing, plagiarism, or simultaneous/duplicate submission) will not be considered for publication in CHNR. The editorial board will adjudicate the specific reasons for rejection.

**2) Authorship of the manuscript:** Authorship is be limited to those who have made a substantial contribution to the manuscript in terms of conception and design, as well as the collection, analysis, and interpretation of the data. All authors should be involved in drafting and reviewing the

manuscript and must approve the final version of the manuscript. The corresponding author is required to confirm that all appropriate persons are listed as authors in the manuscript. All authors must agree to be accountable for all aspects of their work and to ensure that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

3) **Originality and plagiarism:** Authors are required to submit original manuscripts and confirm that they have cited or quoted others' ideas and texts appropriately and accurately. Plagiarism means the appropriation of another person's ideas, research processes, results, or text as one's This includes using previously published material of oneself or any other author without citing the references. The editorial board of CHNR uses the Crossref Similarity Check tool to check for plagiarism. If plagiarism is discovered in the manuscript, the manuscript will not be published.

4) **Multiple, simultaneous, or duplicate submission:** Authors should not submit the same research to more than one journal and should not publish the manuscript in different languages. If authors wish to pursue a secondary publication of the manuscript in another language, they should obtain approval from the editor-in-chief of both related journals. The editorial board will determine the nature and degree of duplicate publication or duplicate submission for the manuscript.

5) **Data access and retention:** Authors should retain research data and be prepared to allow access to the data in case the editorial board asks them to provide the raw data in connection with the editorial review.

6) **Disclosure and conflict of interest:** Authors are required to disclose commercial or similar relationships to products or companies mentioned in the article being submitted or related to its subject matter.

7) **Acknowledgment of sources:** Sources of funding for the manuscript should be acknowledged. Authors should use or report the information obtained privately with explicit, written permission from sources.

8) **Fundamental errors in a manuscript:** When authors find a fundamental error in a published manuscript, they should immediately inform the editor and cooperate with the editor to correct or withdraw the manuscript.

9) **Process for managing publication malpractice:** When reviewers or readers suspect publication malpractice such as fabrication, falsification, salami slicing, plagiarism, or simultaneous/duplicate publication; inappropriate changes in authorship, an undisclosed conflict of interest, ethical problems with a submitted manuscript, a reviewer who has appropriated an author's idea or data, complaints against editors, and so on, the process of resolution will be initiated following the flowchart provided by the Committee on Publication Ethics (COPE) (http://publicationethics.org/resources/flowcharts). The ethics committee will discuss and adjudicate cases of suspected publication malpractice, as well as complaints and appeals against editors. CHNR will not hesitate to publish errata, corrigenda, clarifications, retractions, apologies, and expressions of concern when needed.

## 4. Conflict of Interest

An article's corresponding author is required to notify the editor of any potential conflicts of interest that might have affected the study's findings or the way the data were interpreted. Even when the authors are certain that their respective judgments were unaffected when producing the article, a potential conflict of interest should be stated on the title page and at the conclusion of the main text. Conflicts of interest can include ties to pharmaceutical corporations on a personal or financial level, political pressure from special interest organizations, or issues in the classroom. The ICMJE Uniform Disclosure Form for Potential Conflicts of Interest (https://www.icmje.org/disclosure-of-interest/) should be used as the model for the disclosure form. The editor will determine whether the conflict of interest disclosure should be made in the final version of the work. All funding sources for a study should be specifically identified. Before assessing a particular paper, CHNR requests that referees notify the editor if they have any conflicts of interest. All article submissions from editors, staff members, or editorial board members are handled in the same manner as unsolicited submissions. They will not participate in the decision-making or reviewer selection process. Even for commissioned manuscripts, editors will not handle their own work.

### 5. Authorship

The practices of CHNR regarding research and publication ethics strictly follow the International Committee of Medical Journal Editors (ICMJE) guidelines (http://www.icmje.org/recommendations/browse/roles-and-responsibilities/defining-the-role-of-authors-and-contributors.html), and the Good Publication Practice Guidelines for Medical Journals 4th Edition (ISMPP, 2022, https://www.ismpp.org/gpp-2022).

