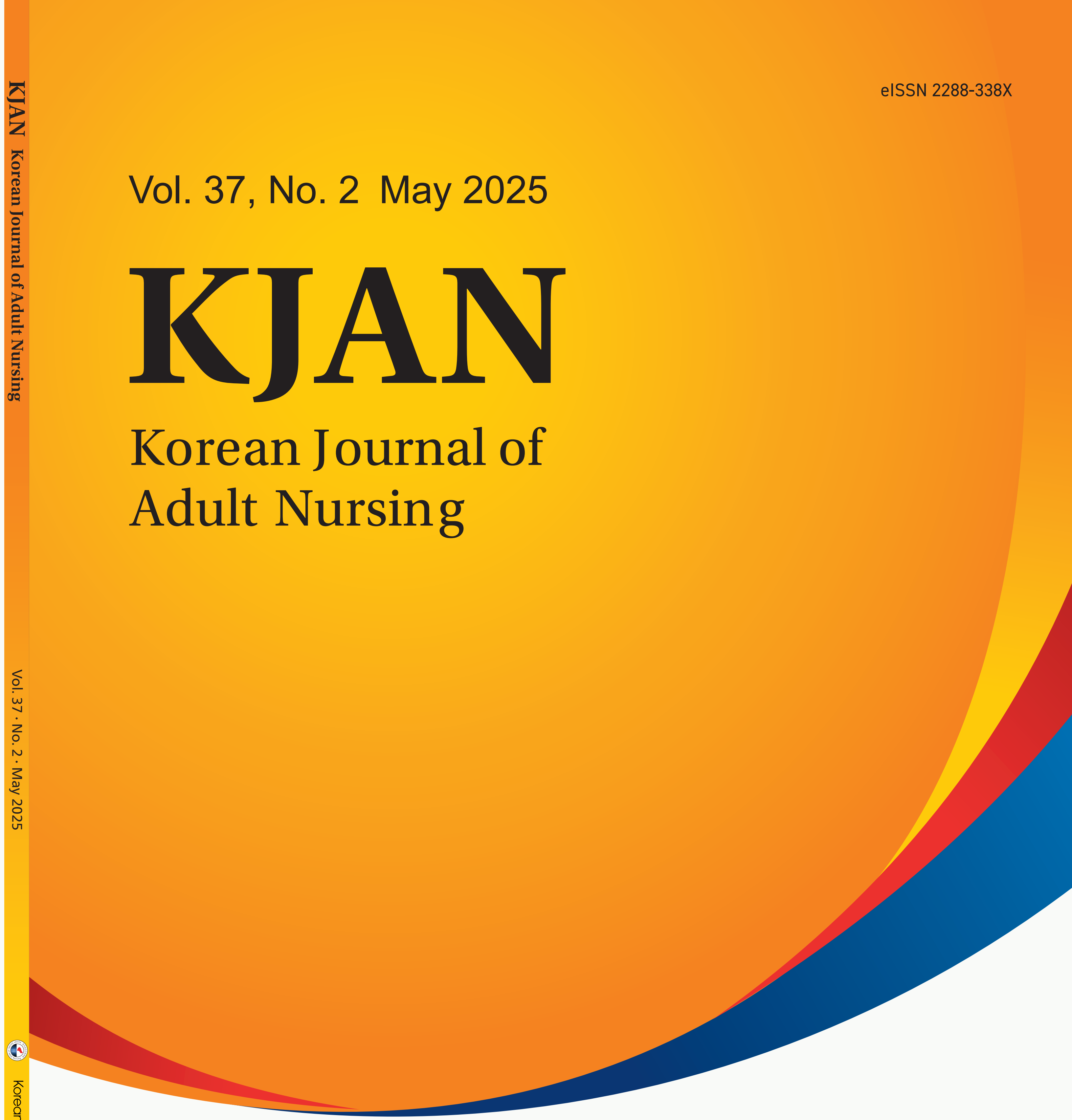
Korean Society of
Adult Nursing

KJAN Korean Journal of Adult Nursing

Vol. 37 · No. 2 · May 2025

Korean Society of Adult Nursing



eISSN 2288-338X

Vol. 37, No. 2 May 2025

KJAN

Korean Journal of Adult Nursing

Korean Society of Adult Nursing

http://kjan.or.kr

KJAN
Korean Journal of
Adult Nursing

http://kjan.or.kr
eISSN 2288-338X

Vol. 37, No. 2 May 2025

The Korean Journal of Adult Nursing (KJAN) is the official peer-reviewed research journal of the Korean Society of Adult Nursing. KJAN is devoted to the dissemination of groundbreaking research on the theories, practices, and education of adult nursing. Research on other subject areas or issues that contribute to adult nursing are published at the discretion of the Editorial Board. The goal of KJAN is to contribute health maintenance, health promotion, disease prevention, and recovery from diseases in adults by publishing research. KJAN is published four times per year at the end of February, May, August, and November. It was launched in 1989. The official title of the Journal is Korean Journal of Adult Nursing and the abbreviated title is Korean J Adult Nurs. This Journal is indexed in SCOPUS, CINAHL, KoreaMed, Google scholar and KCI.

Enacted in March 1989
Publishing 31 May, 2025

- **Publisher** Korean Society of Adult Nursing
- **Editorial Office** College of Nursing, Inje University,
  75 Bokji-ro, Busanjin-gu, Busan 47392,
  Republic of Korea
  Tel: +82-51-890-6233
  E-mail: kjan@ana.or.kr
  https://submit.kjan.or.kr
- **Editor-in-Chief** Jeonghyun Cho, PhD, RN
  College of Nursing, Inje University,
  75 Bokji-ro, Busanjin-gu, Busan 47392,
  Republic of Korea
  Tel: +82-51-890-6233
  E-mail: kjan.jhcho@gmail.com
- **Publishing Office** M2PI
  #805, 26 Sangwon 1-gil, Seongdong-gu,
  Seoul 04779, Republic of Korea
  Tel: +82-2-6966-4930
  Fax: +82-2-6966-4945
  E-mail: support@m2-pi.com

Full text is freely available URL: https://kjan.or.kr

* The articles in this journal are indexed/tracked/covered by SCOPUS, CINAHL, KoreaMed, KCI, Google scholar.

Editorial Board

Editor-in-Chief

Jeonghyun Cho, PhD, RN	Inje University, Korea

Associate Editor

Yoonyoung Lee, PhD, RN	Sunchon National University, Korea
Sunhee Moon, PhD, RN	Chonnam National University, Korea

Editorial Board

Youn-Jung Son, PhD, RN	Chung-Ang University, Korea
Kisook Kim, PhD, RN	Chung-Ang University, Korea
Jae Hee Jeon, PhD, RN, OCN	Gangneung-Wonju National University, Korea
Soo Jung Chang, PhD, RN	Gangneung-Wonju National University, Korea
Jooyoung Cheon, PhD, RN	Sungshin Women's University, Korea
Eun Kyeung Song, PhD, RN	University of Ulsan, Korea
Hee Sun Kim, PhD, RN	Jeonbuk National University, Korea
Myung Kyung Lee, PhD, RN	Kyungpook National University, Korea
Jongmin Park, PhD, RN	Pusan National University, Korea
Su Jung Lee, PhD, RN	Inje University, Korea
Jungmi Yun, PhD, RN	Pusan National University, Korea
Jeongok Logan, PhD, RN	University of Virginia, USA
Simon Ching Lam, PhD, RN, FHKAN	Tung Wah College, Hong Kong
Maria H. Cho, PhD, RN, FNP-BC	California State University, East Bay, USA
Sangmi Kim, PhD, MPH, RN	Emory University, USA

Statistical/Informatical Editor

Sujin Kim, PhD	University of Kentucky, USA

Editorial Assistant

Hyunmi Kim, RN	Inje University, Korea

English Editor

Andrew Dombrowski	Compecs, Inc., Korea

Manuscript Editor

Soo-Hee Chang	Infolumi, Korea

Layout Editor

In A Park	M2PI, Korea

Website and JATS XML File Producer

Hyun Kyung Lee	M2PI, Korea

Contents

Vol. 37, No. 2 May 2025

KJAN
Korean Journal of
Adult Nursing

Invited Article

Review Article

Original Articles

Retraction

INVITED ARTICLE

Korean J Adult Nurs Vol. 37 No. 2, 69-75, May 2025
eISSN: 2288-338X
https://doi.org/10.7475/kjan.2025.0403

KJAN
Korean Journal of
Adult Nursing

Legislation of Medical Support Tasks in the Nursing Act as a Foundation for Nursing Professionalism and Role Expansion

Su Jung Choi

Professor, Graduate School of Clinical Nursing Science, Sungkyunkwan University, Seoul, Korea

Received: April 3, 2025
Revised: April 18, 2025
Accepted: April 30, 2025

Corresponding author:
Su Jung Choi
Graduate School of Clinical Nursing
Science, Sungkyunkwan University,
115 Irwon-ro, Gangnam-gu, Seoul
06355, Korea.
Tel: +82-2-2148-9755
Fax: +82-2-2148-9949
E-mail: sujungchoi@skku.edu

Purpose: This study aimed to suggest directions for legislation regarding medical support tasks in the Nursing Act to promote the advancement of nursing. **Methods:** This study reviewed the history of medical support nurses in South Korea and the educational programs for advanced practice providers, both domestically and internationally. **Results:** Nurses have performed medical support tasks traditionally carried out by physicians, but legal controversies have persisted. As a result of the escalation of conflicts surrounding policies aiming to increase the physician workforce, training doctors left hospitals. This prompted the initiation of pilot programs allowing nurses to legally engage in medical support tasks, culminating in the enactment of the Nursing Act in September 2024. Internationally, advanced practice providers such as advanced practice nurses (APNs) and physician assistants (PAs) undergo graduate-level education and certification. Since Korea lacks a PA system, integrating medical support tasks within the APN framework would be preferable. Achieving this will require absorbing clinical practice nurses (referred to as PA nurses) into the APN system, implementing government-supported education programs to address regional disparities, and establishing reimbursement policies for APNs. **Conclusion:** With the implementation of the Nursing Act, a long-term approach is needed to establish professional qualifications, accreditation, education, training, examination, and regulatory systems. A comprehensive discussion should be undertaken to develop an optimal workforce, ensuring the delivery of safe and high-quality healthcare services to patients and the public.

Key Words: Advanced practice nursing; Legislation, nursing; Professionalism; Role

INTRODUCTION

The Korean medical community experienced a tumultuous year in 2024. In early February, government plans to increase the medical school admissions quota met with unprecedented opposition, as 91.5% of interns and residents (12,380 individuals) left hospitals, and medical students refused classes. This healthcare gap was partly filled by nurses and advanced practice nurses (APNs) through a "pilot project on nursing-related tasks" [1]. Amid ongoing conflicts between the medical community and the government, the scope of nursing duties was expanded in September 2024 with the promulgation of the Nursing Act, which now authorizes APNs and qualified nurses to perform medical support tasks [2]. Although this decision emerged amidst a crisis, it marked a turning point in which the long-undervalued professionalism of nursing personnel began receiving formal recognition by both the government and the healthcare industry.

Following the legislative announcement of enforcement decrees and rules, which include detailed implementation plans reflecting opinions from the healthcare community and civic groups, the Nursing Act is scheduled to take effect on June 21, 2025, after a period of public consultation. While some predict that the pilot project on nursing-related tasks implemented in 2024 will ease consensus on medical support tasks, substantial disagreements remain regarding the specific duties and qualifications required for nurses performing these tasks. Therefore, we intend to examine domestic and international practices of medical support tasks and propose directions for their legalization in the Nursing Act to facilitate the advancement of nursing.

THE INITIATION AND EXPANSION OF MEDICAL SUPPORT TASKS AMONG NURSES IN SOUTH KOREA

Korean nurses have performed medical support tasks since the 1970s, prior to the establishment of nationwide universal healthcare, when basic primary care was delivered in rural, physician-scarce areas through public health clinics staffed by nurses [3]. Legislation such as the Rural Special Acts enabled nurses to provide primary care, preventive programs, and health education. Moreover, provisions in the School Health Act, Industrial Safety and Health Act, and Correctional Services Act authorized nurses to treat patients, administer emergency care, and dispense medications during periods or in areas when physicians were unavailable.

Since the introduction of the National Health Insurance System in 1989, physician shortages in medical institutions have become a concern [4]. Increased demand for medical services under expanded insurance coverage led to a significant rise in hospital beds, yet the number of doctors did not increase proportionately. This discrepancy was further aggravated by the enforcement of the separation of medicine and pharmacy in 2000, which reduced medical school admission quotas by 10%, and by the reduction of residents' and interns' working hours under a 2017 regulation aimed at improving training conditions and status [4]. Additionally, physicians increasingly preferred more lucrative specialties, such as cosmetic and plastic surgery (which are not covered by insurance), over essential services like emergency departments and intensive care units, thereby deepening existing healthcare disparities.

In Korean medical law, medical practice is defined as an exclusive responsibility of physicians [5]; yet, in reality, doctors cannot manage all their extensive duties alone. In many healthcare institutions, nurses with various designations, such as APNs, clinical practice nurses, coordinators, and physician assistant (PA) nurses, perform tasks including prescription writing, documentation, and other clinical activities under the delegation of physicians, often using the physician's identification. This practice has repeatedly sparked legal disputes [6,7]. Moreover, even APNs who meet the qualifications specified by medical law are confined by the scope defined by their nursing licenses [8]. Additionally, nurses referred to as PAs, who are not legally recognized in South Korean medical law, have been embroiled in legal controversies over unauthorized medical practices, resulting in lawsuits [7].

In early 2024, most residents and interns who opposed the government's plan to expand medical school enrollment quotas left hospitals. This departure prompted the initiation of a temporary "pilot project on nursing-related tasks" [1], enabling nurses to perform medical support tasks. In September of that year, the scope of nursing duties was further expanded through legislation to officially include medical support tasks [2]. Furthermore, starting in October, the Tertiary General Hospital Transformation Support Project proposed replacing the conventional, resident- and intern-centered on-call system with a model led by experienced teams composed of specialists and medical support nurses. This shift aims to concentrate on care for severe, emergency, and rare diseases while ensuring high-quality training for interns and residents.

If the government envisions medical support task nurses as essential team members alongside specialists, it becomes crucial to review the training and qualifications of their counterparts abroad and integrate these standards into the domestic Nursing Act's enforcement rules. The Nursing Act is scheduled to take effect on June 21, 2025; however, in accordance with Article 14, Paragraph 2, the designation and evaluation of institutions that conduct educational programs must be implemented within three years from nine months after its promulgation [2]. Establishing a robust education system is imperative to ensure patient safety, broaden the scope of nursing, and strengthen professional expertise. Consequently, we intend to review international educational practices and discuss improvements for educating domestic medical support task nurses.

PROPOSED FRAMEWORK FOR DOMESTIC EDUCATION FOR NURSES ON MEDICAL SUPPORT TASKS BASED ON THE INTERNATIONAL SYSTEM FOR ADVANCED PRACTICE PROVIDER EDUCATION

The global shortage of physicians has driven many countries to train non-physician clinicians—such as APNs and PAs—and to expand their scope of practice [9–12]. These non-physician clinicians are often referred to as middle-level providers or advanced practice providers (APPs). In countries with a high utilization rate of APPs, education and certification systems have been established to ensure that these professionals acquire the necessary knowledge and skills to safeguard public health and safety [7,13]. Although APNs originate from a nursing background, PAs can be recruited from non-medical fields; consequently, PA programs typically require more extensive education and practical training hours in their master's curricula than those for APNs [11,13]. Since South Korea does not have a PA system, it is more appropriate to rely on APNs, and hence, we will focus on examining the APNs education system.

In both Singapore and Taiwan—where the APN system emerged around the same time as in South Korea—governments reviewed qualifications for APP personnel and ultimately recognized only APNs, excluding PAs [14,15]. In Singapore, APNs candidates must complete a master's degree program that lasts 1 year and 6 months, followed by a mandatory 1-year internship under an accredited preceptor, which includes at least 1,280 hours of clinical practice. Additionally, candidates are required to submit a specified number of Objective Structured Clinical Examination reports based on direct patient examinations [15]. In Taiwan, eligibility for the APN examination can be achieved either by completing a master's degree program for APNs or by completing 1,500 hours of clinical training as part of a team consisting of one specialist with at least two years of experience and four APNs, along with a minimum of 213 hours of theoretical education at an educational hospital with a dedicated department for APNs [16]. In both the United States and the United Kingdom, APN programs require a minimum of 500 hours of clinical practice [12].

In countries where the roles of APNs have been expanded, educational curricula require significantly more practical training than those in Korea. Given that the Nursing Act is expected to broaden the scope of medical support tasks beyond what is outlined in current medical laws, revising the existing APN curriculum is inevitable. APNs may be expected to perform more invasive procedures and manage delegated prescriptions for diverse patient needs. In some hospitals participating in the Tertiary General Hospital Transformation Support Project, APNs work 24/7 shifts, respond to primary patient calls, and resolve issues based on their own judgment whenever possible. In certain institutions, APNs share inpatient management duties with physicians. This model of shift-based APN work was proposed even before the current conflicts between medical and governmental entities, when hospitalists were encouraged to collaborate in teams with APNs [17]. Consequently, to enable APNs to fully assume their roles as competent APPs, they must further develop their skills in health assessment, technical procedures, and clinical reasoning. Their training should comprehensively cover essential subjects—such as pathophysiology, pharmacology, physical/health examination, and health promotion, which constitute the "4Ps" of education [18]—and both the academic curriculum and clinical practice components must be realigned with evolving clinical demands. Educational programs should be a collaborative effort between academic institutions and the healthcare settings where the nurses will work. Moreover, it is necessary to explore the possibility of integrating current clinical practice nurses engaged in medical support tasks into the formal APN system.

FUTURE CHALLENGES FOR UTILIZING ADVANCED PRACTICE NURSES AS ADVANCED PRACTICE PROVIDERS

APNs have achieved significant success in enhancing patient outcomes and satisfaction, and they are now employed globally [19]. Their effectiveness likely stems from a holistic approach to patient care, deeply embedded in nursing principles. According to the U.S. Department of Labor's projections, while the number of physicians is expected to increase by only 2.9% between 2021 and 2031, the number of APNs is projected to rise by 45.7%, highlighting the growing demand for these professionals [11]. In Korea, patients who have been cared for by APNs frequently describe them as "experts with specialized knowledge and diverse clinical experience," "facilitators who help patients manage their conditions independently," and "indispensable healthcare professionals who bridge the gap between doctors and patients" [20].

Nevertheless, due to the vague boundaries of APNs' responsibilities and inadequate fee-for-service and compensation structures, many medical institutions continue to assign medical support tasks to nurses under the designation of PA nurses—a title not recognized by medical law—instead of fully utilizing APNs [21]. Consequently, to ensure the active deployment of well-trained APNs, several issues require resolution. These include: “What should be done with clinical practice nurses already performing medical support tasks?”, “Is there a sufficient number of APNs capable of undertaking these roles?”, “Are there enough educational institutions to train APNs, particularly in rural areas where educational disparities are more pronounced?”, and “Is the APN system economically sustainable?” In this paper, we present opinions addressing these questions.

First, we address solutions concerning existing clinical practice nurses. Although 17,850 nurses are currently certified as APNs, the absence of a reporting system obscures their actual activities within healthcare institutions. A study [22] surveying 1,347 certified APNs found that 29.1% were working as APNs, 14.5% as clinical practice nurses, 30.0% as registered nurses, and 24.1% in academic or managerial roles—indicating that many certified individuals do not serve as APNs. While three major tertiary hospitals in Seoul report having between 100 and 200 APNs in practice, most other healthcare facilities either have few or no positions designated for APNs. Notably, a study conducted in institutions that operate solely under the clinical practice nurse model [23] reported that 34.3% of clinical practice nurses held APN certifications. Therefore, nurses holding APN certification should be formally assigned to APN roles. Additionally, individuals with master’s degrees or substantial clinical practice nurses experience—those capable of performing as APPs—should be granted opportunities to sit for the APN certification exam via an exceptional process [6]. Although societal consensus on such exceptions is necessary, temporary measures might be justified. For instance, if clinical practice nurses experience is deemed equivalent to a residency training program—as demonstrated by Taiwan’s APN certification process [16]—then temporary exceptions could be implemented. (refer to Figure 1 for an example of such an exceptional process.)