**1) Authorship credit**

All other contributors should be credited in the acknowledgments. After the initial submission of a manuscript, any changes whatsoever in authorship (adding author[s], deleting author[s], or re-arranging the order of authors) must be explained in a letter to the editor from the authors concerned. All authors of the paper must sign this letter. Every author must also complete a copyright assignment.

**2) Authorship Taxonomy**

The corresponding author is responsible for ensuring that the descriptions are accurate and agreed upon by all authors. The role(s) of all authors should be listed, using the above relevant categories. Authors may have contributed in multiple roles. CRediT in no way changes the journal's criteria to qualify for authorship. Please select the CRediT (https://credit.niso.org/) statements provided below during the submission process. This information will appear above references section of the published paper, as shown below as an example.

**3) Corresponding author and first author:** CHNR does not allow multiple corresponding authors for a single article. Only one author for each article should correspond with the editorial office and reviewers. CHNR does not allow multiple first authors for a single article.

**4) Correction of authorship after publication:** CHNR does not correct authorship after publication unless the editorial staff has made a mistake. Authorship may be corrected after submission and before publication if all authors involved with the manuscript request an authorship correction.

## III. Guidelines for Manuscript Preparation

### 1. Types of Manuscripts

This journal publishes original articles, review articles, and

**Table 1.** Authorship Taxonomy(https://credit.niso.org/)

| Term | Definition |
|---|---|
| Conceptualization | Ideas; formulation or evolution of overarching research goals and aims |
| Methodology | Development or design of methodology; creation of models |
| Software | Programming, software development; designing computer programs; implementation of the computer code and supporting algorithms; testing of existing code components |
| Validation | Verification, whether as a part of the activity or separate, of the overall replication/ reproducibility of results/experiments and other research outputs |
| Formal analysis | Application of statistical, mathematical, computational, or other formal techniques to analyze or synthesize study data |
| Investigation | Conducting a research and investigation process, specifically performing the experiments, or data/evidence collection |
| Resources | Provision of study materials, reagents, materials, patients, laboratory samples, animals, instrumentation, computing resources, or other analysis tools |
| Data Curation | Management activities to annotate (produce metadata), scrub data and maintain research data (including software code, where it is necessary for interpreting the data itself) for initial use and later reuse |
| Writing – Original Draft | Preparation, creation and/or presentation of the published work, specifically writing the initial draft (including substantive translation) |
| Writing – Review & Editing | Preparation, creation and/or presentation of the published work by those from the original research group, specifically critical review, commentary, or revision – including pre-or post-publication stages |
| Visualization | Preparation, creation and/or presentation of the published work, specifically visualization/ data presentation |
| Supervision | Oversight and leadership responsibility for the research activity planning and execution, including mentorship external to the core team |
| Project administration | Management and coordination responsibility for the research activity planning and execution |
| Funding acquisition | Acquisition of the financial support for the project leading to this publication |

editorials on health care and nursing for birth to young people and their families.

- ***Original articles:*** CHNR publishes original articles that fit the journal's aims and scope. These comprise comprehensive papers outlining novel research. These are reports of empirical data from top-notch scientific and clinical research studies that have relevance to nursing and health care for people from the beginning of life to young adulthood and their families. Original articles cover children's health issues, with topics encompassing nursing theory, practice, and education, among others. The articles published in CHNR present significant research results obtained using a variety of methodologies, including mixed-method designs, observational, quasi-experimental, and experimental investigations, as well as qualitative methods and measurements, including the development and evaluation of instruments. The appropriate standards should be followed when writing research papers.
- ***Review articles:*** Critical presentations on themes of interest and importance to child health nursing theory, practice, and education are included. A review article's body should consist of a thorough evaluation of the literature that is supported by academic research, critical analysis, and reasoned conclusions. We publish comprehensive literature reviews, as well as systematic reviews which target specific research problems, such as scoping reviews. We also release discussion papers, which are academic works with a discursive or argumentative tone. There must always be a discussion and critical evaluation of a significant body of research or other scholarship.
- ***Editorials:*** These are by invitation only and feature remarks made by institutional representatives or individual authors on topics of current interest. Authors should get in touch with the manager in the editorial office if they have any suggestions for editorials that deal with topics that are critically important to the discipline, especially those that are contentious or closely related to recent or upcoming journal articles.