Second, we address the issue of insufficient educational institutions for APNs. Currently, 39 institutions run APN programs, but these are largely concentrated in major metropolitan areas [24]. APN curricula require more coursework and clinical practice hours compared to existing master’s programs in nursing, which places considerable strain on faculty and results in high tuition fees for students. To

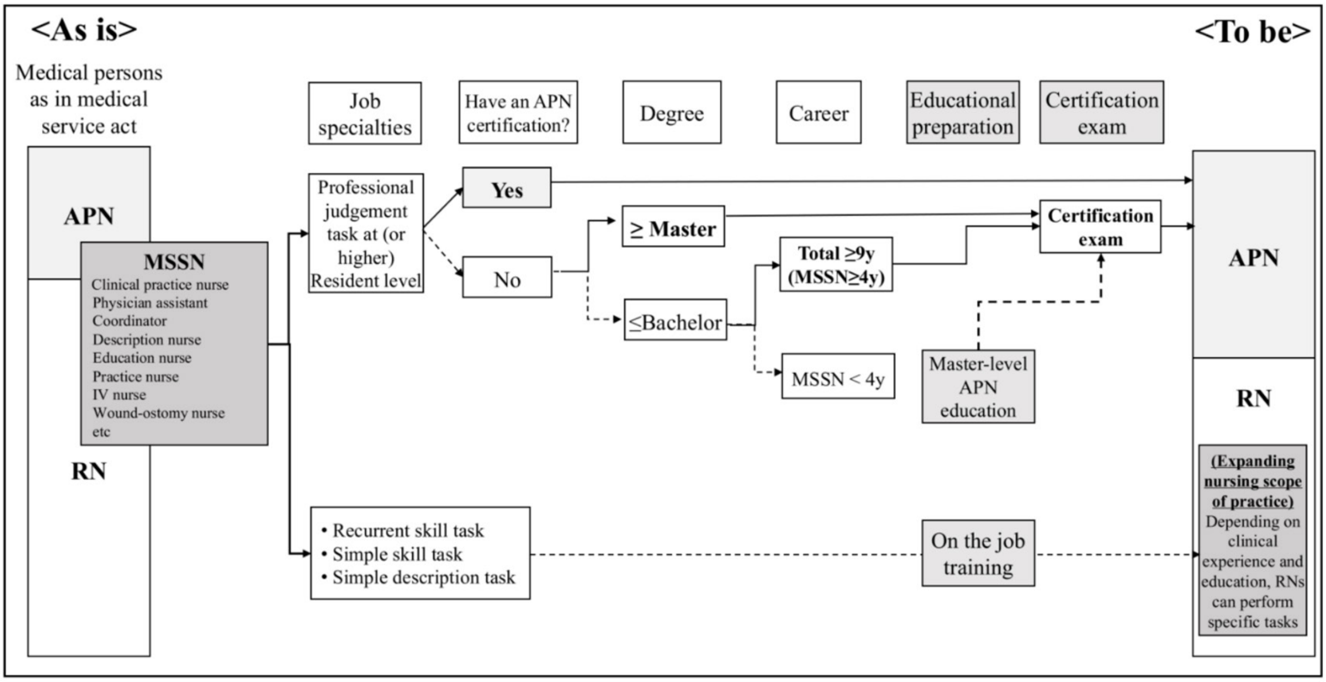


Figure 1. Credentials and special qualification acceptance criteria. This figure has been reproduced with permission from the *Journal of Korean Academy of Nursing*. 2024;54(3):300-10 [6]. APN = advanced practice nurse; MSSN = medical support staff nurse; RN = registered nurse.

alleviate regional disparities in education, local governments should support the establishment of additional training institutions—for example, by promoting APN education in rural areas through a contract education system. Under such a system, businesses would request schools to offer training programs, provide tuition support for students, and offer financial aid to educational institutions, with the condition that graduates work for the sponsoring business for a set period [25]. By having local governments support this system and universities manage APN programs as contract-based departments, regional disparities in educational opportunities can be reduced, and healthcare facilities will be better positioned to employ experienced nurses. Moreover, once certified, APNs not only represent experienced healthcare personnel but also have the potential to expand their roles as APPs collaborating with physicians. This approach—integrating existing clinical practice nurses into APN roles and expanding regional education—could significantly increase the supply of APNs.

Finally, for the role and system of APNs to expand, institutional support is required—not only through legalizing their scope of practice and activating reimbursement systems, but also by ensuring that institutions employing APNs provide support for efficient job performance, including the development of detailed job descriptions. On an individual level, APNs must continuously update their knowledge of current trends and engage in ongoing research to demonstrate their effectiveness (Table 1). Proving their cost-effectiveness is crucial for justifying reimbursement and for gaining recognition for their expertise. For example, in South Korea, the additional deployment of specialized nursing personnel in intensive care units has been shown to increase sepsis bundle intervention rates, ultimately reducing patient mortality [26]. This success has paved the way for pilot projects such as rapid response teams that include additional staffing reimbursements. Although pioneering a new role presents challenges, failure to establish and publicize the role may cause it to remain confined to a supplementary position in clinical practice. Therefore, APNs must actively engage in research, promote their roles, and demonstrate leadership.

CONCLUSION

Expanding the scope of APNs as APPs is likely to have a substantially positive impact on public health rather than causing harm [27]. As the responsibilities of both registered nurses and APNs evolve, academic institutions and clinical facilities must collaborate to provide multidisciplinary education and training to ensure that patients receive optimal care. In the future, as legal recognition of nurses' roles in medical support tasks increases along with the contributions of skilled APNs, improved patient outcomes and enhanced medical services are expected to be increasingly documented. Naturally, this should lead to appropriate compensation. Although current discussions about APNs are predominantly focused on healthcare institution-based settings—due to ongoing conflicts between the medical community and the government—future dialogues should also explore the diverse roles that APNs can play in community-based settings. For example, employing APNs in schools (in addition to public health nurses) or in nursing homes could help address local healthcare challenges.

The establishment of the Nursing Act, along with changes in the healthcare system, will necessitate adaptations in the roles and responsibilities of medical personnel. New qualifications, authority, and accountability for performing these duties will be required. From a long-term perspective, it is essential to engage in a comprehensive dialogue on strategies to cultivate and deploy optimal healthcare

Table 1. Strategies for Facilitating the Role of Advanced Practice Nurses in Korea

Level	Strategies
Macro (structural) level (government)	Legislate and extend the scope of practice Remuneration Remodeling and integration of the 13 APN specialties
Meso level (institution)	Foster APN (position & reward) Privileges (competency-based job description)
Micro level (individual)	Continued clinical competency Research and evidence-based practice Leadership competency

APN = advanced practice nurse.

personnel. This will involve addressing licensing, certification, accreditation, education, training, examinations, and regulatory measures to ensure the provision of safe and superior medical services to both patients and the public.

ORCID

Su Jung Choi, https://orcid.org/0000-0003-2171-7441

CONFLICTS OF INTEREST

The author declared no conflict of interest.

FUNDING

None.

ACKNOWLEDGEMENT

None.

DATA AVAILABILITY STATEMENT

No new data were created or analyzed during this study. Data sharing is not applicable to this article.

REFERENCES

1. Division of Nursing Policy. Pilot project related to nurse scope of work [Internet]. Sejong: Ministry of Health and Welfare; 2024 [cited 2024 May 2]. Available from: https://www.mohw.go.kr/board.es?mid=a10504000000&bid=0030&cg_code=
2. Nursing Acts [Internet]. Sejong: Korean Law Information Center; 2024 [cited 2025 March 20]. Available from: https://www.law.go.kr/LSW/lsInfoP.do?lsiSeq=265413&viewCls=lsRvs-DocInfoR#
3. Seol M, Shin YA, Lim KC, Leem C, Choi JH, Jeong JS. Current status and vitalizing strategies of advanced practice nurses in Korea. Perspect Nurs Sci. 2017;14(1):37-44. https://doi.org/10.16952/pns.2017.14.1.37
4. Choi SJ, Kim YH, Lim KC, Kang YA. Advanced practice nurse in South Korea and current issues. J Nurse Pract. 2023;19(9):104486. https://doi.org/10.1016/j.nurpra.2022.10.015
5. Medical Service Act [Internet]. Sejong: Korean Law Information Center; 2020 [cited 2025 March 20]. Available from: https://www.law.go.kr/LSW/eng/engLsSc.do?menu=2&query¼MEDICAL%20SERVICE%20ACT#liBgcolor30
6. Choi SJ, Kim MY. Legal and practical solutions for the expanding the roles of medical support staff nurses. J Korean Acad Nurs. 2024;54(3):300-10. https://doi.org/10.4040/jkan.24075
7. Yum HK, Lim CH, Park JY. Medicosocial conflict and crisis due to illegal physician assistant system in Korea. J Korean Med Sci. 2021;36(27):e199. https://doi.org/10.3346/jkms.2021.36.e199
8. Kim HN, Kim KH. Legal review on physician assistants. Chonnam Law Rev. 2016;36(3):331-52.
9. Maier CB, Aiken LH. Task shifting from physicians to nurses in primary care in 39 countries: a cross-country comparative study. Eur J Public Health. 2016;26(6):927-34. https://doi.org/10.1093/eurpub/ckw098
10. Dankers-de Mari E, van Vught A, Visee HC, Laurant MG, Batenburg R, Jeurissen PP. The influence of government policies on the nurse practitioner and physician assistant workforce in the Netherlands, 2000-2022: a multimethod approach study. BMC Health Serv Res. 2023;23(1):580. https://doi.org/10.1186/s12913-023-09568-4
11. Hooker RS, Christian RL. The changing employment of physicians, nurse practitioners, and physician associates/assistants. J Am Assoc Nurse Pract. 2023;35(8):487-93. https://doi.org/10.1097/JXX.0000000000000917
12. Wheeler KJ, Miller M, Pulcini J, Gray D, Ladd E, Rayens MK. Advanced practice nursing roles, regulation, education, and practice: a global study. Ann Glob Health. 2022;88(1):42. https://doi.org/10.5334/aogh.3698
13. Yoon SJ. A review and implication of international trends for the definition and scope of physician assistant. Glob Soc Secur Rev. 2022;20:5-16. https://doi.org/10.23063/2022.03.1
14. Chou LP, Hu SC. Physician assistants in Taiwan. J Am Acad Physician Assist. 2015;28(3):1-3. https://doi.org/10.1097/01.JAA.0000460932.03971.e0
15. Xu C, Koh KW, Zhou W. The development of advanced practice nurses in Singapore. Int Nurs Rev. 2024;71(2):238-43. https://doi.org/10.1111/inr.12810
16. Taiwan Association of Nurse Practitioners. Nurse Practitioners Laws [Internet]. New Taipei City: Taiwan Association of Nurse Practitioners; 2024 [cited 2025 March 20]. Available from: https://www.tnpa.org.tw/en/certification/nurse.php

17. Shin DH. The vision of hospitalist system in Korea. Korean J Med. 2021;96(1):1-6. https://doi.org/10.3904/kjm.2021.96.1.1
18. Day K, Hagler DA. Integrating the 4Ps in masters-level nursing education. J Prof Nurs. 2024;53:16-24. https://doi.org/10.1016/j.profnurs.2024.04.003
19. Kilpatrick K, Savard I, Audet LA, Costanzo G, Khan M, Atallah R, et al. A global perspective of advanced practice nursing research: a review of systematic reviews. PLoS One. 2024;19(7):e0305008. https://doi.org/10.1371/journal.pone.0305008
20. Jeon MK, Choi SJ, Han JE, Kwon EK, Park JH, Kim JH. Experiences of patients and their families receiving medical services provided by advanced practice nurses at tertiary general hospitals. J Korean Acad Nurs. 2024;54(4):594-606. https://doi.org/10.4040/jkan.24069
21. Choi SJ, Lee DH, Kang YA, Lee CS, Jeon MK. A study of the roles, practice, and reimbursement of Korean advanced practice nurses, and proposal for improving reimbursement policies. J Korean Clin Nurs Res. 2024;30(3):178-92. https://doi.org/10.22650/JKCNR.2024.30.3.178
22. Shin YS, Yoon KJ, Chae SM, Kang YM, Kwon YJ, Jun A, et al. Research to revitalize the advanced practice nurse system. Sejong: Ministry of Health and Welfare; 2019.
23. Ryu MJ, Park M, Shim J, Lee E, Yeom I, Seo YM. Expectation of medical personnel for the roles of the physician assistants in a university hospital. J Korean Acad Nurs Adm. 2022;28(1):31-42. https://doi.org/10.11111/jkana.2022.28.1.31
24. Korean Accreditation Board of Nursing Education. Operation guideline of the advanced practice nurses' training course [Internet]. Seoul: Korean Accreditation Board of Nursing Education; 2025 [cited 2025 March 20]. Available from: http://www.kabone.or.kr/mainbusin/nurse03perform.do
25. Regulations on the establishment and operation of contracts [Internet]. Sejong: Korean Law Information Center; 2023 [cited 2025 April 1]. Available from: https://www.law.go.kr/LSW/admRulLsInfoP.do?chrClsCd=&admRulSeq=2100000223592#AJAX
26. Choi S, Son J, Oh DK, Huh JW, Lim CM, Hong SB. Rapid response system improves sepsis bundle compliances and survival in hospital wards for 10 years. J Clin Med. 2021;10(18):4244. https://doi.org/10.3390/jcm10184244
27. Markowitz S, Adams EK, Lewitt MJ, Dunlop AL. Competitive effects of scope of practice restrictions: public health or public harm? J Health Econ. 2017;55:201-18. https://doi.org/10.1016/j.jhealeco.2017.07.004

REVIEW ARTICLE

Korean J Adult Nurs Vol. 37 No. 2, 76-90, May 2025
eISSN: 2288-338X
https://doi.org/10.7475/kjan.2025.0306

KJAN
Korean Journal of
Adult Nursing

Expectation-Loss-Resilience Interaction Model in Women's Experiences of Infertility: A Meta-Synthesis of Qualitative Studies

Hwi-Su Kim

Graduate Student, College of Nursing, Chonnam National University, Gwangju, Korea

Received: March 6, 2025
Revised: April 29, 2025
Accepted: May 13, 2025

Corresponding author:
Hwi-Su Kim
College of Nursing, Chonnam National University, 160 Baekseo-ro, Dong-gu, Gwangju 61469, Korea.
E-mail: khsu712@naver.com

Purpose: This study involved a meta-synthesis of qualitative research concerning the experiences of women with infertility and infertility treatments. Based on an analysis of emotional changes and adaptation processes, it aimed to propose an interaction model encompassing expectation, loss, and resilience and clarify the conceptual meaning of each component. **Methods:** Thomas and Harden's five-step qualitative meta-synthesis methodology was employed. A total of 22 studies published between 2014 and 2024 were comprehensively analyzed and synthesized. The findings were integrated into a model representing the experiences of women undergoing infertility and infertility treatments. **Results:** The meta-synthesis identified six key themes: changes in identity and inner growth; strengthening resilience through the roles of spouses, family, and peers; strategies for recovery and growth; support systems amidst economic and social burdens; life in the tension of waiting and hope; and the reconfiguration of couple and family relationships. Based on these themes, a dynamic interaction model, named the Model of Psychological Changes and Resilience (PCR Model), was developed to illustrate the interrelationships among expectation, loss, and resilience. The conceptual implications of these relationships were also explicated. **Conclusion:** The cyclical interplay between expectation and loss among women experiencing infertility is intensified by social ideologies and cultural contexts, while resilience is strengthened through overcoming distress and finding meaning in life. Further quantitative research is necessary to validate these relationships in clinical settings by obtaining empirical data that apply this model.

Key Words: Female infertility; Hope; Grief; Psychological resilience; Psychological models

INTRODUCTION

The number of infertility patients in South Korea increased by 25.7% over the past decade, rising from 189,879 in 2012 to 238,610 in 2022 [1]. Women accounted for 64% (152,953) of these cases. This trend aligns with global patterns but is particularly pronounced in Korea, influenced by sociocultural pressures and delayed childbearing. As of 2023, the average maternal age reached 33.6 years, with the proportion of mothers aged 35 and older rising from 19.7% in 2012 to 36.3% [2]. Given the marked decline in fertility and *in vitro* fertilization success rates after age 35 [3], the physical, psychological, and financial burdens of treatment continue to increase. Women experiencing infertility often begin treatment filled with hope [4], but repeated treatment failures lead to emotional exhaustion and psychological distress [5]. While successful outcomes depend on age, health status, and treatment methods [6], medical efforts alone cannot guarantee success, making emotional support essential [7-9]. This study adopts the term “women experiencing infertility” to reflect a person-centered and respectful perspective. Infertility is more than a medical condition; it involves navigating emotional, relational, and cultural challenges. Qualitative studies have identified core themes such as emotional distress, stigma, identity shifts, and disrupted relationships. However, differences in scope and methodologies among studies limit a comprehensive understanding. Thus, a meta-synthesis is needed to integrate these findings, reveal broader patterns, and deepen insight into how women psychologically adapt over time [10].

Central to the infertility experience are psychological distress, bodily changes, relational shifts, and societal expectations. These factors shape how infertility is experienced and interpreted. Emotional distress arises from uncertainty and recurrent loss; bodily changes from treatment procedures affect self-image; relational tensions develop within partnerships and families; and societal ideals of motherhood amplify feelings of inadequacy. Together, these elements shape how women construct meaning and develop coping mechanisms.

This study examined how women progress through a psychological process involving expectation, loss, and resilience. These three components are interconnected, forming a cyclical pattern throughout infertility treatment. By synthesizing existing qualitative research, this study aims to construct an integrated model that represents these dynamic emotional transitions. The model has practical implications for clinical and policy settings. Clinically, it can guide tailored psychological support at each stage of infertility treatment. In terms of policy, the model highlights the need for stage-specific mental health services and public education that recognizes the long-term emotional impacts of infertility. Therefore, this model aims to contribute to more empathetic and comprehensive care.

The purpose of this study was to perform a meta-synthesis of primary qualitative research exploring the experiences of women undergoing infertility and infertility treatments. Specifically, the study aimed to analyze the emotional changes and adaptation processes of women experiencing infertility and to propose an interaction model involving expectation, loss, and resilience. Through this, the study sought to explain the conceptual meaning of each element.

METHODS

1. Research Design

This study is a qualitative meta-synthesis examining research on the experiences of women undergoing infertility and infertility treatments. Its objective was to explore psychological changes in an integrated manner and coping processes observed within infertility experiences. To achieve this, the study applies the thematic synthesis approach within qualitative meta-synthesis, involving five structured stages. This study adhered to the SWiM (Synthesis Without Meta-analysis) reporting guideline to ensure transparent and systematic reporting of the narrative synthesis.

2. Quality Assessment of Selected Literature

This study employed the Critical Appraisal Skills Program (CASP) Qualitative Checklist to assess the quality of the selected literature [11]. The CASP tool comprises 10 items evaluating the rigor and transparency of qualitative research, including clarity of research aims, appropriateness of methodology, recruitment strategy, data collection methods, ethical considerations, rigor in data analysis, and the value of findings. Each study was independently evaluated by two reviewers using a standardized scoring form, assigning scores as “yes” (1 point), “unclear” (0.5 points), or “no” (0 points) per item. The final score was calculated as a percentage of the total possible points. Only studies achieving a CASP compliance rate of 85% or higher were included to ensure methodological robustness (Table 1). Discrepancies between reviewers’ scores were resolved through discussion and consensus, enhancing reliability and minimizing reviewer bias.

3. Literature Search and Selection of Synthesized Literature

Qualitative studies on the experiences of women undergoing infertility and infertility treatments were identified through a comprehensive literature search, including articles published up to December 2024. The search was conducted across five major electronic databases: RISS, DBpia, KISS, PubMed, and CINAHL. Search terms included combinations of keywords such as “infertility,” “women,” “experience,” and “qualitative research,” tailored specifically for

Table 1. Quality Appraisal of Included Studies

Items	Korean studies											International studies										
	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11
Was there a clear statement of the aims of the research?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Is a qualitative methodology appropriate?	Y	Y	Y	Y	Y	C	C	C	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Was the research design appropriate to address the aims of the research?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	C	Y	Y	Y	Y	Y	Y	C	Y	C
Was the recruitment strategy appropriate to the aims of the research?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Was the data collected in a way that addressed the research issue?	Y	Y	Y	Y	Y	N	N	C	Y	Y	N	Y	N	Y	N	N	Y	C	N	C	N	C
Has the relationship between researcher and participants been adequately considered?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Have ethical issues been taken into consideration?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Was the data analysis sufficiently rigorous?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Is there a clear statement of findings?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
How valuable is the research?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Percentage of met CASP (%)	100	100	100	95	100	85	85	90	100	100	90	100	85	100	90	90	100	95	90	90	90	90

C = can’t tell; CASP = Critical Appraisal Skills Program; N = no; Y = yes.

each database using Boolean operators (“AND,” “OR,” and “NOT”). To ensure completeness, additional manual searches were performed using relevant keywords on Google Scholar. A total of 78 articles were initially retrieved. All records were imported into EndNote for systematic management and removal of duplicates, resulting in the exclusion of eight duplicates, leaving 70 unique studies. In the second stage, five studies were excluded due to the unavailability of full texts, yielding 65 studies eligible for full-text review.

The inclusion criteria were as follows: (1) studies focused on women with infertility; (2) qualitative research addressing infertility experiences; and (3) publications available in Korean or English.

The exclusion criteria included: (1) studies primarily focusing on medical treatments rather than lived experiences; (2) policy- or project-related studies; (3) studies without full-text access, including conference abstracts and proceedings; and (4) non-peer-reviewed articles.

To ensure clarity, an operational definition of “lived experience” was provided to guide inclusion decisions. Mixed-methods studies were excluded to ensure methodological consistency and the depth of qualitative synthesis.

In the third stage, full texts were thoroughly reviewed to determine eligibility based on their content. Studies were excluded if they did not focus explicitly on the lived experiences of women with infertility—for example, studies addressing only miscarriage or general healthcare services (29 studies) or those limited strictly to clinical or medical aspects without experiential data (14 studies). Ultimately, 22 qualitative studies met the inclusion criteria and were selected for meta-synthesis. A detailed flowchart of the selection process is presented in Figure 1.

4. Data Synthesis Method

This study employed qualitative meta-synthesis, following the thematic synthesis approach of Thomas and Harden (2008) [12], integrated with procedural steps proposed by Song [13]. Specifically, Thomas and Harden’s method provided the overarching analytical framework—including data extraction, inductive coding, theme development, and interpretive synthesis—while Song’s modifications structured the procedural flow of the synthesis. Song’s frame-

https://doi.org/10.7475/kjan.2025.0306

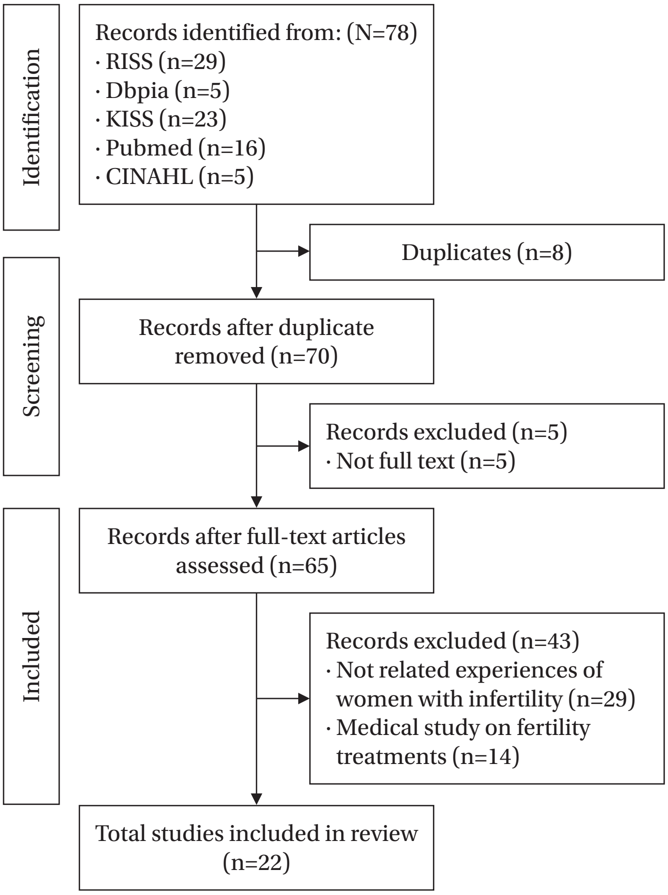


Figure 1. Flowchart of article extraction process.

work emphasizes iterative cross-checking, researcher reflexivity, and context-sensitive analysis. To reduce researcher subjectivity and ensure analytical rigor, multiple strategies were employed: (1) triangulation through discussions with a professor specializing in women's health nursing and a nurse specializing in infertility, and (2) memo writing to document analytical decisions and assumptions. These steps enhanced transparency and trustworthiness in the interpretive process.

By combining these two approaches, the study ensured methodological consistency and cultural sensitivity, thus enhancing the originality of the synthesis process. The research was carried out in the following five stages.

1) Stage 1: Literature search and selection

Studies were selected based on predefined inclusion and exclusion criteria: qualitative design, relevance to infertility experiences, and language (English or Korean). Mixed-methods studies were excluded to maintain methodological consistency and emphasize qualitative depth. A systematic search was conducted across major databases, and relevant articles were organized using Microsoft Excel.

2) Stage 2: Quality assessment

The CASP Qualitative Checklist was used to evaluate methodological quality. Two independent reviewers assessed each study using a 10-item form, scoring each item as "Yes," "No," or "Unclear." Scores were converted to percentages, and only studies scoring 85% or higher were included. Discrepancies were resolved through consensus discussion, enhancing reliability.

3) Stage 3: Data extraction

Key information and findings related to infertility experiences were extracted into a standardized Excel template. Data were independently reviewed by two researchers. Researcher reflexivity was maintained through memo writing, documenting decisions and perspectives throughout this process.

4) Stage 4: Text coding and development of descriptive themes

Line-by-line inductive coding preserved original language and meaning. Codes were grouped and refined into subcategories and descriptive themes through constant comparison. Two researchers independently coded a subset of data, resolving discrepancies through dialogue and guidance from a senior qualitative researcher to ensure analytical consistency.

5) Stage 5: Generation of analytical themes

Descriptive themes were abstracted into higher-order analytical themes, generating new conceptual insights into psychosocial and sociocultural dimensions of infertility. Researcher triangulation involved iterative discussions with a women's health nursing professor and an infertility-specialized nurse, promoting validity and conceptual clarity. Divergent or ambiguous findings were explicitly examined to avoid overgeneralization.

5. Researcher Preparation

The researcher is a nurse with clinical experience in the maternal health department of a 110-bed women's specialty hospital, closely involved in providing care and treatment for women experiencing infertility. The researcher reviewed both qualitative and quantitative infertility studies, applying Thomas and Harden's thematic synthesis methodology for data interpretation. To mitigate researcher bias, reflexivity was practiced throughout the research process by documenting subjective perspectives in analytic memos and regularly consulting with interdisciplinary experts. Findings were derived through extensive discussions with a women's health nursing professor and a nurse specializing in infertility care.

RESULTS

1. Literature Review and Analysis

Detailed information and analysis of the research findings are summarized in Table 2 and Appendix 1, and key results are discussed in the text. Participants in the reviewed studies had an average infertility diagnosis duration of 5 to 6 years, with approximately 80% undergoing 3 to 4 infertility treatments. Notable differences were observed between domestic and international study results.

2. Thematic Synthesis Results

Through thematic synthesis, six themes were identified, providing a systematic understanding of infertility experiences.

Table 2. Overview of Studies Included in the Meta-Synthesis

No.	First author (year)	Objective	Infertility diagnosis period	Experiences with infertility treatments (%)	Data collection	Data analysis	Findings
A1	Jeong (2014)	Resilience process of women with infertility	Avg. 3.7 years	61.5% (8 out of 13)	In-depth individual interviews	Phenomenology (Colaizzi)	Psychological journey of pregnancy and infertility Impact of familial and societal expectations Recovery and new beginnings
A2	Jeong (2014)	Infertility experiences: pain and coping	Avg. 8.3 years	16.7% (1 out of 6)	In-depth individual interviews	Grounded theory method (Strauss & Corbin)	Determinism and identity crisis Idealized motherhood and the search for renewal
A3	Jeong (2017)	Examines social support experiences of infertile women	Avg. 5.9 years	66.7% (4 out of 6)	In-depth individual interviews	Phenomenology (Giorgi)	Expectant waiting Worrying waiting Confronting reality My world changes Facing myself again
A4	Ryu (2019)	Women's infertility treatment realities	(–)	(–)	In-depth individual interviews	Thematic analysis method	Infertility and exile ART and the uncertainty of hop
A5	Yang (2019)	To explore the impact, challenges, and coping in infertility treatment	(–)	100% (mean number of treatments: 3.5)	In-depth individual interviews	Thematic analysis method	The deteriorating mind Strained relationships Balancing challenging work and treatment The endless torture of hope without results
A6	Baek (2020)	Explores the pain of repeated infertility treatment failures	(–)	100% (mean number of treatments: 4)	In-depth individual interviews	Phenomenology (Colaizzi)	Objectified body and elusive fortune Lonely struggle for recognition and pregnancy

(Continued on the next page)

https://doi.org/10.7475/kjan.2025.0306

Table 2. Continued

No.	First author (year)	Objective	Infertility diagnosis period	Experiences with infertility treatments (%)	Data collection	Data analysis	Findings
A7	Son (2020)	Examines the lived experiences of women over 35 undergoing infertility treatment	Avg. 3 years	100% (mean number of treatments: 4.5)	In-depth individual interviews	Phenomenology (Colaizzi)	Anxiety due to uncertainty Depression Strained relationships in distress Willingness toward pregnancy
A8	Oh (2021)	Explores and analyzes infertility treatment experiences of aging women	Avg. 3.7 years	Two treatments: 37.5% One treatment: 62.5%	Semi-structured interviews	Phenomenology (Colaizzi)	Trials and challenges of treatment Hope and value in the experience
A9	Lee (2021)	Explores women's experiences from infertility to pregnancy	Avg. 4 years	100% (mean number of treatments: 2)	In-depth individual interviews	Phenomenology (Giorgi)	The meant-to-be mother The longing for a child The pain of infertility treatment Ascending to motherhood
A10	Jeon (2022)	Examines coping experiences with infertility treatment	(–)	(–)	In-depth individual interviews	(–)	Childbirth burden and healthcare access challenges Lack of psychological and emotional support
A11	Park (2024)	Abandonment process in women discontinuing infertility treatment	Avg. 8.2 years	61.5% (8 out of 13)	In-depth individual interviews	Grounded theory method (Strauss & Corbin)	Psychological burden and social conflicts of infertility Support, Comfort, and Adaptation Traditional expectations and new paths
B1	Ranjbar (2015)	Examines and explains infertility treatment experiences of pregnant women	6 months–15 years	0–5 treatments	In-depth individual interviews	Content analysis method	Struggle to achieve pregnancy Fear and uncertainty Breaking free from stigma Pursuit of husband's satisfaction
B2	Dierickx (2018)	Explores the impact of infertility on women's lives	(–)	(–)	In-depth individual interview	Thematic analysis method	The multidimensional impact of infertility Gender and pro-natal norms Respondent's position and infertility experience
B3	Hasanpoor-Azghady (2019)	Explains the psychosocial process of the social construction of infertility	Avg. 5.3 years	Average treatment duration: 3.3 years	In-depth individual interviews	Grounded theory method (Strauss & Corbin)	Marital and social interactions Psychological and social impact of infertility Treatment and spiritual growth

(Continued on the next page)

Table 2. Continued

No.	First author (year)	Objective	Infertility diagnosis period	Experiences with infertility treatments (%)	Data collection	Data analysis	Findings
B4	Aghakhani (2020)	Explores the infertility experiences of Iranian women	(–)	(–)	In-depth individual interviews	Content analysis method	Shock Reaction Processing Adjustment
B5	Ofosu-Budu (2020)	To explore infertile women's experiences	(–)	(–)	In-depth individual interviews	Thematic analysis method	Emotional experiences Social support and challenges
B6	Kiani (2021)	Investigates anxiety factors and their impact on the quality of life of infertile women	Avg. 8.2 years	Medication treatment: 26.6% Infertility treatment: 53.2% Egg donation: 20.2%	In-depth individual interviews	Content analysis method	Infertility-related concerns Coping with infertility
B7	Taebi (2021)	Explores the concept of infertility stigma based on women's experiences and perceptions	~5 years: 53% 5–10 years: 35.3% More than 10 years: 11.7%	(–)	In-depth individual interviews	Thematic analysis method	Stigma profile Self-stigma Defense mechanisms Balancing
B8	Halkola (2022)	Explains factors supporting coping in women with infertility	(–)	(–)	In-depth individual interviews	Inductive analysis method	Personal resources Well-functioning relationships Seeking help Adaptability to life without children
B9	Sambasivam (2023)	Evaluates factors affecting helplessness, fatigue, and coping in infertile women	(–)	Treatment duration: 6 months to 4 years	In-depth individual interviews	Phenomenology (Colaizzi)	Intersection of hope and despair Social isolation and spiritual/mental resources Coping and recovery strategies
B10	Adane (2024)	Explores psychological issues and coping strategies of infertile women	(–)	(–)	In-depth individual interviews	Thematic analysis method	Psychological challenges and coping of infertile women Psychological difficulties Coping strategies of infertile women
B11	Keten Edis (2024)	Investigates infertile women's use and views on complementary and traditional practices	Avg. 5.6 years	(–)	In-depth individual interviews	Braun and Clarke's analysis method	Reasons for using CST practices Effectiveness of complementary and traditional practices

A = Korean studies; ART = assisted reproductive technology; Avg. = average; B = international studies; CST = complementary, supportive and traditional; (–) = cannot be verified.

1) Theme 1: Struggles with identity and the pursuit of inner growth

Women experienced a profound identity crisis influenced by repeated assisted reproductive technology failures and societal expectations (A8 and A11), triggering emotional instability and self-doubt. Amid psychological pain, many sought to reconstruct their sense of self. Spousal support was crucial for navigating these emotional challenges and promoting inner transformation (B10). Spiritual reflection also emerged as a means to regain internal stability and redefine personal identity (B2).

2) Theme 2: Isolation and the reconstruction of resilience through support

Intense social pressures, family conflicts, and stigmatization resulted in profound loneliness and vulnerability among women (B1). These difficulties often led to alienation and psychological distress. Within these isolating experiences, emotional and informational support from peers and spouses became critical coping resources (A5 and B8). Gradually, women reinterpreted their infertility journeys (B7), and empathetic support helped alleviate the pain of repeated losses (B11).

3) Theme 3: Emotional turmoil and coping strategies for recovery

The emotional landscape of infertility was characterized by recurring anxiety, despair, and feelings of helplessness, influenced by personal and cultural contexts. Women adopted strategies such as couples counseling (A6), medical guidance (A2 and A3), and spiritual or ritual practices (B9) to manage emotional overload. These coping mechanisms were not immediate solutions but represented challenging processes of emotional recovery and meaning-making (B11).

4) Theme 4: Navigating economic hardship and social stigma with systemic support

Women undergoing infertility treatments faced significant economic strain (A2 and B1) from treatment-related expenses (A5), leading some to discontinue treatment (B7). Financial assistance (B6) and insurance support (A11) provided relief. Social stigma (A2 and B1) and associated psychological stress (A11) were mitigated through counseling and advocacy efforts (A4). Insensitive remarks exacerbated distress, highlighting the necessity of support (A1). Workplace policies (B5) were beneficial in achieving work-life balance.

5) Theme 5: Psychological tension between waiting and hope

The prolonged and uncertain process of waiting created significant emotional distress. Many women experienced repeated cycles of hope and loss, accompanied by fear and internalized stigma (A5, A1, and B3). Despite these emotional setbacks, women continually searched for meaning and possibilities for the future (A9). The psychological tension between waiting and hoping became central to their struggle, laying the groundwork for personal growth and deeper relationships. Achieving pregnancy marked a pivotal turning point, often restoring self-worth (B5).

6) Theme 6: Redefining marital and familial relationships amid crisis

Infertility exerted significant pressure on marital and familial relationships, frequently causing emotional distance and conflicting expectations (A1 and A11). Confronted with these tensions, some couples undertook painful yet necessary reflections on the meaning of parenthood. Through this crisis, they worked towards rebuilding mutual understanding and shared goals (A8). Over time, infertility experiences were reframed from purely negative events into opportunities for relational growth and a value-based redefinition of family (B3 and B9).

3. Model of Research Findings

The model was developed under the name Model of Psychological Changes and Resilience (PCR Model).

1) Model structure

(1) Model structuring process

The model was constructed by synthesizing the six themes identified in the meta-synthesis. Variables necessary for building the model were comprehensively organized based on these themes. The detailed process of model construction is illustrated in Figure 2.

(2) Filtering (F)

The filtering (F) process involves examining the six identified themes through various social perspectives to capture the core essence of women's infertility experiences [14]. This approach analyzes individual experiences within broader social contexts—including gender, race, religion,

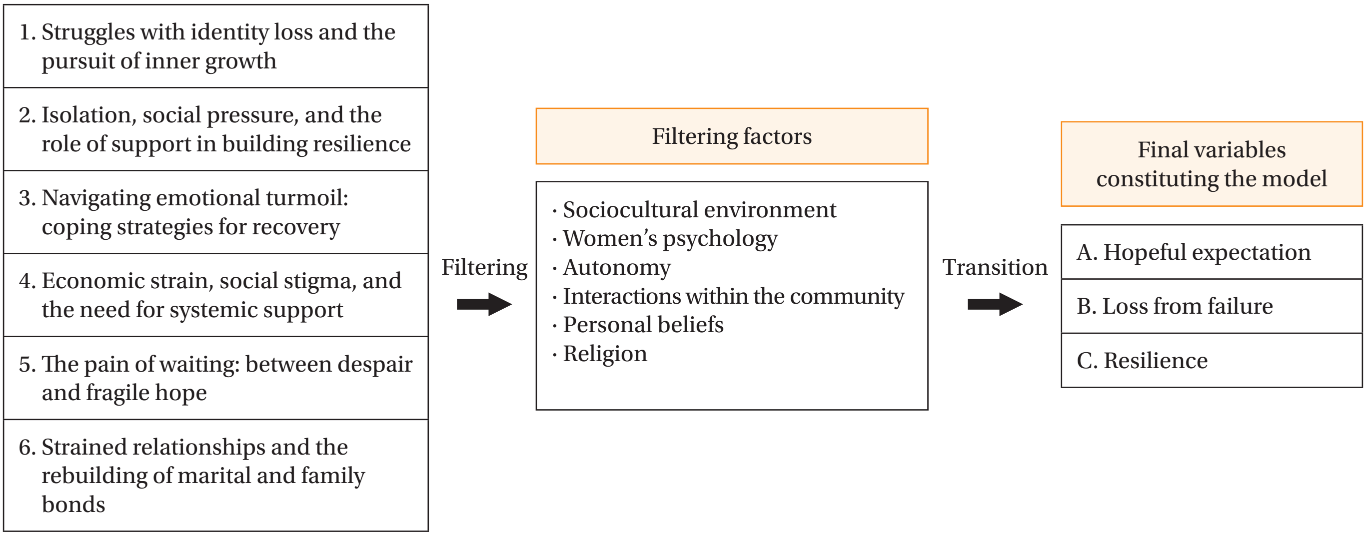


Figure 2. Structuring process of the model.

and culture—to uncover context-specific meanings [15]. In modeling the psychological states of women with infertility, identifying elements connecting thematic findings with personal experiences is crucial. The filtering process thus distills the empirical psychological essence of infertility by translating broad social constructs into lived realities, an approach commonly used in sociological research [16]. This study employed five key filtering elements: sociocultural environment, psychological state, autonomy, community interaction, and individual beliefs and religion. These elements mediate between individuals and society, reflecting concrete challenges faced by women with infertility. They significantly influence women's daily lives [17], forming the basis for identifying individual-level variables within the six thematic categories. The filtering process shifts the discourse on infertility from macro-level sociocultural narratives to micro-level understandings of personal psychological and emotional realities. Each theme was interpreted through these filtering elements: identity struggles through psychological states; isolation, support, and relationship strains through community interaction and emotional dynamics; coping strategies through autonomy; economic strain and stigma through sociocultural environment; and psychological tension in waiting through personal beliefs and religion. Filtering provided deeper sociocultural context for each theme. Through this analysis, diverse infertility experiences were synthesized into three core psychological constructs: hopeful expectations, sense of loss from failure, and psychological resilience.

(3) Transition (T)

The transition (T) process reconfigures infertility experiences into three core variables: expectation, loss, and resilience. This simplification aims to structurally analyze psychological fluctuations, identify the impacts of individual and social contexts, explain relationships within a theoretical model, and enhance research efficiency. These variables form a cyclical structure, highlighting the interconnected flow of hope, failure, and recovery, illuminating emotional and social changes throughout the infertility journey.

2) Model of psychological changes and resilience in women with infertility

(1) Emotional fluctuations, resilience factors, and their interplay in women with infertility before and after treatment and pregnancy loss

Figure 3A outlines the psychological changes experienced by women with infertility across four stages. At t_0 (pre-treatment stage), women maintain a relatively stable or baseline emotional state (area I). This state represents a neutral psychological condition before emotional upheaval from infertility treatment begins. Between t_0 and t_1 (preparation phase), women start experiencing physical and psychological suffering, including side effects from medication, emotional stress, and financial strain, collectively defining area II. This phase initiates emotional instability. At t_1 (treatment initiation), positive emotions emerge, characterized by heightened hope and anticipation about potential pregnancy. These positive emotions form area III,

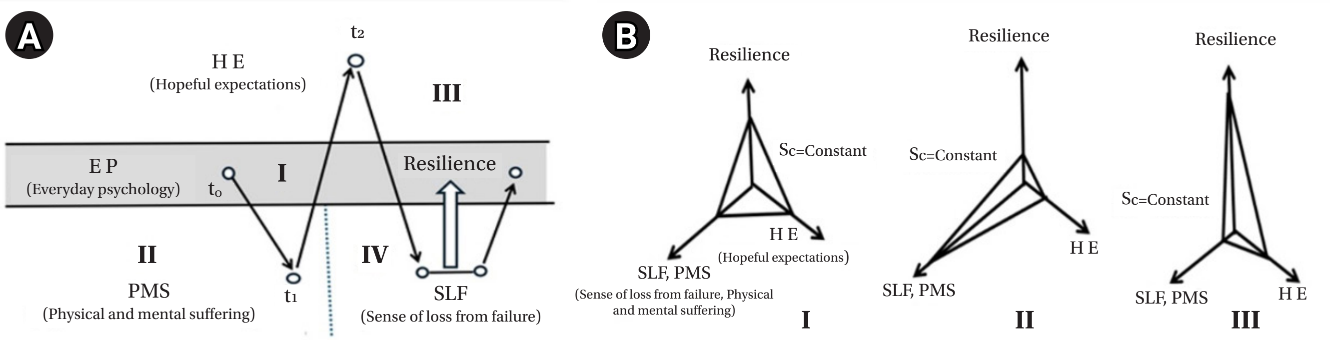


Figure 3. Emotional changes and resilience in infertility: expectation, loss, and recovery. (A) Emotional changes and recovery factors in infertility treatment and pregnancy failure. (B) Changes in expectation, sense of loss and resilience in women with infertility undergoing treatment.

signifying rising expectation, which peaks at t_2 (pregnancy confirmation point).

If pregnancy fails, emotional state plummets into area IV, marked by intense disappointment, grief, and loss. However, some women activate resilience mechanisms, gradually recovering to a more stable state, cycling back toward area I. This model was constructed based on qualitative findings. For example, study B3 reported women feeling "a thrilling hope" during early treatment, reflecting elevated expectation (E). Conversely, study A6 described profound self-blame and emptiness following repeated failures, illustrating significant emotional loss (L). Study A1 emphasized community support and religious faith in enabling women to "stand back up," exemplifying resilience (R). In Figure 3B, the psychological states after treatment outcomes are mathematically represented with the following relationship:

$$\mathrm{E} + \mathrm{L} + \mathrm{R} = \mathrm{C} \tag{1}$$

where E (expectation) refers to the degree of hope or anticipation a woman has regarding pregnancy success; L (loss) indicates the magnitude of emotional pain or grief following treatment failure; R (resilience) represents the internal or external factors that help in recovery; and C (constant) denotes the total psychological capacity or emotional bandwidth, assumed to be finite and constant during a treatment cycle.

This equation indicates that emotional energy is conserved and dynamically allocated across the three variables. Their sum remains constant, reflecting complementary relationships [18]. For instance, a high level of expectation (E) may reduce available resilience (R) following a significant loss (L). Conversely, increasing R through support or coping strategies can mitigate L despite treatment failure.

In section II of Figure 3B, pregnancy outcome determination represents a critical emotional inflection point. A failed outcome typically yields high L and low E, leaving resilience (R) as the primary determinant for psychological recovery. Section III shows that adequate resilience allows women to gradually stabilize emotionally, reducing the loss's impact. Without sufficient resilience, however, loss remains high, complicating recovery. This interdependence among E, L, and R, within the fixed emotional capacity C, underscores trade-offs and complementary dynamics between these variables.