## 2. Authors of Manuscripts

1) Anyone may submit a manuscript for publication in CHNR.
2) If the manuscript is the product of a dissertation, the author must disclose that the manuscript is the product of a dissertation for an academic degree program. The first author must be the author of the dissertation.

## 3. General Information

### 1) Submission system

The manuscript must be submitted online through http://www.e-chnr.org/ (website of CHNR) or http://www.chnr-submission.org/ (peer review system of CHNR). There, authors may review the submission instructions and access all submission forms, including the author checklist.

### 2) Language and style

Every manuscript should be written in English. The author can submit the manuscript as a Microsoft Word file or HWP file with an A4 paper size layout. The margins of the paper should be set as follows: top 30 mm, bottom 25 mm, left 25 mm, and right 25 mm. A 10-point font size should be used, and the text should be double-spaced.

### 3) Manuscript length

Abstracts, texts, references, tables, and figures included in the manuscript have different limits depending on the type of manuscript submitted, but all submissions must comply with the contents of Table 1. The number of references is recommended to be 30 or fewer for an article. However, the authors can include more references depending on the various article types, which have no limit on references.

**Table 2.** Recommended maximums for articles submitted to *Child Health Nursing Research*

| | Abstract | Text | Tables & Figures |
|---|---|---|---|
| Original article | 250 | 6,000 | 5 |
| Review article | 250 | 8,000 | 5 |
| Editorial | None | 2,500 | 5 |

### 4) Abbreviations used

If authors choose to use an English abbreviation, the complete spelling must be used upon first mention, and the abbreviation may be used after that. The title should not include any abbreviations.

### 5) Samples and participants

Authors should confirm the correct use of the words "sex" (when reporting biological factors) and "gender" (identity, psychosocial, or cultural factors), and report the sex or gender of study participants. Authors should define how they determined race or ethnicity and justify its relevance. If the

study was done involving an entire population, the authors should explain the reason.

**6) Prior approval for the use of psychosocial questionnaires (survey tools)**

Authors must acquire permission for the utilization of any psychosocial questionnaire from the tool's copyright holder.

**7) Describing machinery or technical equipment**

When identifying machinery and equipment, the following should be included in parentheses: the model, manufacturer. Brand names are identified by ™, ®, etc. Brand names should be used only when necessary.

**8) When the manuscript is submitted, references and citations may follow any accepted style:**

Examples include National Library of Medicine (NLM) and American Psychological Association (APA) style. However, after the manuscript is accepted, all references and citations must be converted to follow Citing Medicine: The NLM Style Guide for Authors, Editors, and Publishers, 2nd Edition (2007). It is the responsibility of the submitting author(s) to confirm that NLM style guidelines are adhered to prior to final publication.

## 4. Reporting Guidelines for Specific Study Designs

Research reports frequently omit important information. As such, reporting guidelines have been developed for a number of study designs. Authors are encouraged to adhere to relevant reporting guidelines when describing their study. A good source of reporting guidelines is the EQUATOR Network (http://www.equator-network.org/home/) and the United States National Institutes of Health/ National Library of Medicine (http://www.nlm.nih.gov/services/research_report_guide.html).

- *Observational cohort, case-control, and cross-sectional studies*

  Strengthening the Reporting of Observational Studies in Epidemiology (STROBE)

  Meta-analysis of Observational Studies in Epidemiology (MOOSE)
- *Qualitative studies*

  Consolidated Criteria for Reporting Qualitative Research (COREQ)

  Standards for Reporting Qualitative Research (SRQR)
- *Quasi-experimental/ non-randomized trials*

  Transparent Reporting of Evaluations with Non-randomized Designs (TREND)
- *Randomized (and quasi-randomized) controlled trials*

  Consolidated Standards of Reporting Trials (CONSORT)
- *Study of Diagnostic accuracy/assessment scale*

  Standards for the Reporting of Diagnostic Accuracy Studies (STARD)
- *Systematic Review and meta-analysis*

  Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA)

  Meta-analysis of Observational Studies in Epidemiology (MOOSE)
- *Quality improvement studies*

  Standards for Quality Improvement Reporting Excellence (SQUIRE)

## 5. Sequence of Headings in an Original Article

The manuscript should be organized as follows. Each section should be clearly delineated. Instructions for each appear below the list.

| | |
|---|---|
| Beginning section | - Cover letter<br>- Title page<br>- Abstract and keywords |
| Middle section (Main text) | - Introduction<br>- Materials and Methods<br>- Results<br>- Discussion<br>- Conclusion |
| Ending section | - ORCID and ResearcherID<br>- Authors' contribution<br>- Conflict of interest<br>- Funding resource<br>- Data availability<br>- Acknowledgements<br>- Supplementary materials<br>- References |
| Other elements | - Tables and Figures |

**1) Beginning section**

**(1) Cover letter**

The authors should address a cover letter to the editor in which they summarize the main components of the manuscript and what makes its contribution original and relevant to the Aims and Scope of CHNR. The author(s) should also address any other matters associated with authorship and publication they wish the editors to consider.

**(2) Title page**

① The content of the title page should appear as follows in this order: Title, running title, type of manuscript, author(s), corresponding author, conflict of interest, IRB approval, MeSH (Medical Subject Headings, https://www.ncbi.nlm.nih.gov/mesh/) keywords, number of references, and number of words of the English abstract. More specific requirements for these components are detailed below.

② Type of manuscript: One of the following should be noted: original article, review article, editorial, or invited paper.

③ Author(s): This section should list the names of all authors, each with their position and affiliation including title, department, and location of institutions to which the work should be attributed. It should also present each author's ORCID number and describe the author's role in this study.

④ Corresponding author: The corresponding author should be identified with the address (zip code), email, telephone, fax, and ORCID number.

⑤ Conflict of interest: Any matter pertaining to the research should be noted here, such as the source of research funds, conflicts of interest, or indication that the manuscript is derived from a dissertation or thesis for an academic degree program.

⑥ IRB approval: The author should fill in information about the institution that provided IRB approval, including the approval number, and informed consent. However, if it is not a study of humans or animals, a statement should be made about IRB exemption.

⑦ MeSH Keywords: The keywords are drawn from the MeSH list (not more than five).

⑧ Number of references: It is recommended that an article include no more than 30 references. However, for articles that have no reference restriction, such as meta-analyses, systematic reviews, or structural equation models, authors are free to provide more references.

⑨ Number of words of the English abstract: The number of words in the English abstract should be noted. The total should be no more than 250 words.

**(3) Abstract and keywords**

An abstract of up to 250 words for articles (including reviews) should be typed double-spaced on a separate page. It should cover the main factual points, including statements of the purpose, methods, results, and conclusions. The abstract should be accompanied by a list of three to five keywords for indexing purposes. The keywords should be as specific as possible and drawn from the list of MeSH keywords.

**2) Middle section**

The text should be composed in the following order: introduction, methods, results, discussion, conclusion.

**(1) Introduction**

The introduction should clearly state the need for this study and the main question or hypothesis of the study. A literature review or summary of background information related to the study should be presented.

**(2) Methods**

This section should describe the study design, setting and samples, ethical considerations, measurements/instruments, data collection/procedure, and data analysis used. If the study is qualitative, the research instrument can be omitted. An “Ethics statement” should be provided after the "Methods" heading in a text-box format.

> Example)
> Ethics statement: This study was approved by the Human Ethics Committee of the University of XXX (IRB No. 202104-0002-03). Informed consent was obtained from all participants.

**(3) Results**

The main results should be summarized in concise paragraphs. Levels of statistical significance and confidence intervals should be noted where appropriate.

**(4) Discussion**

The discussion should be based only on the reported results. The discussion is recommended to reflect advances in nursing practice and nursing knowledge development.

**(5) Conclusion**

Conclusions and recommendations for further study should be presented here, but the study results should not be summarized again.

**3) Ending section**

**(1) ORCID and ResearcherID**

The authors should provide the ORCID number and ResearcherID.

**(2) Authors' contribution**

Authors' contribution should be based on the authorship taxonomy.

**(3) Conflict of interest**

Authors are required to disclose commercial or similar relationships to products or companies mentioned in or related to the subject matter of the article being submitted. If there are no conflicts of interest, the following is an example of a sentence that can be used: "No existing or potential conflict of interest relevant to this article was reported."

**(4) Funding resource**

Funding institutions' policies should acknowledge sources of funding for the manuscript. If there is no funding resource, the following is an example of a sentence that can be used: "None".

**(5) Data availability**

Based on the degree of sharing plan, authors should deposit their data after deidentification and report the DOI of the data and the registered site. Please contact the corresponding author for data availability.

**(6) Acknowledgments**

Any persons who contributed to the study or the manuscript but did not meet the authorship requirements can be listed here. Written permission should be obtained from any person or organization mentioned in this section.

**(7) Supplementary materials**

If there are supplementary materials to help the understanding of readers or too much data to be included in the main text, it may be presented as supplementary data.

**(8) References**

When the manuscript is submitted, references and citations may follow any accepted style. Examples include National Library of Medicine (NLM) and American Psychological Association (APA) style. However, after the manuscript is accepted, all references and citations must be converted to follow Citing Medicine: The NLM Style Guide for Authors, Editors, and Publishers, 2nd Edition (2007). It is the responsibility of the submitting author(s) to confirm that NLM style guidelines are adhered to prior to final publication. Authors are responsible for the accuracy of the references. Use of DOIs is highly encouraged.

**4) Other Elements**

**(1) Tables and Figures**

Tables and figures, including illustrations and photos, should be presented or described in English. The figures should be on separate pages. The total number of tables and figures in a manuscript is no more than 5.

All tables and figures should be easy to understand, even when presented separately from the rest of the manuscript, and should present information relevant to the study.

## 6. References format

**1) Style**

A description of the References section is provided below. The References follow the NLM Style Guide for Authors, Editors, and Publishers, 2nd Edition (2007) (http://www.nlm.nih.gov/citingmedicine) if not mentioned below. References should be numbered serially in the order of appearance in the text, with numbers in brackets [ ]. The original reference number should be used if a reference is cited more than once.

**2) Citation format**

If authors wish to cite references, please use the following format.

**(1) Cited work's author**

If there are 7 or more authors of a cited work, the first 6 should be listed, followed by "et al."

Example: Wolchik SA, West SG, Sandler IN, Tein J, Coatsworth D, Lengua L, et al.

**(2) Journals**

The name of the journal should be written in full.

① Journal articles

- For 6 or fewer authors, all authors should be listed

Example:
Diego MA, Field T, Hernandez-Reif M. Preterm infant weight gain is increased by massage therapy and exercise via different underlying mechanisms. Early Human Development. 2014;90(3):137-140. https://doi.org/10.1016/j.earlhumdev.2014.01.009

- For more than 6 authors, the first 6 should be listed, followed by et al.
  Example:
  Kang HK, Kim TB, Kim KH, Kim MJ, Kim JH, Kim HY, et al. Development and effect of a metabolic syndrome prevention program for university students using mobile application. Child Health Nursing Research. 2014;20(3):205-214. https://doi.org/10.4094/chnr.2014.20.3.205
- Journals on the internet
  Example:
  Yoon SH, Kim SJ. A study on the relativeness between safety knowledge and safety behavior of elementary school children. Journal of the Korean Society of School Health. [Internet]. 2012 June [cited 2017 November 7];25(1):39-50. Available from: http://www.jkssh.or.kr/journal/view.html?uid=81&page=&sort=&scale=10&all_k=&s_t=&s_a=&s_k=&s_v=25&s_n=1&spage=&pn=search&year=&vmd=Full
- Newspaper articles
  Example:
  Cho CU. Stem cell windpipe gives Korean toddler new life. The Korea Herald. 2013 May 2;Sect. 01.