(2) Changes in expectation and loss over time in women with infertility

Figure 4A demonstrates the dynamic increase in expectation (E) throughout infertility treatment, divided into three psychological stages: (1) Preparation phase (pre-treatment): women experience confusion and distress due to uncertainty and insufficient information. Expectation (E) remains low, while anxiety is elevated. (2) Early to middle phase (post-treatment initiation): As treatment progresses and women receive feedback from professionals and others, E increases. The rate of increase is non-linear, following a logistic curve characterized by slow initial growth, accelerating with positive reinforcement. This progression can be mathematically represented by the following equation:

$$E_f(t) = E_0 \times \frac{E_f}{E_0 + e^{-ct}} \tag{2}$$

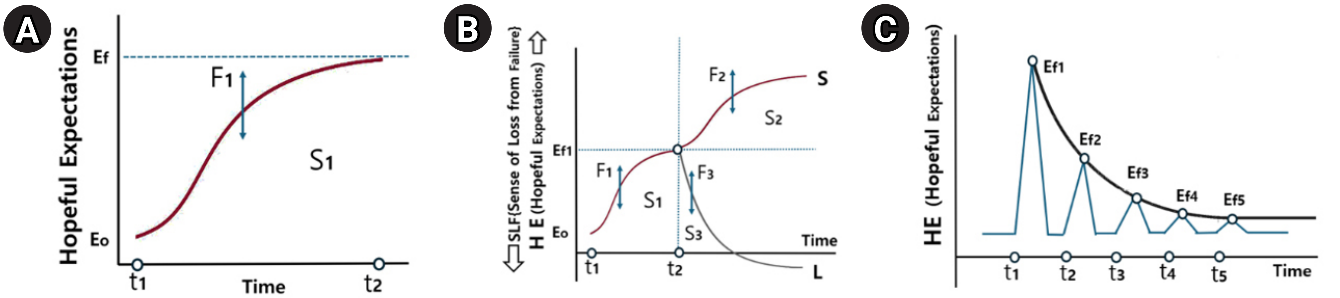


Figure 4. Changes in expectation and loss across the infertility treatment process and pregnancy confirmation. (A) Hopeful expectation before pregnancy confirmation. (B) The shift in expectations and loss during treatment. (C) Declining expectations with repeated treatment failures.

where $E_f(t)$ represents the expectation level at time during treatment; E_0 denotes the initial expectation level at the start of treatment; E_f indicates the saturation point of expectation, or the maximum achievable level; c is the growth rate constant, indicating how quickly expectation increases; and t refers to the time elapsed during the treatment process.

This equation models the gradual increase in hope over time, influenced by internal and external factors. It captures women's emotional progression from initial uncertainty to cautious optimism.

(3) Late phase (just before pregnancy confirmation): Expectations plateau at a saturation point E_{f1}, due to growing anxiety regarding treatment outcomes. Women become emotionally cautious, mentally preparing for either result. This expectation change pattern is influenced by expectation-influencing factors (F1), where F1+ includes positive healthcare feedback, social support, stable living environment, past success, while F1– includes physical fatigue, financial strain, emotional burnout, partner conflict, repeated failures.

The area under the curve S1 (between t1 and t2) represents the total emotional investment in E. A greater F1 leads to higher peaks and larger emotional engagement.

In Figure 4B, the determination of pregnancy at t2 leads to two diverging paths. Success path (S2) describes a pattern in which emotional states follow an S-curve as joy and relief build over time. F2+ factors (support, health stability, and medical reassurance) extend and elevate this positive trajectory, whereas F2– factors (early complications, trauma, and pressure) flatten or shorten this path. Failure path (S3) represents emotional states decline exponentially, shown as a steep drop on the L-curve. F3+ factors (e.g., high resilience, support, flexibility) moderate the fall, while F3– factors (e.g., age, financial depletion, repeated failures) intensify it. The S3 area reflects how long and deeply the woman experiences emotional loss after failure.

In Figure 4C, E declines exponentially with repeated pregnancy failures. This pattern is modeled by an exponential decay function:

$$E_f(t) = E_{f1} \times e^{-ct} \tag{3}$$

where $E_f(t)$ represents the expectation level at time t after treatment failure; E_{f1} indicates the expectation level just before the result (final saturation point); c is the decay coefficient, representing how rapidly expectation declines over time; and t denotes the time since treatment failure.

A larger c means a steeper decline—that is, women lose hope faster as failures accumulate. In early cycles, hope may remain strong, but as attempts repeat, the psychological cost becomes harder to overcome, leading to diminished expectations and increased vulnerability.

DISCUSSION

This study constructed the PCR model to better understand the complex psychological processes experienced by women with infertility. The findings indicate that expectation, loss, and resilience are closely interrelated, significantly influencing emotional stability and coping strategies during infertility treatments. By moving beyond traditional biomedical approaches and integrating psychological, sociocultural, and existential dimensions, this model provides a dynamic framework for interpreting the emotional journey of women with infertility. In particular, incorporating theories by Hegel, Freud, and Frankl offers a holistic perspective on the internal conflicts and growth these women experience.

https://doi.org/10.7475/kjan.2025.0306

1. Desire for Recognition and Social Identity

Recognition is central to the psychological experience of infertility. As Hegel [19] and Freud [20] emphasized, identity formation occurs through recognition by others. In the context of infertility, recognition is often connected to fulfilling the culturally valued role of motherhood. When this recognition is unmet, it generates emotional distress and social isolation, particularly within societies strongly influenced by gender norms. Recognition thus becomes a driving force within the PCR model's expectation-loss dynamics [21,22]. While previous studies often addressed recognition through social role theory or stigma theory, the PCR model uniquely highlights recognition as an existential and relational dynamic shaped by philosophical underpinnings (e.g., Hegel and Freud). This differentiates the PCR model from more behavioral or sociological frameworks regarding identity disruption.

2. Expectation and Loss: Psychological and Sociocultural Layers

Hope, described by Spinoza as "an uncertain joy" [23], encapsulates the emotional cycles experienced by women undergoing infertility treatment. These cycles, frequently marked by repeated disappointment, align with Seligman's theory of learned helplessness and the emotional strain caused by cognitive dissonance [24,25]. Drawing from Marx [26], the concept of the instrumentalized body illustrates how women may perceive their bodies as fragmented tools during treatment—an objectification that erodes identity when reproductive success becomes the primary valued outcome. This objectification intensifies feelings of loss, particularly under sociocultural pressures. Althusser's ideological state apparatus theory and Bourdieu's concept of habitus explain how dominant norms and insufficient cultural capital pressure women to internalize societal expectations regarding motherhood, reinforcing the emotional toll of repeated treatment failures [22,27]. Unlike traditional definitions of "expectation" and "loss" in infertility literature—which often frame these terms clinically or biomedically (e.g., anticipated pregnancy outcomes, treatment failures)—this study redefines expectation as a socio-existential longing for recognition and fulfillment, and loss as a multi-layered disruption of selfhood, identity, and bodily agency.

3. Resilience as Existential Reorientation and Transformation

In the PCR model, resilience represents more than mere recovery; it is an active process of redefining self and meaning amidst uncertainty. Frankl's logotherapy provides a framework for understanding this transformation, emphasizing the pursuit of meaning through suffering [28]. Women reconstruct their identities beyond motherhood, integrating infertility experiences into broader self-narratives. Stoic philosophy complements this approach by advocating for inner strength and acceptance, reinforcing resilience as an existential reorientation rather than simple adaptation. Thus, resilience is generative—it reshapes personal values and identities, highlighting its pivotal role in transitioning from loss to psychological renewal. This perspective extends beyond traditional psychological resilience theories, such as those by Masten or Rutter, which primarily focus on adaptive capacity and protective factors. Instead, this study draws from existential and philosophical frameworks, positioning resilience as a transformative force for identity reconstruction rather than merely a return to prior states.

Moreover, the PCR model diverges from existing frameworks by portraying resilience as a creative reorientation—rather than mere coping—where infertility is incorporated as a formative experience of meaning-making rather than a limitation to overcome.

CONCLUSION

This study synthesized findings from 22 qualitative studies on women's infertility experiences, focusing on emotional changes and the cyclical interaction among expectation, loss, and resilience. Domestic research primarily addressed treatment processes (A4–8, A10–11), while international studies emphasized emotional and social contexts (B2–10). Six key themes were identified: identity transformation, resilience through familial roles, strategies for recovery, support systems, the psychological tension between waiting and hope, and shifts in marital dynamics. The proposed psychological resilience model illustrates how emotional responses fluctuate throughout infertility treatment, highlighting resilience as a central mediator in psychological recovery. Philosophical perspectives enrich the interpretation of these phases, providing deeper insights into women's processes of meaning-making. Clinically, this model offers nurses and healthcare providers a structured framework to assess patients' emotional stages and implement tailored interventions—such as expectation management, grief counseling, and resilience-building programs—at appropriate times. From a policy standpoint, the model suggests the need for integrated psychosocial support services and mental health screening protocols within infertility care systems. These implications support transitioning toward more comprehensive, person-centered care.

Future longitudinal studies are necessary to validate the dynamic interactions within the model and explore the long-term influence of sociocultural and psychological variables.

ORCID

Hwi-Su Kim, https://orcid.org/0009-0005-6161-7471

CONFLICTS OF INTEREST

The author declared no conflict of interest.

FUNDING

None.

ACKNOWLEDGEMENT

None.

DATA AVAILABILITY STATEMENT

The data can be obtained from the corresponding authors.

REFERENCES

1. Health Insurance Review and Assessment Service. Analysis of infertility treatment trends [Internet]. Wonju: Health Insurance Review and Assessment Service; 2023 [cited 2023 May 25]. Available from: https://www.hira.or.kr/bbsDummy.do?pgmid=HIRAA020041000100&brdScnBltNo=4&brdBltNo=10880
2. Statistics Korea. Mean age of childbearing [Internet]. Daejeon: Statistics Korea; 2024 [cited 2024 Aug 28]. Available from: https://kosis.kr/statHtml/statHtml.do?sso=ok&returnurl=https%3A%2F%2Fkosis.kr%3A443%2FstatHtml%2FstatHtml.do%3Flist_id%3DA21%26obj_var_id%3D%26seqNo%3D%26eType%3D%26tblId%3DDT_1B81A12%26vw_cd%3DMT_ZTITLE%26orgId%3D101%26path%3D%252Fcommon%252Fmeta_onedepth.jsp%26conn_path%3DK2%26itm_id%3D%26lang_mode%3Dko%26scrId%3D%26
3. Kim HO, Sung N, Song IO. Predictors of live birth and pregnancy success after in vitro fertilization in infertile women aged 40 and over. Clin Exp Reprod Med. 2017;44(2):111-7. https://doi.org/10.5653/cerm.2017.44.2.111
4. Durning PE, Williams RS. Factors influencing expectations and fertility-related adjustment among women receiving infertility treatment. Fertil Steril. 2004;82(Suppl 1):S101. https://doi.org/10.1016/j.fertnstert.2004.07.256
5. Aimagambetova G, Issanov A, Terzic S, Bapayeva G, Ukybassova T, Baikoshkarova S, et al. The effect of psychological distress on IVF outcomes: reality or speculations? PLoS One. 2020;15(12):e0242024. https://doi.org/10.1371/journal.pone.0242024
6. Maroufizadeh S, Karimi E, Vesali S, Omani Samani R. Anxiety and depression after failure of assisted reproductive treatment among patients experiencing infertility. Int J Gynaecol Obstet. 2015;130(3):253-6. https://doi.org/10.1016/j.ijgo.2015.03.044
7. Forsythe S. Social stigma and the medicalisation of infertility. J Man Anthrop Stud Assoc. 2009;28:22-36.
8. Park KH. Trend of research on psychological support for infertility in South Korea: a review of journals and theses between 1988-2020. Crisisonomy. 2020;16(6):1-16. https://doi.org/10.14251/crisisonomy.2020.16.6.1
9. Boonmongkon P. Family networks and support to infertile people. In: Vayena E, Rowe PJ, Griffin PD, editors. Current practices and controversies in assisted reproduction. Geneva: World Health Organization; 2002. p. 281-6.
10. Son HM. A literature review on qualitative meta-synthesis. J Korean Assoc Qual Res. 2020;5(2):109-18. https://doi.org/10.48000/KAQRKR.2020.5.109
11. Critical Appraisal Skills Programme. CASP qualitative studies checklist [Internet]. Oxford: Critical Appraisal Skills Programme; 2024 [cited 2024 December 27]. Available from: https://casp-uk.net/casp-tools-checklists/
12. Thomas J, Harden A. Methods for the thematic synthe-

sis of qualitative research in systematic reviews. BMC Med Res Methodol. 2008;8:45. https://doi.org/10.1186/1471-2288-8-45

13. Song M. Qualitative meta synthesis methodology and exploration and implications in special education research. J Spec Educ. 2022;29(3):36-66. https://doi.org/10.34249/jse.2022.29.3.36
14. Kim J. Study on the development of collaborative filtering systems and its application. J Inst Soc Sci. 2018;29(2):197-209. https://doi.org/10.16881/jss.2018.04.29.2.197
15. Jeong D, Kim J, Kim GN, Heo JW, On BW, Kang M. A proposal of a keyword extraction system for detecting social issues. J Intell Inform Syst. 2013;19(3):1-23. https://doi.org/10.13088/jiis.2013.19.3.001
16. Lee JH. Excess of relationships, excess of interactions: network size and interaction quality on Facebook. Inst Commun Res. 2016;53(1):217-66. https://doi.org/10.22174/jcr.2016.53.1.217
17. Lee KA. A study on feminist ministry for the women in subfertility. J Korean Fem Theol. 2016;82:118-42.
18. Saelor TK, Ness O, Holgersen H, Davidson L. Hope and recovery: a scoping review. Adv Dual Diagn. 2014;7(2):63-72. https://doi.org/10.1108/ADD-10-2013-0024
19. Hegel GW. Phenomenology of spirit. Lim SJ, translator. Paju: Hangilsa; 2005. p. 128-40.
20. Freud S. Introduction to psychoanalysis. Choi SJ, translator. Goyang: Dodeulsaekim; 2024. p. 218-30.
21. Beck-Gernsheim E. The invention of motherhood. Lee JW, translator. Seoul: Alma; 2014. p. 157-62.
22. Boggs B. The art of waiting. Lee KA, translator. Seoul: Chaekilneun Suyoil; 2020. p. 31-42, 210-5.
23. Spinoza B. Ethics. Kang YG, translator. Seoul: Seogwangsa; 2007. p. 240-50.
24. Seligman ME. Learned optimism. Choi HY, translator. Seoul: 21st Century Books; 2008. p. 38-42.
25. Benyamini Y, Johnston M, Karademas EC, editors. Between stress and hope: from a disease-centered to a health-centered perspective. 1st ed. Westport, CT: Praeger; 2008. p. 141-66.
26. Marx K. Capital. Kim SH, translator. Seoul: Bibong Publishing; 2015. p. 249-60.
27. Heo SH. Postmodernism and subject 6: Althusser and ideological subject. J Third Age. 2017;105:12-9.
28. Frankl VE. Man's search for meaning. Lee SH, translator. Paju: Cheong-A Publishing; 2020.

APPENDICES

Appendix 1. List of Included Studies

A1. Jeong KI. A study on resilience in women experiencing infertility: a grounded theory approach [dissertation]. Seoul: Sungkyunkwan University Graduate School; 2014.

A2. Jeong KI. A study on hermeneutic grounded theory of women who experience infertility suffering and relief from pain. Korean J Soc Welf Stud. 2014;45(4):5-35. https://doi.org/10.16999/kasws.2014.45.4.5

A3. Jeong YM, Kang SK. A phenomenological study on infertile experiences of women: waiting for meeting. Stud Life Cult. 2017;44:271-319.

A4. Ryu SJ. Infertility and the social context of deferred motherhood: a qualitative inquiry based on an online infertility community. J Asian Women. 2019;58(2):5-38. https://doi.org/10.14431/jaw.2019.08.58.2.5

A5. Yang S. The experience of infertility treatments among working women without children. Korean J Soc Welf Educ. 2019;48:93-120. https://doi.org/10.31409/KJSWE.2019.48.93

A6. Baek EH, Oh SE, Lee HS. The suffering experiences of infertile women due to repeated assisted reproductive technology failure. Paper presented at: Proceedings of the Conference of the Korean Society of Maternal and Child Health; 2020 November 28; Virtual event.

A7. Son SJ. A phenomenological study of lived experiences in infertile women over 35 years of age. J Learn Cent Curric Instr. 2020;20(19):435-50. https://doi.org/10.22251/jlcci.2020.20.19.435

A8. Oh HJ. The experiences and significance of assisted reproductive technologies for the infertile women with the age of 35 or higher [master's thesis]. Seoul: Graduate School of Health Nursing, Chung-Ang University; 2021.

A9. Lee M, Cho H, Kim J. A phenomenological study on the psychological difficulties experienced during pregnancy of infertile women. J Music Hum Behav. 2021;2(1):19-36.

A10. Jeon H, Kim DS. The experience of infertility treatment among qomen in eelation to medical environment. J Asian Women. 2022;61(1):211-46. https://doi.org/10.14431/jaw.2022.4.61.1.211

A11. Park EM. Experiences of in infertile woman quitting in vitro fertilization procedures [dissertation]. Daegu: Graduate School, Kyungpook National University; 2024.

B1. Ranjbar F, Behboodi-Moghadam Z, Borimnejad L, Ghaffari SR, Akhondi MM. Experiences of infertile women seeking assisted pregnancy in Iran: a qualitative study. J Reprod Infertil. 2015;16(4):221-8.

B2. Dierickx S, Rahbari L, Longman C, Jaiteh F, Coene G. 'I am always crying on the inside': a qualitative study on the implications of infertility on women's lives in urban Gambia. Reprod Health. 2018;15:151. https://doi.org/10.1186/s12978-018-0596-2

B3. Hasanpoor-Azghady SB, Simbar M, Vedadhir AA, Azin SA, Amiri-Farahani L. The social construction of infertility among Iranian infertile women: a qualitative study. J Reprod Infertil. 2019;20(3):178-90.

B4. Aghakhani N, Marianne Ewalds-Kvist B, Sheikhan F, Merghati Khoei E. Iranian women's experiences of infertility: a qualitative study. Int J Reprod Biomed. 2020;18(1):65-72. https://doi.org/10.18502/ijrm.v18i1.6203

B5. Ofosu-Budu D, Hanninen V. Living as an infertile woman: the case of southern and northern Ghana. Reprod Health. 2020;17:69. https://doi.org/10.1186/s12978-020-00920-z

B6. Kiani Z, Simbar M, Hajian S, Zayeri F. Quality of life among infertile women living in a paradox of concerns and dealing strategies: a qualitative study. Nurs Open. 2021;8(1):251-61. https://doi.org/10.1002/nop2.624

B7. Taebi M, Kariman N, Montazeri A, Alavi Majd H. Infertility stigma: a qualitative study on feelings and experiences of infertile women. Int J Fertil Steril. 2021;15(3):189-96. https://doi.org/10.22074/ijfs.2021.139093.1039

B8. Halkola ST, Koivula M, Aho AL. A qualitative study of the factors that help the coping of infertile women. Nurs Open. 2022;9(1):299-308. https://doi.org/10.1002/nop2.1062

B9. Sambasivam I, Jennifer HG. Understanding the experiences of helplessness, fatigue and coping strategies among women seeking treatment for infertility: a qualitative study. J Educ Health Promot. 2023;12:309. https://doi.org/10.4103/jehp.jehp_1600_22

B10. Adane TB, Berhanu KZ, Sewagegn AA. Infertile women of Ethiopia: psychological challenges and coping strategies. Medicine (Baltimore). 2024;103(15):e37725. https://doi.org/10.1097/md.0000000000037725

B11. Keten Edis E, Bal S, Koc E. Complementary, supportive and traditional practice experiences of infertile women in Türkiye: a qualitative study. BMC Complement Med Ther. 2024;24:302. https://doi.org/10.1186/s12906-024-04604-0

ORIGINAL ARTICLE

Korean J Adult Nurs Vol. 37 No. 2, 91-103, May 2025
eISSN: 2288-338X
https://doi.org/10.7475/kjan.2025.0108

KJAN
Korean Journal of
Adult Nursing

A Qualitative Content Analysis of Nursing Students' Guided Reflective Journal Writing Following Simulation-Based Practice for the Initial Management of Falls in Older Adults

Gi Yon Kim[1], Youn-Jung Son[2], Go Eun Choi[3], Jung-Won Ahn[4]

[1]Professor, Wonju College of Nursing, Yonsei University, Wonju, Korea
[2]Professor, Red Cross College of Nursing, Chung-Ang University, Seoul, Korea
[3]Graduate Student, Wonju College of Nursing, Yonsei University, Wonju, Korea
[4]Associate Professor, Department of Nursing, Gangneung-Wonju National University, Wonju, Korea

Received: January 8, 2025
Revised: March 28, 2025
Accepted: April 25, 2025

Corresponding author:
Jung-Won Ahn
Department of Nursing, Gangneung-Wonju National University,
150 Namwon-ro, Heungeop-myeon,
Wonju 26403, Korea.
Tel: +82-33-760-6878
Fax: +82-33-760-8641
E-mail: jwahn@gwnu.ac.kr

Purpose: This study analyzed nursing students' guided reflective journals following simulation-based practice using standardized patients for the initial care of older adults experiencing falls. It aimed to provide a deeper understanding of how changes in students' thinking occurred through the learning experience and to describe their levels of reflection. **Methods:** An eight-hour simulation-based education program was implemented during a geriatric clinical practicum. The program consisted of orientation, pre-learning activities, simulation practice, and a wrap-up session. Reflective journals from 53 third-year nursing students were analyzed using qualitative content analysis. **Results:** Fifty-three third-year nursing students participated and submitted reflective journals. Three categories emerged from the analysis: "preparing for simulation-based practice," which involved students setting care plans and employing observation; (2) "experiencing patient fall management through simulation-based practice," where students actively engaged in realistic fall management scenarios; and (3) "critical reflection after simulation-based practice," encompassing students' acquisition of new insights and their personal growth. In the first category, students prepared for patient encounters by developing care plans and conducting observations. The second category highlighted realistic fall management scenarios utilizing standardized patients. The third category focused on personal growth through critical reflection. In the 53 reflective journals (185,021 words), level 3 reflections accounted for 31.6% of the content, while level 5, the highest reflection level, comprised only 8.6%. **Conclusion:** Post-simulation reflective journaling stimulated critical thinking and self-assessment, enabling nursing students to analyze and reflect deeply on clinical practices. This process reinforced their knowledge base and behavioral foundations essential for clinical practice.