**(3) Books**

① Reference to an entire book
Example:
Brown B. Braving the wilderness: The quest for true belonging and the courage to stand alone. 1st ed. Random House: 2017. p. 132.
Example:
Peate I. The student's guide to becoming a nurse. 2nd ed. John Wiley & Sons; 2012. p. 59-90.
Example:
Min KA, Kim CG. Nursing management. Knowledge & Future; 2012. p. 45-62.

② Chapter in an edited book
Example:
Bochner BH. Identification of nodal metastases: The role of iron oxide enhanced MRI. In: Lee CT, Wood DP, Editors. Bladder cancer. 1st ed. Humana Press; 2010. p. 67-77.

③ Entire books on the internet
Example:
Radley DC, How SKH, Fryer AK, McCarthy D, Schoen C. Rising to the challenge: Results from a scorecard on local health system performance, 2012 [Internet]. Commonwealth Fund; 2012 March [cited 2017 February 8]. 14 p. Available from: http://www.commonwealthfund.org/~/media/files/publications/fund-report/2012/mar/local-scorecard/1578_commission_rising_to_challenge_local_scorecard_2012_finalv2.pdf

**(4) Scientific and technical reports**

Example:
Korean Women's Development Institute. 2015 National multicultural family survey report. Survey Report. Seoul: Ministry of Gender Equality & Family; 2016. Report No.: MOGEF2016-3.
Example:
Won YJ, Shin HR, Jeong GW, Shin AS, Gong HJ, Oh CM, et al. Cancer registration & statistics branch, division of cancer registration & surveillance. National Cancer Control Institute Annual Report. Seoul: National Cancer Center; 2012 November. Report No.: 2012.11-13520000010145-10.

**(5) Unpublished theses or dissertations**

Example:
Lee YH. Development and effects of nocturnal emission and menstruation education program using CAI for Korean elementary school children [dissertation]. Seoul: Ewha Womans University; 2010. p. 1-118.
Example:
Choi JW. Clinical characteristics and treatment outcomes of pediatric neurofibromatosis type 2: Neurosurgical series [master's thesis]. Seoul: Seoul National University; 2013. p. 1-45.

**(6) Conference proceedings**

Example:
Bell JM. Highlights from the 10th international family nursing conference. Making family nursing visible: From knowledge building to knowledge translation 10th international family nursing conference; 2011 June 24-48; Kyoto International Conference Center. Kyoto: Sage Publications; 2012. p. 135-139.

**(7) Web**

Example:

Statistics Korea. Cause of death statistics in 2015 [Internet]. 2016 [cited 2016 September 27]. Available from: http://kostat.go.kr/portal/eng/pressReleases/8/10/index.board?bmode=read&bSeq=&aSeq=357968&pageNo=1&rowNum=10&navCount=10&currPg=&sTarget=title&sTxt=

Example:

Statistics Korea. 2014 Maternal birth rate by age [Internet]. 2014 [cited 2015 February 10]. Available from: http://kosis.kr/index/index.do

## 7. Tables and Figures format

**1) Table formatting**

① All lines are to be single. Vertical lines should not be used.

② The title of a table should appear above the table. The first letter of important words in the title should be capitalized (title case).

Example: Table 1. Responses to Question Types

③ Tables should be numbered consecutively, e.g., Table 1., Table 2., and so on.

④ Table data should be explained in the footnotes. All abbreviations used in the tables should be defined in the footnotes of every table in which they appear.

Example: HR, heart rate; T, temperature.

⑤ In a table, use a superscript lowercase letter to indicate each footnote. The tables should be placed beneath the footnotes.

Example: [a)]Surviving case; [b)]Deceased case.

⑥ If the value of a decimal exceeds 1, a 0 should appear before the decimal point; otherwise, nothing should appear before the decimal point.

Example: $t = 0.26$, $F = 0.92$

Example: $p < .001$, $r = .01$, $R^2 = .61$

⑦ The statistical significance ($p$ value) should be written without a footnote and should be rounded to three decimal places. (For example: $p = .003$)

If $p$ is 0.000, then indicate that $p$ is less than 0.001 ($p < .001$).

If $p$ is 1.000, then indicate that $p$ is greater than 0.999 ($p > .999$).