Key Words: Accidental falls; Cognitive reflection; Nursing; Patient simulation; Qualitative research

INTRODUCTION

Falls are the second most common safety-related accidents occurring in healthcare facilities [1], with older adults at significantly higher risk than other age groups. Falls can lead to severe complications, such as cerebral hemorrhage,

---

fractures, and even death [1]. This underscores the importance of fall prevention education within geriatric nursing practicums, as well as the necessity for timely and appropriate evaluation, intervention, and reporting of a patient's condition immediately following a fall [2]. Despite the high incidence of falls in healthcare settings [3], their unpredictability makes it challenging for nursing students to acquire real-world experience managing such incidents during clinical practice [4]. Consequently, most educational programs tend to focus primarily on fall prevention rather than the management of actual fall incidents.

Growing difficulties in placing nursing students in clinical practice—particularly due to restrictions imposed by infectious diseases such as coronavirus disease 2019 in recent years—have heightened the need for alternative methods of clinical education [5]. These alternatives are vital not only for fulfilling students' clinical experience requirements but also for providing training in managing fall incidents, which students might rarely encounter during traditional clinical placements [6].

Simulation-based education has emerged as an effective pedagogical approach, fostering students' problem-solving abilities and coping skills through realistic clinical scenarios [7]. Specifically, simulation-based learning using standardized patients (SPs) has been demonstrated to positively influence nursing students' communication skills, self-efficacy, and knowledge acquisition, while also providing a highly realistic clinical experience [8,9]. Such education is valuable because it allows students to extend their learning beyond theoretical knowledge, aiding in the translation of simulated experiences into practical clinical skills [10,11].

Reflection is a crucial component of learning, especially in nursing education, where it facilitates the development of clinical reasoning and judgment. The five levels of reflection—reporting, responding, relating, reasoning, and reconstructing—progressively move from descriptive to analytical, providing a structured framework to enhance reflective practice [12]. At the reporting level, the writer provides a descriptive account of a situation, event, or issue. The responding level involves expressing emotional or personal reactions to the experience. At the relating level, the writer analyzes the situation using a theoretical framework, integrating both personal and academic perspectives. The reasoning level entails critically examining, exploring, or deeply explaining the issue. Finally, at the reconstructing level, the writer synthesizes insights to formulate conclusions and develop a reasoned plan for future actions [3,12]. These levels guide students toward meaningful reflection and support the integration of theoretical knowledge with practical skills. Furthermore, analyzing reflection levels helps educators identify gaps in students' thinking, allowing them to tailor educational strategies to enhance clinical nursing skills [3,13].

To facilitate the transfer of learning—that is, applying knowledge and skills gained through simulation education into clinical settings—students and faculty must engage in reflection, provide feedback, and discuss their experiences during simulations. This process, known as debriefing [14], helps structure these experiences meaningfully as the final step of simulation-based education [15]. Debriefing encourages reflection, enabling students to transfer and integrate insights, clinical competencies, and knowledge gained through simulation into real-world clinical practice [14,15].

The ultimate goal of reflection is to encourage reflective thinking, often achieved through journal writing, which allows learners to articulate and organize their thoughts regarding clinical experiences. This process stimulates critical thinking and enhances clinical judgment [5,16]. Reflective writing enables learners to systematically review and analyze their practice over time, thereby developing problem-solving skills and reinforcing learning through self-directed efforts [16,17]. Guided reflective writing, as an active learning strategy, can enhance educational outcomes and improve clinical judgment in patient care [5].

In this study, we implemented a simulation-based educational curriculum on the initial management of falls in older adults using SPs and collected guided reflective journals from nursing students. We analyzed these reflective journals to explore the students' reflective thinking processes. The aim of this study was to provide an in-depth understanding of how students' reflective thinking evolves through their experiences managing falls in older adults using SPs, thus providing foundational insights for advancing simulation-based education in nursing.

METHODS

1. Study Design

This qualitative study employed content analysis to explore nursing students' guided reflective journals submitted after their participation in simulation-based training.

2. Participants and Settings

1) Participants

Fifty-six third-year nursing students from a university in Wonju City were recruited using convenience sampling. Inclusion criteria included students enrolled in the Geriatric Nursing Practicum course during their second semester, who participated in a simulation-based training program focused on early fall management as part of their clinical education (Table 1), and who agreed to participate in the study. The simulation training occurred between October 12 and December 4, 2020, involving a total of 56 students. Data extraction occurred from March 25 to April 7, 2021, with 53 students consenting to participate in the study; three students who were on leave were excluded.

2) Simulation-based education for early fall management

The research team, including experts in simulation-based education and a doctoral student with eight years of geriatric care experience, developed a preliminary simulation scenario involving fall management with SPs. This initial scenario was reviewed by a nursing professor and a clinical expert from a long-term care facility.

The scenario began with a resident who had fallen from a bed while attempting to retrieve a TV remote control from the floor. In this scenario, the student nurse was tasked with assessing the patient, moving the patient to a safe location, re-evaluating the patient's condition, and reporting the situation to a physician. The scenario development drew upon previous studies on fall management [2,18], evidence-based practice guidelines from the Hospital Nurses Association [19], and hospital-based fall management algorithms [20]. It was created in alignment with simulation education standards [21].

To increase realism, an SP in her 70s, closely resembling the patient described in the scenario, was recruited. The

Table 1. Outline of Simulation-based Education for the Initial Management of Falls in Older Adults

Sessions	Contents	Methods
(1) Orientation (30 minutes)	Overview of simulation of practice: - Purpose of simulation - Scenario outline - Introduction to pre-learning topics: initial and re-evaluation of fall patients, interpreting evaluation results, therapeutic communication	Lecture using written materials
(2) Pre-learning (3 hours 30 minutes)	Fall preventions Management of fall patients	Pre-study (1 hour 30 minutes) - Instructor provides a learning list and guidance Group discussion (2–3 students per group) (1 hour) - Analyze fall risk factors and demonstrate prevention strategies using illustrations - Instructor: questions and answers during discussion Presentation and feedback (1 hour)
(3) Simulation practice (2 hours)	Initial management of falls in older adults: using a standardized patient	Group 1: Pre-briefing/simulation/preparation for debriefing/observation of another team/debriefing (1 hour)
	- Standardized patient: 70-year-old female	Group 2: Pre-briefing/observation of another team/simulation/preparation for debriefing/debriefing (1 hour)
	- Groups of 2–3 students	Group 3: Pre-briefing/preparation for simulation/observation of another team/simulation and preparation for debriefing/debriefing (1 hour) Instructor: Pre-briefing/simulation and observation of other team/debriefing
(4) Review and journal writing (2 hours)	Review of fall prevention and management in older adults	Review with instructor (30 minutes)
	Guided reflective journal writing	Individual student's journal writing (1 hour 30 minutes)

researcher provided the SP with verbal explanations about her role, clarified the training objectives, and reintroduced the scenario with detailed written instructions. Mock training was carried out in the same clinical practice room where the simulation-based education sessions took place (Appendix 1).

Students were divided into groups of two or three. The program consisted of four primary components: orientation, pre-learning, simulation, and journal writing. After completing pre-learning activities, students participated in the simulation practice in groups of two or three. Following pre-briefing, participants were divided into three groups (groups 1, 2, and 3). Before the simulation practice, an instructor provided an orientation explaining the self-study content and simulation procedures. The pre-learning session also included a review of the simulation room, the equipment necessary for caring for SPs, and observation areas for students watching other teams perform (Table 1).

Due to limitations in instructor availability, space, and resources, each group's simulation practice was observed by the other groups through a one-way mirror in the control room, either before or after their own session. Observing groups did not receive guidance. After completing the simulation, participants had time to reflect quietly on their practice before participating in structured debriefing sessions.

3. Data Collection

Semi-structured questions for guided reflective journaling were developed based on previous studies related to debriefing and reflective journaling [15,22]. The questions were classified into technical, analytical, and application-based categories, each corresponding to different reflection levels. Technical questions (e.g., "What was your experience using simulation-based training with SP?") corresponded to level 1 (reporting) and level 2 (responding). Analytical questions (e.g., "Why did you perform that activity?"; "What did you think while observing other groups' practice?"; "What did you think they did well in the simulation-based training?") aligned with level 3 (relating) and level 4 (reasoning). Application-based questions (e.g., "How will you apply what you learned from this training to your clinical practice?") related to level 5 (reconstructing). Students were given one day to complete their reflective journals, which they were instructed to upload to the learning management system (LMS). The reflective journals submitted by students ranged from three to four pages in length on A4-sized paper.

4. Ethical Considerations

The Institutional Review Board of Wonju Severance Christian Hospital approved the data collection process before the start of the study (date of approval: 2021/03/24, No. CR321009). To ensure fairness, data extraction from the LMS began only in the semester following the simulation training. During the first semester of their fourth year, participants were informed about the purpose and methods of the study and provided consent for the use of the reflective journals they had previously submitted in the second semester of their third year. Students received an information sheet detailing the study's objectives and procedures, and enrollment occurred only after obtaining their written consent.

To avoid potential disadvantages or unfair advantages, a research assistant explained the study's purpose and methods during the semester following simulation-based training. Participants were assured that their reflective journals would not be graded. All identifying information, including names and student ID numbers, was removed to protect student privacy. The de-identified journals were downloaded from the LMS onto a USB drive and provided to two researchers for analysis.

5. Data Analysis

Two researchers analyzed the students' reflective journals using qualitative content analysis, an objective technique involving deep immersion in the data to inductively derive themes and categories [23]. The analysis was conducted using MAXQDA 2020 software (VERBI Software, Berlin, Germany) following Krippendorff's six-step content analysis method: unitizing, sampling, recording/coding, reducing, abductively inferring, and narrating. The systematic analysis proceeded as follows: (1) Reflective journals were read repeatedly to grasp the overall meaning of the data. (2) The words, phrases, and sentences in the data were divided into units of analysis, and similar contents were merged and coded to identify meaningful statements. (3) Codes independently determined by two evaluators were compared, and discrepancies were reconciled by re-examining the raw data and engaging in further discussion to establish subcategories. (4) Subcategories were grouped by similarity to form more abstract categories. (5) Through abductive inference, underlying patterns and contextual meanings were identified, leading to a coherent synthesis of the findings. This process facilitated the extraction of meaningful insights aligned with the study's objectives. (6) Categories were finalized after thorough discussions among the researchers. The researchers agreed that data saturation was reached, as no new codes emerged despite repeated analyses.

Levels of reflection were analyzed using MAXQDA software by examining word frequencies and percentage of text coverage. All researchers reviewed divergent interpretations, discussed the defining properties of each subcategory and category, and reached a consensus through group discussions.

6. Rigor of the Study

The rigor of this study was assured by addressing credibility, auditability, fittingness, and confirmability [24]. To enhance credibility, semi-structured questions were utilized to help students vividly describe their practical experiences. Each researcher involved had prior experience in qualitative research and at least 7 years of experience with simulation and debriefing, thereby strengthening the credibility of data analysis and interpretation. Coding criteria were established in advance, and researchers independently conducted the coding analyses. Their results were subsequently exchanged, and ambiguous or problematic aspects were discussed collaboratively to refine and consolidate analysis outcomes through triangulation. This triangulation involved evaluation by a doctoral student with 8 years of geriatric nursing experience and two nursing professors. To ensure auditability, data analysis strictly followed the qualitative content analysis method, and raw data are presented transparently in the results. Fittingness, the measure of how applicable the study's findings are to other subjects and contexts, was supported by providing detailed demographic information (gender, school year, and grade) of the 53 participants. This information allows for the findings to be relevant and transferable to similar educational contexts. Confirmability, which addresses the neutrality of the research findings, was strengthened by efforts to eliminate researcher bias as much as possible during data analysis. Analysis outcomes were repeatedly compared against study notes and reviewed across multiple rounds, with time intervals between each round to ensure objectivity. The Consolidated Criteria for Reporting Qualitative Research (COREQ) checklist was used for the systematic reporting of qualitative study data [25].

RESULTS

Fifty-three students submitted completed reflective journals; among them, 45 (84.9%) were women and eight (15.1%) were men. Qualitative content analysis yielded 617 meaningful statements, categorized into 10 subcategories under three main categories. The meaningful statements, along with their frequencies and percentages, are presented in Table 2.

1. Preparing for Simulation-Based Practice

This phase involved gathering information through orientation and pre-learning activities focused on fall management. Based on this preparation, students analyzed the scenario and developed action plans for the simulation.

1) Developing a care plan for managing falls in older adults

Students anticipated their potential responses to encountering older adults who had fallen, creating detailed care plans for various scenarios. They also pledged to avoid repeating mistakes from previous clinical experiences.

> Although the (fall management) algorithm was given by the professor..., I felt nervous, so the day before the simulation, I wrote down scenarios for all possible situations and prepared answers on how to deal with them, then I memorized them all (#10).
>
> Last week, I cared for a maternal patient who kept complaining of pain during a virtual simulation... so I focused on learning more about pain assessment and nursing interventions to manage it (#14).

2) Using external observation to adjust the care plan before simulation-based practice

During the simulation-based practice, external observation provided valuable opportunities for students to adjust their care plans. Due to instructors simultaneously managing three groups (Table 1), two groups could observe other groups' simulation sessions before their own practice. This allowed them to learn from peers' successes and mistakes, helping refine their own approaches to patient care.

Table 2. Content Analysis of Students' Reflective Journals on Simulation-Based Fall Management Education ($N=53$)

Categories	Subcategories	Meaningful statements	n (%)
Preparing for simulation-based practice	Developing a care plan for managing falls in older adults	Before simulation, I created scenarios for all possible situations and memorized responses. I developed a care plan by reviewing fall management algorithms and practicing assessment sequences.	36 (5.8)
	Using external observation to adjust the care plan before simulation-based practice	Watching peers perform patient care allowed me to adjust my care plan for better preparedness.	77 (12.5)
Experiencing patient fall management during simulation-based practice	Immersion in the clinical situation due to a human standardized patient	Hearing the patient's moans made the situation feel intensely real. Interacting with a live patient increased my sense of responsibility.	45 (7.3)
	Providing care for older adults with consideration of their difficulties	I adjusted my speech to be louder and slower for the older adult patient.	54 (8.8)
	Nervousness and lack of confidence in priorities and actions	I froze and forgot my planned steps upon seeing the fallen patient. Hearing the patient's moans made me panic and doubt my actions.	62 (10.0)
Critical reflection after simulation-based practice	Identifying areas of improvement through critical reflection	Taking notes is essential for structured communication and accurate information delivery. Fall assessment requires evaluating both pain and potential neurological damage.	219 (35.5)
	Feeling proud of progress as a nurse	I felt proud of maintaining composure and following the fall protocol smoothly. Successfully explaining procedures to the patient increased my confidence as a nurse.	67 (10.9)
	Establishing perspectives on nursing role and responsibilities	Providing both physical and emotional care is essential for effective patient-centered nursing.	57 (9.2)
Total			617 (100.0)

Through observation, students identified areas for improvement and gained deeper insights into essential nursing competencies, ultimately enhancing their readiness for simulation-based practice.

After observing other groups' simulations, participants recognized successful actions and identified overlooked tasks, such as checking patients' names and practicing proper hand hygiene. Watching peers communicate effectively with the patient, interact clearly with healthcare providers, and competently perform nursing activities provided valuable learning opportunities, allowing students to consider important aspects they had not previously contemplated.

> Since my turn was late in the order, I observed what other students were doing and realized that I should react differently in certain situations… (#10).
>
> When I heard words of empathy and support, such as, 'You must be having a hard time,' I reflected on becoming a nurse who prioritizes patient safety, even in emergencies (#49).
>
> When the doctor said, "Is this Mrs. Yoon OO?" but said the wrong name, and the nurse said, "Yes, that's right." I realized the importance of accurately verifying the patient's name (#13).

2. Experiencing Patient Fall Management during Simulation-Based Practice

After completing pre-learning activities, students participated in simulation practice, during which they assessed and cared for an SP in her 70s who had fallen and was found lying on the floor.

1) Immersion in the clinical situation due to a human SP

The presence of an older adult as an SP enabled students to engage in realistic, two-way communication. This contributed to their sense of providing genuine patient care and facilitated full immersion in the scenario. Participants actively engaged in an urgent, realistic clinical situation, prompting them to think and act as nurses.

> As I saw the patient in pain, I thought that I might not have helped the patient lay comfortably on the bed because of my weak arms, so I felt sorry, and I inadvertently said, "I'm sorry you're in pain. I'm going to finish this quickly so bear with me a moment." (#40).

2) Providing care for older adults with consideration of their difficulties

Participants empathized deeply with the SP as they observed first-hand the challenges older adults face, including declining physical abilities, hearing loss, pain from falling, and interactions with inexperienced healthcare providers. This empathy facilitated a better understanding of patients' difficulties and encouraged students to reflect on their own anxieties and perceptions.

> I thought about how patients feel as they slowly develop diseases and see their bodies change. I was also surprised that this is the normal changes of aging. My view of older people changed, and I realized, 'I could be in the same situation one day, and there would be nothing easy in their lives if young people don't help.' (#53).

3) Nervousness and lack of confidence regarding priorities and actions

Some students felt embarrassed due to their inability to respond calmly and proficiently during the simulation. Their minds often went blank when confronted with realistic clinical situations, leading to delayed responses and hesitancy in executing necessary tasks. They struggled to maintain composure under pressure, particularly in prioritizing tasks during the emergency scenario. Participants expressed frustration with their inability to provide optimal care, despite extensive preparation beforehand.

> After one thing not working out as I'd expected, I just went blank and couldn't decide what to do next. I broke out in cold sweat thinking that I couldn't move on to the next step, since this problem was not solved (#49).
>
> When the patient told me that she was sick, I doubted whether what I was doing right then was really a priority (#27).
>
> Since the BP was normal earlier, I panicked when it increased to 155/93 mmHg. I wasn't sure if I had measured it wrong or if I should measure it again" (#9).

3. Critical Reflection after Simulation-Based Practice

This phase occurred after completing simulation practice and involved the analysis of nursing performance. Reflective thinking and learning transitions were facilitated through instructor-led debriefings and guided reflective journal writing. While students expressed regret over certain ineffective nursing actions, they also experienced pride in their improvements. Through reflective journaling, students analyzed their educational experiences, enabling them to identify areas for further improvement and formulate plans for further improvement.

1) Identifying areas of improvement through critical reflection

This subcategory accounted for 35.5% of the meaningful statements within the reflective journals. Students analyzed their practice through guided reflective journaling, identifying strengths and weaknesses, and reflecting upon newly gained insights and areas requiring improvement to enhance their nursing competence. A frequent theme among students was their desire to develop nursing competencies to respond calmly and sensitively to changes in patients' conditions.

> I thought to myself that when evaluating geriatric patients, I would carefully consider their physical changes and accurately and quickly perform the next nursing activity without floundering, even if symptoms occur. Also, I want to be a nurse who empathizes with the feelings of older adults and attentively checks whether we are communicating well (#32).
>
> Through this experience, I realized the importance of applying nursing care that considers the unique characteristics of each individual's life stage. I also recognized the need to prepare strategies for managing uncooperative patients (#19).

2) Feeling proud of progress as a nurse

The participants felt that they were slowly improving as nurses, and they gained a deeper understanding of fall care, empathy, and patient care through this education.

> I felt confident and proud of what I do, and I think I could assess fall patients and report to doctors effectively after this simulation experience (#34).

3) Establishing perspectives on nursing role and responsibilities

This reflection underscored the essential qualities and responsibilities required of nurses in emergency situations, emphasizing the importance of responding swiftly and calmly to deliver effective patient care. Nurses recognized the need to address not only patients' physical health but also their psychological well-being, understanding that emotional support is as important as medical intervention. Participants acknowledged that, in high-pressure scenarios, maintaining composure and executing skillful actions instills trust and confidence in patients. Mental resilience and strict adherence to procedures, even under stress, were identified as critical components of effective nursing. Furthermore, sincere and genuine communication, as opposed to formal or mechanical interactions, was emphasized as crucial for building strong rapport and trust, reinforcing the pivotal role of nurses in these situations.

> Nursing extends beyond treating physical difficulties; it involves empathizing with, comforting, and supporting patients who may be psychologically anxious or confused (#37).
>
> I realized the importance of establishing a systematic approach among medical staff and maintaining a continuous attitude of inquiry and reflection to ensure accurate and prompt nursing actions based on well-developed protocols (#26).

Table 3 summarizes the quantitative analysis of the five reflection levels identified within the 53 reflective journals, totaling 185,021 words. Level 3 reflections accounted for 31.6% of the content, whereas level 5 reflections comprised 8.6% (Table 3).

DISCUSSION

Reflective practice is recognized as a highly effective educational approach, and the use of guided reflection can further enhance its benefits [16,17]. In this study, guided reflective journaling required students to document their experiences, allowing them to critically reflect on the care processes, including patient interactions, assessments, and evaluations. This reflective approach helped students integrate their prior knowledge with practical simulation experiences, proving particularly effective in identifying areas needing improvement. Previous studies similarly report that guided reflective journaling enhances students' clinical judgment, facilitates analysis of alternative nursing interventions, and aids students in prioritizing patient care plans [5].

In this study, nursing students participated in simulation training using an SP. Simulation-based education involving SPs is known to improve clinical competency, communication skills, problem-solving abilities, and self-efficacy by enabling direct interactions and realistic, experiential learning [9]. Using a 70-year-old SP provided students with tangible insights into geriatric care, allowing them to experience the physical characteristics of older adults, such as changes in skin texture, limited joint movement, and hearing difficulties (including the use of hearing aids), thereby deepening their understanding of aging-related challenges.

Two student groups participated in external observation. Previous studies indicate that external observation can help reduce students' stress and anxiety and, for proactive learners, can offer valuable opportunities for peer discussion. However, without instructor guidance, students may struggle to evaluate whether their approaches are correct [26]. A prior study reported that observing peers without instructor guidance or a structured checklist did not sig-

Table 3. Levels of Reflections in Students' Reflective Journals on Simulation-Based Fall Management Education (185,021 words)

Levels of reflection	5Rs	n (%)
Level 1 describes a situation, incident, or issue.	Reporting	26,261 (14.2)
Level 2 records the emotional or personal response to the experience.	Responding	27,156 (14.7)
Level 3 reports on understanding of the situation/issue and how it relates to theory exposes taking personal and theoretical experience as reference.	Relating	58,452 (31.6)
Level 4 interrogates, explores, or explains.	Reasoning	40,887 (22.1)
Level 5 draws a conclusion and develops a future course of action based on reasoning.	Reconstructing	15,925 (8.6)
Not coded		16,340 (8.8)

nificantly enhance students' performance [26]. Although this study provided no such guidance during observations, we did not specifically evaluate the effects of this limitation; thus, its impact remains uncertain. Nevertheless, pre-learning the fall care protocol aided students in clearly understanding and applying nursing roles and problem-solving strategies during the simulation [27], confirming that this study adhered to systematic simulation-based education guidelines.

The second category, "experiencing patient fall management through simulation-based practice," illustrates how students became fully immersed in realistic, urgent clinical scenarios. Participants described experiencing nervousness and emotional distress upon discovering the SP on the floor, mirroring real clinical situations. Their varied emotional and cognitive responses were consistent with findings from previous simulation-based education studies [22,28]. This category also highlights students' emotional responses and cognitive processes when they failed to effectively apply previously acquired theoretical knowledge in clinical practice.

The diverse responses to identical guided reflection questions indicate that students individually experienced distinct doubts, perspectives, and emotions concerning the same clinical scenario. This underscores the value of reflective journaling in facilitating personalized thinking processes, individualized reflection, motivated learning, and stimulating self-directed learning planning [5]. Students reported recognizing their inadequacies as nurses after failing to fully implement care plans prepared prior to the simulation and experienced self-doubt regarding their clinical actions. Moreover, they gained experiential training in communication, patient education, empathy, and professional attitudes through direct interactions with the SP, elements that theoretical education alone cannot adequately provide. Observing peers' attitudes and interactions enabled students to identify both appropriate and inappropriate nursing behaviors. These results align with previous findings indicating that post-simulation reflections and mutual observations stimulate critical thinking and enhance learners' motivation [28].

Utilizing an SP increases immersion by enabling realistic, two-way communication [29]. In this study, employing an SP of similar age to the patient depicted in the scenario vividly illustrated realistic physical characteristics, such as skin texture and joint limitations, similar to those encountered in actual clinical practice. The SP's use of a hearing aid was an unexpected but valuable enhancement to realism. However, a limitation of this study was not employing the SP as an evaluator. Future research could benefit from incorporating SPs as evaluators to offer additional insights and feedback.

The final category, "critical reflection after simulation-based practice," demonstrated that participants gained significant insights into patients' perspectives and effectively reflected on their future roles as nurses. Qualitative content analysis revealed that the most meaningful statements in this section (35.5%) emphasized guided reflective journaling's role in enhancing critical reflection, confirming its effectiveness in identifying areas for improvement. Additionally, by reflecting on how they had thought and acted like nurses during the simulation, students experienced pride and confidence in their developing nursing competencies. These findings align with previous research indicating that learning transfer manifests as perceived satisfaction, confidence, and proficiency among learners [10,11]. The ongoing implementation of simulation-based education in a safe, structured environment, in conjunction with clinical practicums, could significantly contribute to deepening knowledge, promoting reflective practice, and strengthening nursing students' professional confidence.

In this study, reflective journals were analyzed according to the five levels of reflection [3,11]. As shown in Table 3, level 3 reflection (relating) accounted for the highest proportion at 31.6%, whereas level 5 reflection (reconstructing)—the highest level of critical thinking—comprised only 8.6%. These findings indicate that most students could effectively relate their experiences to theoretical knowledge, but fewer students reached the reconstructing level, which involves critical analysis and applying insights to future situations. The reflection levels observed in this study were higher compared to previous studies [3,13] and similar to those reported in medical education discussions [30]. Although this study aimed to enhance nursing students' reflective capabilities through semi-structured guided journaling and structured debriefing, the cross-sectional design limits causal interpretation. Therefore, replication studies and further research involving subjects with diverse professional experiences are recommended to establish stronger evidence. Nevertheless, the results suggest that guided reflective journaling can effectively assist students in achieving advanced reflection levels.

Guided reflective journal writing is recognized as a valuable educational tool that complements the limitations associated with oral debriefing, which typically occurs in a group setting with limited time, potentially restricting passive students' opportunities to express themselves [3,5,16,17]. In this study, participants demonstrated their ability to reason and reconstruct situations based on their understanding and knowledge of fall prevention through guided reflective writing. Therefore, repeated journal writing exercises could promote critical reflection, representing the highest level of reflective thinking.

A limitation of this study is that only a single set of reflective journals was collected, preventing a longitudinal analysis of students' developmental trajectories over time. Furthermore, the study focused solely on reflective journals without incorporating in-depth interviews or quantitative measures of students' learning experiences, resulting in incomplete understanding. Future mixed-methods studies, integrating both qualitative and quantitative data, would be valuable to provide a more comprehensive examination of students' learning experiences. Additionally, because data extraction and analysis occurred after data collection was complete, real-time assessment of data saturation during collection was not feasible. Confirming saturation only during the analysis phase constitutes an additional study limitation.

Despite these limitations, this study offers several important implications. Guided reflective journaling effectively stimulated critical thinking and deeper reflection by allowing students to thoughtfully examine their behaviors and emotions during the learning process [16]. Additionally, analyzing these reflective journals provided valuable insights into the depth of students' reflective thinking after simulation practice. Moreover, students' first-hand descriptions of their experiences and thought processes during simulation-based education offer valuable feedback for instructors, contributing to the design and continuous improvement of future simulation-based curricula.

CONCLUSION

The ultimate objective of nursing education is to facilitate students' ability to effectively transfer knowledge acquired through lectures and clinical practicums into actual patient care. This study provided partial evidence of the learning-transfer process among nursing students, demonstrating how the use of an age-matched SP in simulation education, combined with guided reflective journal writing, enabled students to progress beyond theoretical nursing knowledge and apply that knowledge effectively in clinical scenarios. Furthermore, developing and implementing an ongoing simulation-based education curriculum would enrich our understanding of the complete learning-transfer process and the long-term educational impact. Therefore, simulation-based education and reflective practice should not be conducted as isolated or single events, but rather integrated within regular nursing education curricula.

ORCID

Gi Yon Kim, https://orcid.org/0000-0003-2817-4769
Youn-Jung Son, https://orcid.org/0000-0002-0961-9606
Go Eun Choi, https://orcid.org/0000-0001-5998-644X
Jung-Won Ahn, https://orcid.org/0000-0001-5389-3189

CONFLICTS OF INTEREST

Youn-Jung Son, a contributing editor of the *Korean Journal of Adult Nursing*, was not involved in the editorial evaluation or the decision to publish this article. The other authors have declared no conflicts of interest.

AUTHORSHIP

Conceptualization and supervision - GYK; data curation, investigation, and project administration - GYK and GEC; formal analysis, methodology, software, and writing - original draft - GYK and JWA; validation and writing - review and editing - GYK, YJS, and JWA.

FUNDING

None.

ACKNOWLEDGEMENT

None.

DATA AVAILABILITY STATEMENT

The data can be obtained from the corresponding authors.

REFERENCES

1. Korea Patient Safety Reporting & Learning System. 2023 Korean patient safety incident report [Internet]. Seoul: Korea Institute for Healthcare Accreditation; 2024 [cited 2024 October 30]. Available from: https://www.koiha-kops.org/
2. Cho I, Park KH, Suh M, Kim EM. Evidence-based clinical nursing practice guideline for management of inpatient falls: adopting the guideline adaptation process. J Korean Acad Fundam Nurs. 2020;27(1):40-51. https://doi.org/10.7739/jkafn.2020.27.1.40
3. Tiago Horta RD. Falls prevention in older people and the role of nursing. Br J Community Nurs. 2024;29(7):335-9. https://doi.org/10.12968/bjcn.2024.0005
4. Roca J, Reguant M, Tort G, Canet O. Developing reflective competence between simulation and clinical practice through a learning transference model: a qualitative study. Nurse Educ Today. 2020;92:104520. https://doi.org/10.1016/j.nedt.2020.104520
5. Dewart G, Corcoran L, Thirsk L, Petrovic K. Nursing education in a pandemic: academic challenges in response to COVID-19. Nurse Educ Today. 2020;92:104471. https://doi.org/10.1016/j.nedt.2020.104471
6. Smith T. Guided reflective writing as a teaching strategy to develop nursing student clinical judgment. Nurs Forum. 2021;56(2):241-8. https://doi.org/10.1111/nuf.12528
7. Alharbi A, Nurfianti A, Mullen RF, McClure JD, Miller WH. The effectiveness of simulation-based learning (SBL) on students' knowledge and skills in nursing programs: a systematic review. BMC Med Educ. 2024;24(1):1099. https://doi.org/10.1186/s12909-024-06080-z
8. Ma J, Lee Y, Kang J. Standardized patient simulation for more effective undergraduate nursing education: a systematic review and meta-analysis. Clin Simul Nurs. 2023;74:19-37. https://doi.org/10.1016/j.ecns.2022.10.002
9. Kim YJ, Jung KH. Nursing students’ experiences in simulation education with standardized patients. J Korean Soc Simul Nurs. 2022;10(2):19-34. https://doi.org/10.17333/JKSSN.2022.10.2.19
10. Hustad J, Johannesen B, Fossum M, Hovland OJ. Nursing students' transfer of learning outcomes from simulation-based training to clinical practice: a focus-group study. BMC Nurs. 2019;18:53. https://doi.org/10.1186/s12912-019-0376-5
11. El Hussein MT, Cuncannon A. Nursing students' transfer of learning from simulated clinical experiences into clinical practice: a scoping review. Nurse Educ Today. 2022;116:105449. https://doi.org/10.1016/j.nedt.2022.105449
12. Bain JD, Ballantyne R, Mills C, Lester NC. Reflecting on practice: student teachers’ perspectives. Flaxton: Post Pressed; 2002.
13. Lim JY, Ong SY, Ng CY, Chan KL, Wu S, So WZ, et al. A systematic scoping review of reflective writing in medical education. BMC Med Educ. 2023;23(1):12. https://doi.org/10.1186/s12909-022-03924-4
14. Fegran L, Ten Ham-Baloyi W, Fossum M, Hovland OJ, Naidoo JR, van Rooyen DR, et al. Simulation debriefing as part of simulation for clinical teaching and learning in nursing education: a scoping review. Nurs Open. 2023;10(3):1217-33. https://doi.org/10.1002/nop2.1426
15. Fanning RM, Gaba DM. The role of debriefing in simulation-based learning. Simul Healthc. 2007;2(2):115-25. https://doi.org/10.1097/SIH.0b013e3180315539
16. Dulloo P, Vedi N, Patel M, Singh S. Empowering medical education: unveiling the impact of reflective writing and tailored assessment on deep learning. J Adv Med Educ Prof. 2024;12(3):163-71. https://doi.org/10.30476/JAMP.2024.101594.1938
17. Parrish DR, Crookes K. Designing and implementing reflective practice programs: key principles and considerations. Nurse Educ Pract. 2014;14(3):265-70. https://doi.org/10.1016/j.nepr.2013.08.002
18. Carpenter CR, Cameron A, Ganz DA, Liu S. Older adult falls in emergency medicine: 2019 update. Clin Geriatr Med. 2019;35(2):205-19. https://doi.org/10.1016/j.cger.2019.01.009
19. Korean Hospital Nurses Association. Evidence-based clinical nursing practice guideline: preventing falls in hospitlas [Internet]. Seoul: Korean Hospital Nurses Association; 2018 [cited 2024 October 30]. Available from: https://khna.or.kr/home/data/nak_01.pdf
20. Korea Patient Safety Reporting and Learning System. Patient safety and warning: falls in the older adults in health care facilities [Internet]. Seoul: Korea Institute for Healthcare Accreditation; 2024 [cited 2024 October 30]. Available from: https://www.kops.or.kr/portal/board/news/boardDetail.do?bbsId=news&nttNo=20000000001894
21. Korean Accreditation Board of Nursing Education. Simulation practice standards 2017 [Internet]. Seoul: Korean Accreditation Board of Nursing Education; 2017 [cit-

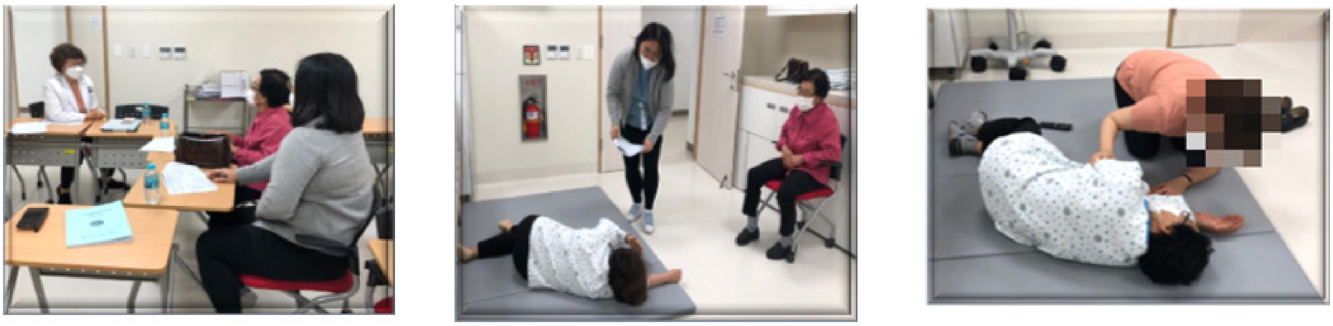
ed 2024 October 30]. Available from: http://www.kabone.or.kr/reference/refRoom.do

22. Park J, Hong J. Content analysis of the reflective journaling after simulation based practice education of nursing students. J Korea Soc Simul Nurs. 2019;7(1):13-29. https://doi.org/10.17333/JKSSN.2019.7.1.13
23. Krippendorff K. Content analysis: an introduction to its methodology. 4th ed. London: Sage Publications; 2019.
24. Sandelowski M. The problem of rigor in qualitative research. ANS Adv Nurs Sci. 1986;8(3):27-37. https://doi.org/10.1097/00012272-198604000-00005
25. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. Int J Qual Health Care. 2007;19(6):349-57. https://doi.org/10.1093/intqhc/mzm042
26. Delisle M, Ward MA, Pradarelli JC, Panda N, Howard JD, Hannenberg AA. Comparing the learning effectiveness of healthcare simulation in the observer versus active role: systematic review and meta-analysis. Simul Healthc. 2019;14(5):318-32. https://doi.org/10.1097/SIH.0000000000000377
27. Jeffries PR. Simulation in nursing education: from conceptualization to evaluation. 3rd ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2020.
28. Anine M, Kari R, Monica O, Hilde SS. Health professional students' self-reported emotions during simulation-based education: an interpretive descriptive study. Nurse Educ Pract. 2022;63:103353. https://doi.org/10.1016/j.nepr.2022.103353
29. Ross JG, Furman G, Scheve A. The impact of standardized patients on first-year nursing students’ communication skills. Clin Simul Nurs. 2024;89:101513. https://doi.org/10.1016/j.ecns.2024.101513
30. Kim YJ, Lee SH, Yoo HH. Analysis of students’ reflective journals on medical communication role plays. Korean Med Educ Rev. 2017;19(3):169-74. https://doi.org/10.17496/kmer.2017.19.3.169

APPENDICES

Appendix 1. Utilization of Standardized Patient

Training a standardized patient



Simulation-based education using a standardized patient

ORIGINAL ARTICLE

Korean J Adult Nurs Vol. 37 No. 2, 104-113, May 2025
eISSN: 2288-338X
https://doi.org/10.7475/kjan.2025.0109

KJAN
Korean Journal of
Adult Nursing

Influence of COVID-19–Induced Anxiety on Job Turnover Intention among Emergency Room Nurses during the COVID-19 Pandemic, the Mediating Effect of Needs Satisfaction: A Cross-Sectional Study

YuJin Seo[1], Myung Kyung Lee[2]

[1]Master's Student, Department of Nursing, Graduate School, Kyungpook National University, Daegu, Korea
[2]Professor, College of Nursing, Research Institute of Nursing Innovation, Kyungpook National University, Daegu, Korea

Received: January 9, 2025
Revised: March 28, 2025
Accepted: April 25, 2025

Corresponding author:
Myung Kyung Lee
College of Nursing, Research
Institute of Nursing Innovation,
Kyungpook National University,
680 Gukchaebosang-ro, Jung-gu,
Daegu 41944, Korea.
Tel: +82-53-950-4485
Fax: +82-53-950-4460
E-mail: mlee@knu.ac.kr

Purpose: During the coronavirus disease 2019 (COVID-19) pandemic, anxiety and need satisfaction may predict turnover intention among emergency room nurses, with need satisfaction negatively influencing turnover intention. This study aimed to examine the mediating effect of need satisfaction on the relationship between COVID-19–induced anxiety and job turnover intention among emergency room nurses during the pandemic. **Methods:** This descriptive cross-sectional study recruited 206 emergency room nurses from 11 hospitals in South Korea. Data were collected using a questionnaire from December 2022 to February 2023. **Results:** High COVID-19–induced anxiety was associated with increased turnover intention among nurses. Physiological needs partially mediated the relationship between COVID-19–induced anxiety and turnover intention. However, safety and belongingness needs showed no mediating effect. **Conclusion:** During the COVID-19 pandemic, if physiological needs were not satisfied, reducing anxiety and turnover intention among emergency room nurses proved challenging, even when other needs were met. Therefore, physiological needs should be prioritized and addressed before focusing on other types of needs.

Key Words: Anxiety; Intention; Personnel turnover; Physiological need; Safety

INTRODUCTION

The coronavirus disease 2019 (COVID-19) pandemic, which began in late 2019 in China, rapidly spread worldwide. Throughout this prolonged pandemic, ensuring the sustainability of healthcare systems has required a deeper understanding of the challenges faced by healthcare professionals [1]. The shortage of nursing staff, a longstanding issue, has been exacerbated by the prolonged nature of the pandemic [2]. Therefore, nurses have experienced an increased risk of excessive workload, potentially leading to resignation [3]. In 2020, during the COVID-19 pandemic, nurses' turnover intention increased significantly compared to pre-pandemic levels. One study reported that 33.5% of nurses expressed an intention to leave their current jobs during the pandemic [4], with particularly elevated turnover intention observed among emergency room nurses [5]. In public health crises, proactive management of nurses' turnover intentions is critical for effectively controlling and managing infectious diseases before actual turnover occurs. Recognizing the importance of this issue, the current study aimed to address it.

In this study, we focused on COVID-19–induced anxiety as a factor influencing turnover intention among emergency room nurses during the COVID-19 pandemic. Generally, when an infectious disease spreads, psychological anxiety increases, and economic and social activities are disrupted [6]. Particularly during the extended spread of COVID-19, nurses have demonstrated high levels of COVID-19–related anxiety [7,8]. Emergency room nurses are usually among the first responders to emerging infectious diseases [4] and often provide direct care to patients without adequate medical information [9]. Therefore, assessing their anxiety levels during the COVID-19 pandemic is essential. Furthermore, several previous studies have identified anxiety as a crucial predictor of turnover intention during this period [2,5]. Anxiety resulting from COVID-19 has made it difficult for healthcare professionals to perform their duties effectively, ultimately increasing their turnover intention [5]. However, the specific variables significantly increasing turnover intention in relation to anxiety have yet to be empirically researched.

This study focused on physiological, safety, and belongingness needs—based on Maslow's hierarchy of needs—as potential mediators in the relationship between nurses' anxiety and turnover intention during the COVID-19 pandemic. According to Maslow's hierarchy of needs (a pyramid consisting of five ascending levels), physiological needs are most essential, followed by safety, belongingness, esteem, and self-actualization [10]. As economies develop and survival is relatively secure, the satisfaction of needs higher than physiological ones has become increasingly prioritized [11]. However, during disaster situations such as the COVID-19 outbreak, healthcare professionals prioritize basic needs, including sufficient food, rest, and safety [1]. A qualitative study on healthcare professionals' experiences during the COVID-19 pandemic reported that receiving support from colleagues within healthcare institutions reduced feelings of isolation and contributed to psychological stability [12]. Thus, outbreaks of emerging infectious diseases highlight the importance of fulfilling physiological, safety, and belongingness needs (hereafter referred to as need satisfaction).

While Maslow's hierarchy includes esteem and self-actualization, these higher-level needs become secondary during crises when fundamental needs are threatened. Previous studies demonstrated that in disaster situations, individuals prioritize physiological, safety, and belongingness needs over higher-order needs, as survival and security take precedence [13]. Research involving healthcare professionals during the COVID-19 pandemic similarly indicated that nurses primarily focused on physical well-being, workplace safety, and social support rather than professional growth or self-fulfillment [14]. Given this theoretical and empirical background, this study focuses explicitly on physiological, safety, and belongingness needs as critical mediators during the pandemic. Need satisfaction can mediate the relationship between anxiety and turnover intention [15]. Anxiety during the COVID-19 pandemic has been associated with sleep disorders, exhaustion, decreased quality of life, and low social functioning [4,16]. Anxiety is also predicted to correlate with need satisfaction [17]. Additionally, need satisfaction influences job turnover intention [18]. A study [3] of healthcare professionals during the COVID-19 pandemic highlighted the importance of managing turnover intention by reducing COVID-19–related anxiety and providing a safe working environment with adequate rest and nutrition. Therefore, a significant relationship exists among COVID-19–induced anxiety, need satisfaction, and turnover intention.