**2) Illustration and Photograph Format Rules**

① The title should appear below an image. Only the first letter of the first word should be capitalized (sentence case).

Example: Figure 1. Mean responses to questions by student grade categories.

② The size of the image should be 102 × 152 mm (4 × 6 inches). Larger images may be permitted; however, each image should not exceed 203 × 254 mm (8 × 10 inches).

③ If one figure contains 2 or more images, consecutive alphabet letters should be used to distinguish among the images.

Example: Figure 1-A, Figure 1-B

④ The photomicrograph of a tissue sample, the region from which the tissue was extracted, and the staining method should be noted. The magnification scale must be included.

⑤ The following symbols should be used in graphs in the following order: ●,■,▶,◆,○,□,▷,◇.

## 8. Quotations from Other Sources

Citations may follow any style, for example, NLM, APA, or others.

# IV. Manuscript Submission, Review, and Publication Process

## 1. Submission process

**1) Before submission**

- The authors can use any files, such as MS Word, .hwp, and so on.
- Manuscripts must be submitted through the CHNR website (http://www.e-chnr.org/) or CHNR peer review system (http://www.chnr-submission.org/).
- Authors may review the submission instructions and access all submission forms, including the author checklist.

**2) During submission**

**(1) Preview:** The editorial committee of editorial staff members initially evaluates each submission. The main goal is quickly selecting which papers should not be put up for peer review and whether to send them for review. In order to prevent delays for authors who might want to seek publication elsewhere, papers that

do not meet basic standards or are unlikely to be published regardless of a favorable peer review, for example, because their novel contribution is insufficient or the relevance to the discipline is unclear, may be rejected at this stage.

**(2) Peer review process**

- All manuscripts are treated as confidential and peer-reviewed by experts in the field.
- The manuscripts are reviewed within a few days of submission to determine whether they adhere to the journal's policies and fit the submission guidelines. Any submission may be rejected for publication by the Editorial Board without cause.
- More details on other pertinent regulations are available on the journal's website. Should there be any questions on how to use the online submission system, authors may contact the editorial office of CHNR.

**3) After the acceptance of the manuscript**

After the acceptance of the manuscript, the author must submit the copyright transfer agreement and conflict of interest disclosure statement. All forms (the author's checklist, copyright transfer agreement, and disclosure of conflicts of interest) are available on the websites of the journal (http://www.e-chnr.org/) and the Korean Academy of Child Health Nursing (http://www.childnursing.or.kr).

All authors should print their names and sign the copyright transfer agreement and conflict of interest disclosure form.

### 2. Peer review process

**1) Number of reviewers**

Two or more reviewers and the editor will conduct a double-blind peer review of each of these manuscripts.

**2) Peer review process and the author's response to the reviewers' comments**

There is a two-week peer review period, and the first decision is made after the evaluation is finished. Following the review, the Editorial Board will decide between the options: acceptable options include minor revision, major revision, or rejection. The Editorial Board may request authors to make changes to the manuscript in response to reviewers' comments. The author should reasonably indicate if the reviewer's opinion is unacceptable or if the reviewer is thought to have misinterpreted the data. The authors should try their best to comply with any requests made by the reviewers to modify the manuscript.

After making changes to the manuscript, the author should upload the updated files along with a response to each reviewer's comment. Revisions from the author must be finished within 15 days of the request. The Editorial Board will inform the author if it is not received by the deadline. The author should discuss an extension with the Editorial Board if they want to prolong the revision window past 15 days. Up to two rounds of the manuscript evaluation process may be offered. The Editorial Board may consider further review if the authors request it. The Editorial Board will ultimately decide whether to approve the submitted manuscript for publication and may, if necessary, ask for additional alterations, edits, and deletions to the article text. Statistical editing is also done if a statistician needs to review the data professionally.

The editor-in-chief of CHNR will make the final decision regarding the manuscript's publication based on the reviewers' comments and the scientific merits of the manuscript. Any potential or existing conflict and issues in the manuscript must be discussed in detail with the Editorial Board.

All manuscripts from editors, employees or editorial board members are processed the same way as other unsolicited manuscripts. Editors will not handle their own manuscripts even if they are commissioned ones. During the review process, they will not engage in the selection of reviewers and the decision process.