Previous studies have produced meaningful findings regarding the relationship among COVID-19–induced anxiety, need satisfaction, and turnover intention. However, these studies examined the relationships between these variables in a fragmented manner. Therefore, the current study aimed to assess COVID-19–induced anxiety, need satisfaction, and job turnover intention among emergency room nurses during the COVID-19 pandemic and to examine the mediating effects of physiological, safety, and belongingness need satisfaction on the relationship between COVID-19–induced anxiety and turnover intention. The ultimate goal of this study is to mitigate job turnover intention and provide insights for improving nurses' work environments during infectious disease crises.

The aim of this study was to examine the mediating effect of need satisfaction in the relationship between COVID-19–induced anxiety and turnover intention among emergency room nurses during the COVID-19 pandemic.

METHODS

1. Study Design

This study employed a descriptive cross-sectional design. Participants were emergency room nurses recruited via convenience sampling from 11 hospitals located in Daegu, Gangwon Province, Gyeongbuk Province, and Chungcheong Province in South Korea. Specifically, these 11 hospitals included four tertiary hospitals, six general hospitals, and one hospital-level institution. Geographically, four hospitals were located in Daegu, two in Gangwon Province, three in Gyeongbuk Province, and two in Chungcheong Province. The average number of hospital beds was 731 (±328). This study was conducted and reported in accordance with the STROBE reporting guideline.

2. Study Participants

The inclusion criteria required nurses to be currently working in emergency rooms and to have experienced the COVID-19 pandemic between 2020 and 2021. Nurses hired after 2021 were excluded.

The sample size was determined using G*Power 3.1.9 [19]. Setting a significance level of .05, a medium effect size of .15, and a statistical power of .95 for multiple regression analysis yielded a required minimum sample size of 184. Considering an anticipated dropout rate of 30%, 240 questionnaires were distributed. A total of 216 responses were collected, but 10 questionnaires with incomplete responses were excluded. Ultimately, 206 valid responses were analyzed.

3. Measures

1) COVID-19–induced anxiety

COVID-19–induced anxiety was assessed using the COVID-19–induced Anxiety Scale (CIAS) [20]. The CIAS was translated into Korean, and its accuracy was ensured through independent back-translation. The scale comprises 10 items, each rated on a 5-point Likert scale ranging from 1 (“totally disagree”) to 5 (“totally agree”). Total scores range from 10 to 50, with higher scores indicating higher levels of COVID-19–induced anxiety. Cronbach’s alpha coefficient was .78 both in the study of Riad et al. [20] and in the present study.

2) Need satisfaction

Need satisfaction was measured using the Nurse Needs Satisfaction Scale, based on Maslow’s hierarchy of needs theory [21]. This scale includes subdomains of physiological needs, safety needs, belongingness needs, esteem needs, and self-actualization needs. For the purposes of this study, only physiological, safety, and belongingness needs were used. The scale consists of 18 items, with each subdomain comprising six items. Each item is rated on a 5-point Likert scale from 1 (“strongly disagree”) to 5 (“strongly agree”). Total scores range from 18 to 90, with higher scores indicating greater satisfaction of nurses’ needs. Cronbach’s alpha coefficients were reported by Kim and Shin [21] as .80 for physiological needs, .76 for safety needs, .81 for belongingness needs, and .90 overall; in the present study, these values were .83, .81, .86, and .82, respectively.

3) Turnover intention

Turnover intention was measured using the Nurse Turnover Intention Scale (NTIS) [22]. The NTIS comprises 10 items across three subdomains: job satisfaction (4 items), interpersonal relationships (3 items), and work performance (3 items). Each item is rated on a 5-point Likert scale from 1 (“strongly disagree”) to 5 (“strongly agree”). Total scores range from 10 to 50, with higher scores indicating higher levels of nurse turnover intention. Cronbach’s alpha coefficient was .83 in Yeun and Kim’s study [22]; in the current study, it was .82.

Prior to using all instruments—the CIAS, the Nurse Needs Satisfaction Scale, and the NTIS—we obtained permission from the original authors via email.

4. Data Collection

We sought permission from the nursing departments of the target hospitals by providing detailed explanations of the study’s purpose and procedures. After obtaining approval, we personally visited emergency rooms to collect data. Throughout the data collection period, cooperation and assistance were provided by the head nurses of the emergency rooms. Data collection occurred from December 22, 2022, to February 3, 2023. Before interacting with participants, researchers completed COVID-19 vaccinations and confirmed negative COVID-19 status using self-diagnostic kits. Proper hand hygiene was maintained, and KF94 masks were consistently worn to minimize the risk of COVID-19 transmission. Participants received comprehensive explanations regarding the study, including its purpose and procedures. Only those who voluntarily agreed to participate were included, and written informed consent was obtained from all participants before conducting the survey.

5. Ethical Considerations

The participants were provided with copies of participant information sheets and informed consent forms, clearly explaining the study's purpose and procedures. They were informed of their right to withdraw from the study at any time without negative consequences. The participant information sheet outlined potential benefits and risks associated with the research, and participants were assured their survey responses would be used solely for research objectives. Only individuals who fully understood the study and voluntarily signed written informed consent forms participated. The questionnaire collected no personally identifiable information. Completed questionnaires were securely stored, and coded data were protected, ensuring access only by the researchers. After study completion, data will be retained for the legally required storage period and then properly disposed of. This study was approved by the institutional review board of Kyungpook National University (approval No. 2023-0272).

6. Data Analysis

Descriptive statistics (frequency, percentage, mean, and standard deviation) were calculated to analyze demographic characteristics and key variables. Differences in turnover intention according to demographic characteristics were analyzed using the independent sample t-test.

The relationships among COVID-19–induced anxiety, need satisfaction, and turnover intention were explored using Pearson correlation coefficients. To examine the mediating effect of need satisfaction on the relationship between COVID-19–induced anxiety and turnover intention, Hayes' PROCESS Macro Model 4 was utilized, controlling for variables found significant in univariate analyses. Subsequently, the statistical significance of the mediating effect was tested using the bootstrapping method with 5,000 iterations. Data analyses were performed using SPSS version 26.0 (IBM Corp., Armonk, NY, USA) and SPSS PROCESS Macro 3.14.

RESULTS

1. Demographic Characteristics and Differences in Turnover Intention According to Demographic Characteristics

The mean age of the participants was 31.13 years. Most participants were female (78.2%), unmarried (69.9%), and held a bachelor's degree (77.7%). Regarding clinical career length, the mean total work experience was 7.42 years. Univariate analyses indicated that turnover intention significantly differed by educational level (t = –3.27, *p* = .001) and career length (t = –2.32, *p* = .022) (Table 1).

2. Description of COVID-19-Induced Anxiety, Need Satisfaction, and Turnover Intention

The mean score for COVID-19–induced anxiety was 2.36 ± 0.62, while the mean score for need satisfaction was 2.95 ± 0.48. Among the subdimensions of need satisfaction, belongingness needs scored the highest (3.80 ± 0.63), followed by safety needs (2.85 ± 0.69) and physiological needs (2.21 ± 0.80). The mean turnover intention score was 3.91 ± 0.62 (Table 2).

Table 1. Demographic Characteristics and Differences in Turnover Intention According to Demographic Characteristics (*N* = 206)

Variables	Categories	n (%)	M ± SD	t (*p*)
Age (year)			31.13 ± 6.67	
	< 30	117 (56.8)	37.46 ± 9.10	
	≥ 30	89 (43.2)	39.56 ± 6.40	0.73 (.464)
Sex	Male	45 (21.8)	36.60 ± 6.64	
	Female	161 (78.2)	38.83 ± 8.43	–1.64 (.103)
Marital status	Married	62 (30.1)	39.29 ± 6.61	
	Single	144 (69.9)	37.96 ± 8.66	1.08 (.279)
Educational level	Diploma	46 (22.3)	35.14 ± 12.82	
	≥ Bachelor	160 (77.7)	39.35 ± 5.66	–3.27 (.001)
Clinical career length (year)	< 5	91 (44.2)	36.88 ± 9.96	
	≥ 5	115 (55.8)	39.47 ± 6.20	–2.32 (.022)

M = mean; SD = standard deviation.

3. Correlations between COVID-19–Induced Anxiety, Need Satisfaction, and Turnover Intention

COVID-19–induced anxiety exhibited significant negative correlations with physiological need ($r=-.22$, $p=.036$) and belongingness need ($r=-.17$, $p=.028$), subdimensions of need satisfaction. However, COVID-19–induced anxiety was not significantly correlated with safety need. COVID-19–induced anxiety demonstrated a significant positive correlation with turnover intention ($r=.18$, $p=.031$).

Table 2. Descriptive Findings for Key Variables ($N=206$)

Variables	Range	M ± SD
COVID-19–induced anxiety	1–5	2.36 ± 0.62
Need satisfaction	1–5	2.95 ± 0.48
Physiological needs	1–5	2.21 ± 0.80
Safety needs	1–5	2.85 ± 0.69
Belongingness needs	1–5	3.80 ± 0.63
Turnover intention	1–5	3.91 ± 0.62

COVID-19 = coronavirus disease 2019; M = mean; SD = standard deviation.

Regarding relationships between turnover intention and need satisfaction subdimensions, turnover intention significantly negatively correlated with physiological need ($r=-.40$, $p<.001$) and safety need ($r=-.24$, $p=.001$). No statistically significant correlation was found between turnover intention and belongingness need (Table 3).

4. Mediating Effect of Need Satisfaction on the Relationship between COVID-19–Induced Anxiety and Turnover Intention

Table 4 presents the mediating effects of need satisfaction on the relationship between COVID-19–induced anxiety and turnover intention. In analyzing the mediation effects, educational level and clinical career length—significant in the univariate analyses—were controlled. In Step 1, COVID-19–induced anxiety showed a significant negative relationship with physiological need satisfaction ($\beta=-.22$, $p<.001$). COVID-19–induced anxiety was not significantly related to safety needs ($p=.884$) or belongingness

Table 3. Correlations between COVID-19–Induced Anxiety, Need Satisfaction, and Turnover Intention ($N=206$)

Variables	COVID-19–induced anxiety	Need satisfaction			Turnover intention
		Physiological needs	Safety needs	Belongingness needs	
COVID-19–induced anxiety	1				
Need satisfaction					
Physiological needs	–.22 (.036)	1			
Safety needs	.01 (.884)	.22 (.001)	1		
Belongingness needs	–.17 (.028)	.06 (.434)	.34 (<.001)	1	
Turnover intention	.18 (.031)	–.40 (<.001)	–.24 (.001)	–.01 (.864)	1

Values are presented as r-values with corresponding p-values in parentheses.
COVID-19 = coronavirus disease 2019.

Table 4. Mediating Effect of Need Satisfaction in the Relationship between COVID-19–Induced Anxiety and Turnover Intention ($N=206$)

Variables	B	β	t	p
Step 1.COVID-19–induced anxiety → mediation variable				
COVID-19–induced anxiety → physiological need satisfaction†	–0.17	–.22	–3.18	<.001
COVID-19–induced anxiety → safety need satisfaction†	0.01	.01	0.15	.884
COVID-19–induced anxiety → belongingness need satisfaction†	–0.02	–.10	–1.67	.166
Step 2. COVID-19–induced anxiety → turnover intention†	0.18	.18	2.61	.010
Step 3. COVID-19–induced anxiety, physiological need satisfaction, safety need satisfaction, belongingness need satisfaction → turnover intention†				
COVID-19–induced anxiety → turnover intention	0.13	.14	2.20	.043
Physiological need satisfaction → turnover intention	–0.43	–.34	–5.05	<.001
Safety need satisfaction → turnover intention	–0.30	–.20	–2.94	.004
Belongingness need satisfaction → turnover intention	0.16	.10	1.44	.152

COVID-19 = coronavirus disease 2019; †Adjusted for educational level and clinical career length.

needs ($p=.166$). In Step 2, COVID-19–induced anxiety demonstrated a positive association with turnover intention ($\beta=.18$, $p=.010$).

When all subdimensions of need satisfaction were simultaneously included in the model (Step 3), physiological needs exhibited a significant negative relationship with turnover intention ($\beta=-.34$, $p<.001$). Additionally, COVID-19-induced anxiety retained a significant positive relationship with turnover intention ($\beta=.14$, $p=.043$). Furthermore, the relationship between safety needs and turnover intention was also significant ($\beta=-.20$, $p=.004$). Considering the significant relationship between COVID-19–induced anxiety and physiological needs identified in Step 1 and the outcomes of Steps 2 and 3, physiological need satisfaction was found to partially mediate the relationship between COVID-19–induced anxiety and turnover intention.

To confirm the partial mediation effect of physiological need satisfaction between COVID-19–induced anxiety and turnover intention, a bootstrap test was performed. Table 5 presents the bootstrap results and mediation effects. The mediating effect of need satisfaction on the relationship between COVID-19–induced anxiety and turnover intention was assessed via bootstrap analysis. For physiological needs, which played a statistically significant role as a mediator, values are presented for total effects (effect=.08, 95% CI=.02–.15), indirect effects (effect=.03, 95% CI=.01–.06), and direct effects (effect=.05, 95% CI=.01–.09). For safety and belongingness needs—which were not statistically significant—only total effects are presented to clearly highlight significant mediation paths. The mediating effect of physiological need satisfaction was statistically significant (effect=.08, Boot 95% CI=.02–.15). Thus, physiological need satisfaction serves as a partial mediator in the relationship between COVID-19–induced anxiety and turnover intention (Figure 1).

DISCUSSION

This study aimed to examine the mediating effect of need satisfaction on the relationship between COVID-19–induced anxiety and turnover intention among emergency room nurses who experienced the COVID-19 pandemic. Our findings indicated that physiological need satisfaction among emergency room nurses partially mediated the relationship between COVID-19–induced anxiety and turnover intention. This result suggests that while anxiety in-

Table 5. Effects for Mediator Models ($N=206$)

Mediating path	Effect	SE	95% BC CI
Mediation variable: Physiological need satisfaction			
Total effect of COVID-19–induced anxiety → turnover intention	.08	0.01	.02 to .15
Direct effect of COVID-19–induced anxiety → turnover intention	.05	0.02	.01 to .09
Indirect effect via physiological need satisfaction	.03	0.07	.01 to .06
Mediation variable: Safety needs			
Total effect of COVID-19–induced anxiety → safety need satisfaction → turnover intention	$-.00^{\dagger}$	0.02	−.04 to .03
Mediation variable: Belongingness needs			
Total effect of COVID-19–induced anxiety → belongingness need satisfaction → turnover intention	−.02	0.02	−.06 to .01

BC=bias-corrected; CI=confidence interval; COVID-19=coronavirus disease 2019; SE=standard error; †Actual value=−.002.

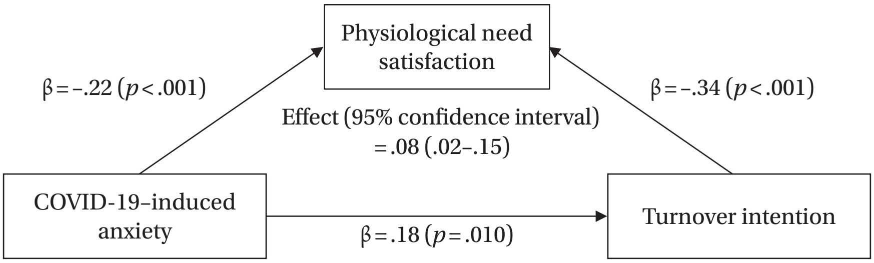


Figure 1. Partial mediating effect of physiological need satisfaction in the relationship between coronavirus disease 2019 (COVID-19)–induced anxiety and turnover intention.

duced by COVID-19 can directly increase nurses' turnover intention, adequately meeting nurse' physiological needs can indirectly mitigate this effect. Therefore, to reduce nurses' turnover intention during the COVID-19 pandemic, health organizations should not only help nurses manage their anxiety but also actively support the satisfaction of their physiological needs.

Emergency room nurses were particularly vulnerable to unmet physiological needs due to the nature of their work during the pandemic [23]. They managed a continuous influx of high-acuity patients, necessitating constant attention and rapid clinical decisions [24]. Additionally, they performed physically demanding tasks such as cardiopulmonary resuscitation, along with COVID-19–related responsibilities, significantly intensifying their workload. The prolonged use of heavy personal protective equipment (PPE), including coveralls, face shields, and N95 or KF94 masks, severely limited their ability to take breaks, use restrooms, breathe fresh air, or maintain adequate hydration. Consequently, their basic physiological needs often went unmet.

This demanding environment likely contributed to the increased turnover intention observed in our study. The mean turnover intention score among emergency room nurses was higher than the integrated turnover intention score (3.28 points) reported for hospital nurses in a systematic review conducted in South Korea [25]. The heightened workload, combined with unmet physiological needs, likely exacerbated nurses' intentions to leave their jobs [26]. To address these challenges, practical and targeted institutional measures should be implemented. These measures could include increasing staffing levels, optimizing shift scheduling, and providing nurses sufficient time and designated spaces to meet their essential physiological needs, even under pandemic conditions.

Safety and belongingness needs did not serve as mediators in this study. Thus, providing a safe working environment and enhancing organizational belongingness alone may be insufficient strategies to mitigate COVID-19–induced anxiety and turnover intention. In other words, during the COVID-19 pandemic, if physiological needs remain unsatisfied, lowering anxiety and turnover intention among emergency room nurses may be difficult, even if other needs are met. Typically, as economic conditions improve and survival becomes more assured, attention shifts toward higher-level rather than lower-level needs, based on Maslow's hierarchy of needs [11]. However, during disaster periods such as the COVID-19 pandemic, physiological needs—essential for survival—are emphasized. One study reported that healthcare professionals prioritized satisfying basic needs, including sufficient food intake, rest, and safety, during the COVID-19 outbreak [1], aligning with our findings.

Although safety need satisfaction did not mediate the relationship between COVID-19–induced anxiety and turnover intention, it directly influenced turnover intention. Previous studies similarly indicated that job security significantly influences turnover intention among hospital nurses [27,28]. To reduce turnover intention among emergency room nurses, hospital administrations should ensure sufficient provision of PPE, offer appropriate support in cases of infection, and establish reasonable compensation systems for nurses' work.

Moreover, this study revealed that COVID-19–induced anxiety had a significant positive correlation with turnover intention. This result aligns with multiple previous studies demonstrating higher turnover intention among healthcare professionals experiencing elevated COVID-19–induced anxiety [2,5,29,30]. Therefore, during infectious disease crises, in-depth assessments should be conducted to identify anxiety levels and their underlying causes among emergency room nurses. Additionally, anxiety management programs should be implemented effectively, and therapeutic interventions should be provided when necessary.

The relationships between COVID-19–induced anxiety and subdimensions of need satisfaction observed in this study are summarized as follows. COVID-19–induced anxiety had a significant negative impact on physiological need satisfaction. Anxiety has been significantly linked to sleep disorders among nurses caring for COVID-19 patients [16], and higher anxiety levels correlate with increased physical and emotional fatigue [3]. Thus, a close relationship between COVID-19–induced anxiety and physiological need satisfaction exists. However, COVID-19–induced anxiety showed no significant effect on safety need satisfaction. This finding might relate to our study participants reporting receiving adequate institutional support for events such as infections or medical accidents, which may have fulfilled their safety needs to some extent. Given the current scarcity of research examining the relationship between COVID-19–induced anxiety and safety needs, further studies on this topic are warranted. Furthermore, COVID-19-induced anxiety demonstrated a significant negative correlation with belongingness need satisfaction. Anxiety induced by COVID-19 can negatively influence organizational socialization and relationship-building through emotional exhaustion [31], partially aligning with the current study's findings.

Physiological and safety need satisfaction demonstrated significant negative correlations with turnover intention. This result is consistent with previous studies [18], which reported that satisfying nurses' physiological and safety needs can reduce their turnover intention. However, belongingness need satisfaction did not emerge as a predictor of turnover intention in our study. This finding is inconsistent with results from a study by Kim and Shin [21], which identified belongingness need as significantly related to turnover intention. Given the limited research examining the relationship between belongingness needs and turnover intention during the COVID-19 pandemic, further investigation is necessary to confirm whether nurses' belongingness needs directly influence turnover intention during infectious disease crises.

In this study, COVID-19–induced anxiety was relatively low overall. Specifically, 83% of respondents answered "strongly disagree" or "disagree" to the statement, "I am afraid to die if I get infected by COVID-19." This study was conducted approximately two years after the onset of COVID-19, a period marked by high vaccination rates and increased availability of effective treatments. Consequently, the participants' anxiety levels regarding COVID-19 likely decreased compared to the early stages of the outbreak. However, 42.2% of participants indicated moderate or higher anxiety levels in response to the statement, "When I or any family member go outside home during this COVID-19 outbreak, I feel anxious." Although the overall level of COVID-19–induced anxiety was not severe, a significant proportion of participants still experienced anxiety related to COVID-19 in their daily lives.

In the present study, physiological and safety need satisfaction were moderate to low, whereas belongingness need satisfaction was above average. A previous study investigating nurses' experiences while caring for COVID-19 patients [32] reported problems such as skin rashes caused by non-ventilated protective clothing, difficulties with urination and defecation, and reduced food and water intake. Additionally, a substantial proportion of nurses reported dissatisfaction regarding compensation and welfare benefits. These unfavorable working conditions might have contributed to the lower satisfaction scores for physiological and safety needs observed in this study. Meanwhile, belongingness needs received the highest satisfaction scores among the subdomains. This finding aligns with previous research [32], wherein nurses caring for COVID-19 patients expressed experiencing a heightened sense of camaraderie and solidarity with colleagues, surpassing prior experiences.

The results of this study may have limited generalizability, as participants were recruited via convenience sampling from specific regions in South Korea, namely Daegu, Gangwon-do, Gyeongsangbuk-do, and Chungcheongbuk-do. Future research should strive to enhance sample representativeness to ensure broader applicability of findings. Moreover, the cross-sectional survey design used in this study limits the ability to establish clear causal relationships between nurses' turnover intention and the examined variables. Thus, future research employing a longitudinal approach to measure key variables at multiple time points according to the evolving COVID-19 situation is recommended.

Despite these limitations, the present study is significant as it empirically examined the relationships among COVID-19–induced anxiety, turnover intention, and need satisfaction, specifically incorporating need satisfaction as a mediating variable. The focus on emergency room nurses during the COVID-19 pandemic adds valuable insights into the interconnected pathways and relationships among these important variables.