## V. Article-processing Charge

After the acceptance of the manuscript, the author is responsible for the following fees: a publication fee, a special typesetting fee, and the printing fee for each volume of the paper.

Upon acceptance, an article-processing charge (APC) of 600 USD (600,000 Korean won) per article is requested from the corresponding author.

Authors in developing countries (https://www.un.org/development/desa/dpad/wp-content/uploads/sites/45/publication/ldc_list.pdf) may be exempt from author fees after negotiation with the Editorial Board.

If at least one of the authors is a Korean Academy of Child Health Nursing member, the paper will qualify for a discounted submission.

## VI. Copyright, Open Access Policy, and Data Sharing Policy

### 1. Copyright

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**Table 3.** Examples of data sharing statements that fulfill the requirements of the International Committee of Medical Journal Editors.

| Element | Example 1 | Example 2 | Example 3 | Example 4 |
|---|---|---|---|---|
| Will individual participant data be available (including data dictionaries)? | Yes | Yes | Yes | No |
| What data in particular will be shared? | All individual participant data collected during the trial, after deidentification. | Individual participant data that underlie the results reported in this article, after deidentification (text, tables, figures, and appendices). | Individual participant data that underlie the results reported in this article, after deidentification (text, tables, figures, and appendices). | Not available |
| What other documents will be available? | Study protocol, statistical analysis plan, informed consent form, clinical study report, analytic code | Study protocol, statistical analysis plan, analytic code | Study protocol | Not available |
| When will data be available (start and end dates)? | Immediately following publication. No end date. | Beginning at 3 months and ending at 5 years following the article publication. | Beginning at 9 months and ending at 36 months following the article publication. | Not applicable |
| With whom? | Anyone who wishes to access the data. | Researchers who provide a methodologically sound proposal. | Investigators whose proposed use of the data has been approved by an independent review committee (“learned intermediary”) identified for this purpose. | Not applicable |
| For what types of analyses? | Any purpose | To achieve aims in the approved proposal. | For individual participant data meta-analysis. | Not applicable |
| By what mechanism will data be made available? | Data are available indefinitely at (link to be included). | Proposals should be directed to xxx@yyy. To gain access, data requestors will need to sign a data access agreement. | Proposals may be submitted up to 36 months following article publication. After 36 months the data will be available in our University's data warehouse but without investigator support other than deposited metadata. | Not applicable |
| Data are available for 5 years at a third-party website (link to be included). | Information regarding submitting proposals and accessing data may be found at (link to be provided). | | | |

(http://www.ncbi.nlm.nih.gov/pmc/).

All articles published in the journal are freely available with open access for everyone to read and download from the CHNR website (http://www.e-chnr.org/) immediately and permanently after publication.

### 3. Manuscript archiving policy

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### 4. Data sharing policy

This journal follows the data sharing policy described in "Data Sharing Statements for Clinical Trials: A Requirement of the International Committee of Medical Journal Editors" (https://doi.org/10.3346/jkms.2017.32.7.1051). As of July 1, 2018, manuscripts submitted to ICMJE journals that report the results of interventional clinical trials must contain a data sharing statement as described below. Clinical trials that begin enrolling participants on or after January 1, 2019 must include a data sharing plan in the trial's registration. The ICMJE's policy regarding trial registration is explained at https://www.icmje.org/recommendations/browse/publishing-and-editorial-issues/clinical-trial-registration.html. If the data sharing plan changes after registration, this should be reflected in the statement submitted and published with the manuscript, and updated in the registry record. All authors of research articles dealing with interventional clinical trials must submit a data sharing plan (see examples 1 to 4 in Table 3). Based on the degree of sharing plan, authors should deposit their data after deidentification and report the DOI of the data and the registered site.

## VII. Open Access License Agreement

It is identical to the "Creative Commons Attribution License."

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□ The title, a separate running title (if the main title exceeds 40 characters in English), author names, their affiliations, research design type, number of words in the English abstract and number of references, keywords (English), and any relevant statements of related funding or conflicts of interest, or mention of an associated graduate thesis are all presented.
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