CONCLUSION

This descriptive survey study investigated the mediating effect of need satisfaction on the relationship between COVID-19–induced anxiety and turnover intention among emergency room nurses employed during the COVID-19 pandemic. Results indicated that emergency room nurses' physiological need satisfaction significantly mediated the relationship between COVID-19–induced anxiety and turnover intention. Therefore, health organizations should not only assist nurses in managing anxiety to reduce turnover intention but, more importantly, develop strategies to effectively satisfy their physiological needs. These findings underscore the importance of exploring practical measures that can substantially increase nurses' ability to satisfy patients' fundamental physiological needs.

ORCID

YuJin Seo, https://orcid.org/0000-0002-5293-1064
Myung Kyung Lee, https://orcid.org/0000-0002-2999-2299

CONFLICTS OF INTEREST

Myung Kyung Lee, a contributing editor of the *Korean Journal of Adult Nursing*, was not involved in the editorial evaluation or the decision to publish this article. The other author has declared no conflicts of interest.

AUTHORSHIP

Study conception and/or design acquisition, analysis, or interpretation of the data, and drafting or critical revision of the manuscript for important intellectual content - YS and MKL.

FUNDING

None.

ACKNOWLEDGEMENT

This article is a revision of the first author’s master’s thesis from Kyungpook National University.

DATA AVAILABILITY STATEMENT

The data can be obtained from the corresponding authors.

REFERENCES

1. Greenberg N, Docherty M, Gnanapragasam S, Wessely S. Managing mental health challenges faced by healthcare workers during COVID-19 pandemic. BMJ. 2020; 368:m1211. https://doi.org/10.1136/bmj.m1211
2. Falatah R. The impact of the coronavirus disease (COVID-19) pandemic on nurses' turnover intention: an integrative review. Nurs Rep. 2021;11(4):787-810. https://doi.org/10.3390/nursrep11040075
3. Tolksdorf KH, Tischler U, Heinrichs K. Correlates of turnover intention among nursing staff in the COVID-19 pandemic: a systematic review. BMC Nurs. 2022;21(1): 174. https://doi.org/10.1186/s12912-022-00949-4
4. Bingol U, Bilgin N, Cetinkaya A, Kutlu A. Variables that predict nurses' job stress and intention to leave during the COVID-19 pandemic in Turkey. J Adv Nurs. 2025; 81(2):878-86. https://doi.org/10.1111/jan.16287
5. Tabur A, Elkefi S, Emhan A, Mengenci C, Bez Y, Asan O. Anxiety, burnout and depression, psychological well-being as predictor of healthcare professionals' turnover during the COVID-19 pandemic: study in a pandemic hospital. Healthcare (Basel). 2022;10(3):525. https://doi.org/10.3390/healthcare10030525
6. Brenner MH, Bhugra D. Acceleration of anxiety, depression, and suicide: secondary effects of economic disruption related to COVID-19. Front Psychiatry. 2020; 11:592467. https://doi.org/10.3389/fpsyt.2020.592467
7. Cho KH, Kim B. The psychological responses of nurses caring for COVID-19 patients: a Q methodological approach. Int J Environ Res Public Health. 2021;18(7): 3605. https://doi.org/10.3390/ijerph18073605
8. Spoorthy MS, Pratapa SK, Mahant S. Mental health problems faced by healthcare workers due to the COVID-19 pandemic: a review. Asian J Psychiatr. 2020; 51:102119. https://doi.org/10.1016/j.ajp.2020.102119
9. Kim SO, Kim KH. Factors influencing emergency nurses' infection control practices related to coronavirus disease 2019 in Korea. Australas Emerg Care. 2023; 26(1):30-5. https://doi.org/10.1016/j.auec.2022.07.004
10. Pardee RL. Motivation theories of Maslow, Herzberg, McGregor & McClelland. A literature review of selected theories dealing with job satisfaction and motivation Washington, DC: Education Resources Information Center. United States of America; 1990 [cited 2025 April 9]. Available from: https://coilink.org/20.500.12592/l1pdg9f
11. Inglehart R. Modernization and postmodernization: cultural, economic, and political change in 43 societies. Princeton, NJ: Princeton University Press; 1997.
12. Liu Q, Luo D, Haase JE, Guo Q, Wang XQ, Liu S, et al. The experiences of health-care providers during the COVID-19 crisis in China: a qualitative study. Lancet Glob Health. 2020;8(6):e790-8. https://doi.org/10.1016/S2214-109X(20)30204-7
13. Donahue DA, Cunnion SO, Balaban CD, Sochats K. The all needs approach to emergency response. Homel Secur Aff. 2012;8(1):1-17.
14. Suh J, Horvitz E, White RW, Althoff T. Population-scale study of human needs during the COVID-19 pandemic: analysis and implications. Paper presented at: Proceed-

ings of the 14th ACM International Conference on Web Search and Data Mining; 2021 March 8-12; Virtual event.

15. Boudrias V, Trepanier SG, Foucreault A, Peterson C, Fernet C. Investigating the role of psychological need satisfaction as a moderator in the relationship between job demands and turnover intention among nurses. Employee Relat. 2020;42(1):213-31. https://doi.org/10.1108/ER-10-2018-0277
16. Al Maqbali M. Sleep disturbance among frontline nurses during the COVID-19 pandemic. Sleep Biol Rhythms. 2021;19(4):467-73. https://doi.org/10.1007/s41105-021-00337-6
17. Schwinger M, Trautner M, Karchner H, Otterpohl N. Psychological impact of corona lockdown in Germany: changes in need satisfaction, well-being, anxiety, and depression. Int J Environ Res Public Health. 2020;17(23):9083. https://doi.org/10.3390/ijerph17239083
18. Chen X, Ran L, Zhang Y, Yang J, Yao H, Zhu S, et al. Moderating role of job satisfaction on turnover intention and burnout among workers in primary care institutions: a cross-sectional study. BMC Public Health. 2019;19(1):1526. https://doi.org/10.1186/s12889-019-7894-7
19. Faul F, Erdfelder E, Buchner A, Lang AG. Statistical power analyses using G*Power 3.1: tests for correlation and regression analyses. Behav Res Methods. 2009;41(4):1149-60. https://doi.org/10.3758/BRM.41.4.1149
20. Riad A, Huang Y, Zheng L, Elavsky S. The associations of COVID-19 induced anxiety, related knowledge and protective behavior. Health Psychol Res. 2021;9(1):24768.
21. Kim HJ, Shin SH. Development and validation of the nurse needs satisfaction scale based on Maslow's hierarchy of needs theory. J Korean Acad Nurs. 2020;50(6):848-62. https://doi.org/10.4040/jkan.20195
22. Yeun EJ, Kim H. Development and testing of a nurse turnover intention scale (NTIS). J Korean Acad Nurs. 2013;43(2):256-66. https://doi.org/10.4040/jkan.2013.43.2.256
23. Gonzalez-Gil MT, Gonzalez-Blazquez C, Parro-Moreno AI, Pedraz-Marcos A, Palmar-Santos A, Otero-Garcia L, et al. Nurses' perceptions and demands regarding COVID-19 care delivery in critical care units and hospital emergency services. Intensive Crit Care Nurs. 2021;62:102966. https://doi.org/10.1016/j.iccn.2020.102966
24. Benjamin E. Innovations in emergency nursing: adapting patient flow management to emergency department overcrowding. J Emerg Nurs. 2025;51(2):261-8. https://doi.org/10.1016/j.jen.2024.10.002
25. Lee Y, Kang J. Related factors of turnover intention among Korean hospital nurses: a systematic review and meta-analysis. Korean J Adult Nurs. 2018;30(1):1-17. https://doi.org/10.7475/KJAN.2018.30.1.1
26. Xu S, Yang Q, Xie M, Wang J, Shan A, Shi F. Work experience of triage nurses in emergency departments during the prevalence of COVID-19. Int Emerg Nurs. 2021;56:101003. https://doi.org/10.1016/j.ienj.2021.101003
27. Sokhanvar M, Kakemam E, Chegini Z, Sarbakhsh P. Hospital nurses' job security and turnover intention and factors contributing to their turnover intention: a cross-sectional study. Nurs Midwifery Stud. 2018;7(3):133-40. https://doi.org/10.4103/nms.nms_2_17
28. Laine M, van der Heijden BI, Wickström G, Hasselhorn HM, Tackenberg P. Job insecurity and intent to leave the nursing profession in Europe. Int J Hum Resour Manag. 2009;20(2):420-38. https://doi.org/10.1080/09585190802673486
29. Kokubun K, Ino Y, Ishimura K. Social and psychological resources moderate the relation between anxiety, fatigue, compliance and turnover intention during the COVID-19 pandemic. Int J Workplace Health Manag. 2022;15(3):262-86. https://doi.org/10.1108/IJWHM-07-2021-0142
30. Modaresnezhad M, Andrews MC, Mesmer-Magnus J, Viswesvaran C, Deshpande S. Anxiety, job satisfaction, supervisor support and turnover intentions of mid-career nurses: a structural equation model analysis. J Nurs Manag. 2021;29(5):931-42. https://doi.org/10.1111/jonm.13229
31. Ungureanu P, Bertolotti F. Backing up emergency teams in healthcare and law enforcement organizations: strategies to socialize newcomers in the time of COVID-19. In: Wardman JK, Lofstedt R, editors. COVID-19: confronting a new world risk. Oxford: Routledge; 2022. p. 56-69.
32. Lee H, Lee SE, Sang S, Morse B. The lived experience of nurses who volunteered to combat the COVID-19 pandemic in South Korea: a qualitative phenomenological study. J Nurs Manag. 2022;30(4):864-71. https://doi.org/10.1111/jonm.13571

ORIGINAL ARTICLE

Korean J Adult Nurs Vol. 37 No. 2, 114-124, May 2025
eISSN: 2288-338X
https://doi.org/10.7475/kjan.2025.0110

KJAN
Korean Journal of
Adult Nursing

The Mediating Role of Patient Safety Perception in the Relationship between Right to Know and Patient Participation among Inpatients

Sun-Hwa Shin[1], **On-Jeon Baek**[2]

[1]*Associate Professor, College of Nursing, Sahmyook University, Seoul, Korea*
[2]*Doctoral Student, College of Nursing, Sahmyook University, Seoul, Korea*

Received: January 10, 2025
Revised: March 17, 2025
Accepted: April 25, 2025

Corresponding author:
On-Jeon Baek
College of Nursing, Sahmyook University, 815 Hwarang-ro, Nowon-gu, Seoul 01795, Korea.
Tel: +82-2-3399-1595
Fax: +82-2-3399-1594
E-mail: perfectoj@naver.com

Purpose: This study aimed to investigate the mediating role of patient safety perception (PSP) in the relationship between the right to know (RtK) and patient participation (PP) among inpatients. **Methods:** This descriptive study used a convenience sample of inpatients from three small and medium-sized hospitals in October 2023. A total of 231 inpatients completed a self-report questionnaire assessing PP, RtK, and PSP. Data were analyzed using a mediation model with the PROCESS Macro (Model 4), applying 95% bias-corrected bootstrap confidence intervals. **Results:** The findings revealed significant positive correlations between PP and RtK ($r = .78$, $p < .001$) and PSP ($r = .83$, $p < .001$). Both RtK and PSP had significant effects on PP. PSP was identified as an important mediator in the relationship between RtK and PP ($B = .35$, boot standard error = .06, 95% confidence interval = .27–.44). The findings confirm that inpatients' RtK is associated with improved PSP and increased PP. **Conclusion:** These findings highlight the critical role of safeguarding patients' right to information as a strategy for promoting patient safety. To ensure safe and effective care in small and medium-sized hospitals, ongoing support is essential for developing and systematically implementing patient safety education initiatives that actively involve patients.

Key Words: Inpatients; Patient safety; Patient participation; Perception; Patient rights

INTRODUCTION

As medical technology advances and average life expectancy increases, patients visiting hospitals are becoming more conscious and informed about the safety of medical services. Patient safety is defined as "a framework of organized activities that create a culture, process, behavior, technology, and environment that consistently and sustainably reduces risks in health care, reduces avoidable harm, reduces the likelihood of errors, and influences harm when it occurs" [1]. To prevent incidents threatening patient safety, medical institutions conduct various patient safety activities such as fall prevention and management, bedsore management, infection management, drug management, fire prevention, and hand hygiene [2]. According to the Patient Safety Act, medical institutions must establish patient safety committees, assign personnel to perform patient safety activities, and voluntarily report patient safety incidents [3].

Tertiary and large general hospitals carry out patient safety activities through dedicated patient safety personnel, as well as through patient safety planning and education [4]. However, small and medium-sized hospitals face challenges such as insufficient dedicated nursing staff for patient safety and difficulties in fulfilling these roles [5]. Small and medium-sized hospitals are classified as general medical institutions with fewer than 300 beds [6,7]. According to the Korea Medical Institutions Accreditation Board, only 173 of the 301 small and medium-sized acute hospitals passed the accreditation evaluation system [6], making effective patient safety activities challenging [2]. Previous studies have also reported that patient safety activity scores among nurses in small and medium-sized hospitals are lower compared to those in large hospitals [8]. Nevertheless, patient safety research predominantly focuses on healthcare staff [9,10] and inpatients in tertiary and large general hospitals [11-15]. Although patient safety research targeting nurses in small and medium-sized hospitals is conducted [8,16], studies specifically examining inpatients in these hospitals are very limited [7]. Therefore, a research gap exists regarding inpatient perspectives and awareness of patient safety in small and medium-sized hospitals.

The World Health Organization emphasizes the role of patients directly affected by patient safety incidents in improving overall patient safety [17]. Thus, patient participation (PP) is gaining attention as a potential pathway for strengthening patient safety. PP refers to the opportunities for patients to engage in and influence decisions about their own treatment through dialogue with healthcare professionals, incorporating patients' preferences and experiential knowledge [18]. Previous studies have demonstrated that involving patients and their families in treatment procedures helps prevent adverse events and medical errors, thereby reducing patient safety incidents [19,20]. Since patients directly suffer from the consequences of safety incidents, such as pain or long-term harm, ongoing communication and active participation in decision-making with healthcare providers throughout treatment are crucial [20]. Specifically, patient and family participation positively influences clinical outcomes, including mortality, readmission rates, and length of hospital stays [21]. Thus, for patient safety improvement, patients must maintain continuous interest in their treatment and actively participate [18]. In other words, PP is an effective strategy to overcome the limitations inherent in patient safety management primarily centered around medical staff, highlighting the need to promote active participation among inpatients.

The right to know (RtK) is a fundamental human right. Patients can exercise self-determination effectively when they receive sufficient explanations from medical staff regarding their illnesses, planned tests, medications, and treatment plans [22]. Adequate information fulfills the patient's RtK, enabling them to better manage the treatment process and achieve positive clinical outcomes [23]. However, the asymmetrical relationship between patients and medical staff remains a significant barrier to fulfilling the RtK [12]. Furthermore, due to information overload, the complexity and specialized nature of medical care, and the inherent informational asymmetry between patients and medical staff, patients' rational decision-making abilities are limited, leading them to rely heavily on medical professionals' judgments [23]. Previous studies indicate that effective communication between patients and medical staff guarantees patients' treatment decision-making rights and significantly enhances satisfaction with medical services [24]. In particular, providing relevant information about treatment decisions, including comparative treatment options, safety assurances, and acknowledgment of the patient's RtK, is crucial [24]. Such communication enables patients to gather and utilize treatment-related information more effectively. Patients' RtK also positively influences their perception of patient safety [25]. Thus, it can be inferred that fulfilling patients' RtK improves their patient safety perception (PSP), subsequently increasing their participation in treatment decisions.

To increase PP among inpatients, they must be educated to recognize safety as an essential issue in medical institutions [13]. PSP refers to the extent to which inpatients recognize they are safe in medical settings; it represents the patient's view and acceptance of their own safety [12,13]. Consequently, a high PSP indicates the patient feels safe. Previous studies indicate that PSP improves through patient safety education aimed at the general public [18], and hospitalized patients' positive experiences also significantly enhance PSP [26]. Furthermore, higher PSP among hospitalized patients is associated with increased PP [14,27]. Therefore, patient safety is a critical concern for both patients and their guardians, with PSP playing a significant role in promoting PP.

Summarizing previous research, inpatients' RtK positively affects PSP [25], and PSP positively influences PP [14,27]. Currently, no studies specifically examine the relationship between RtK and PP among inpatients; however, it has been established that RtK is associated with PP in self-determination [22]. When patients' RtK is satisfied, it potentially facilitates PP, subsequently contributing to patient safety improvements. Thus, understanding patients' RtK and their awareness of patient safety is critical for identifying factors that enhance PP. Studies examining patient safety awareness as a mediating variable have found it mediates the relationship between inpatients' health literacy and PP [15]. Nonetheless, there is limited research exploring how patient safety awareness functions as a mediator in affecting PP. Consequently, understanding the factors influencing PP, as well as the relationship between patients' RtK and patient safety awareness, is vital for developing interventions aimed at enhancing PP. Therefore, this study aims to clarify the importance of PP in improving patient safety among inpatients by establishing and analyzing a mediation model of patient safety awareness in the relationship between the inpatients' RtK and PP.

The specific objectives were as follows: first, to investigate differences in RtK, PSP, and PP according to the general characteristics of inpatients; second, to analyze the correlations among RtK, PSP, and PP among inpatients; and third, to examine the mediating role of PSP in the relationship between RtK and PP among inpatients.

METHODS

1. Research Design

A descriptive study design was used to investigate the mediating effect of PSP on the relationship between the RtK and PP among inpatients in small and medium-sized hospitals. This study was conducted and reported in accordance with the STROBE guidelines.

2. Research Participants

Participants were selected using convenience sampling from three small and medium-sized hospitals located in Seoul. Inclusion criteria were as follows: (1) adults aged 20–65 years, (2) at least two hospitalizations, (3) experience of procedures or surgery, and (4) ability to independently read and complete the questionnaire. Exclusion criteria included: (1) diagnosis from a psychiatrist, and (2) inability to understand the questionnaire due to cognitive impairment. The required sample size was determined using G*Power 3.1.9.7, specifying regression analysis for mediating effects with a medium effect size (.15), significance level (.05), and power (.95). The minimum calculated sample size was 184, considering 12 independent variables. Accounting for a 20% dropout rate, 230 questionnaires were initially distributed. Data from 240 participants were collected, with nine excluded due to not meeting inclusion criteria or providing insincere responses, resulting in a final analyzed sample of 231 participants.

3. Measurements

1) Sociodemographic and clinical characteristics

A structured questionnaire captured sociodemographic characteristics (sex, age, education, occupation, marital status, hospital visit frequency) and clinical characteristics (underlying diseases, patient safety incidents, patient safety education).

2) Right to know (RtK)

RtK was measured using the RtK Scale, modified from Choi and Lee's study [28] based on the Perception of RtK Scale developed by Ahn et al. [22]. This scale comprises 23 items grouped into five sub-factors: existence of legal and institutional frameworks related to RtK (1 item), regulatory effects and granted rights (6 items), doctors' explanatory duties and their binding nature (6 items), perception of RtK (8 items), and realization of RtK in hospitals (2 items). Each item employed a 5-point Likert scale ranging from "not at all" (1 point) to "definitely" (5 points), resulting in scores ranging from 23 to 115, with higher scores indicating greater RtK perception. Cronbach's α reliability was .90 in Choi and Lee's study [28] and .89 in the current study.

3) Patient safety perception (PSP)

PSP was assessed using the PSP Scale, validated by Kim et al. [13] for Korean inpatients based on the Patient Measure of Safety developed by Giles et al. [29]. The scale consists of 24 items divided into three sub-factors: safety assurance activities (9 items), safety practices (10 items), and trust in the medical system (4 items). Items used a 5-point Likert scale from "very dissatisfied" (1 point) to "very much so" (5 points), with total scores ranging from 24 to 120 points. Higher scores indicated greater PSP. Cronbach's α reliability was .93 in the study of Kim et al. [13] and .94 in the current study.

4) Patient participation (PP)

PP was evaluated using the PP Scale (PPS), developed by Song and Kim [18] for Korean outpatients and inpatients. The PPS consists of 21 items grouped into four sub-factors: information and knowledge sharing (8 items), participation in decision-making processes (2 items), proactive

https://doi.org/10.7475/kjan.2025.0110

self-management activities (7 items), and establishment of mutual trust (4 items). Items were rated on a 5-point Likert scale from “not at all” (1 point) to “very much so” (5 points). Scores ranged from 21 to 105, with higher scores indicating greater PP. Cronbach’s α reliability was .92 in Song and Kim’s study [18] and .93 in this study.

4. Data Collection and Ethical Considerations

This study was approved by the Institutional Review Board of Sahmyook University (IRB No. SYU 2023-08-008-005) of the affiliated university. Data collection occurred from October 2 to October 20, 2023. The researcher visited three small and medium-sized hospitals, secured cooperation, and posted recruitment notices in each ward. Research assistants, trained on study objectives and procedures, verified participants’ eligibility, explained study purposes and procedures, and obtained informed consent for participation. The research explanation included the study purpose and methods, the selection criteria for the participants, the voluntary nature of research participation, the right to stop participating at any time, and the fact that the collected data would be used only for research purposes. A URL link was sent to participants who read the explanation and agreed to participate. Participants began the survey by checking the consent box. Those who completed the survey received an online gift card as a token of appreciation.

5. Data Analysis

Data were analyzed using IBM SPSS/WIN 25.0 software (IBM Corp., Armonk, NY, USA). Frequency analysis and descriptive statistics summarized participants’ general characteristics and measured variables. Differences based on general characteristics were assessed through independent t-tests and analysis of variance, followed by Scheffé’s post-hoc tests. Pearson’s correlation analysis evaluated relationships among RtK, PSP, and PP. Mediation analysis utilized Model 4 of the SPSS PROCESS Macro Procedure (version 4.1), employing bootstrapping to calculate a 95% confidence interval (CI). Effects were deemed significant if the CI excluded zero [30].

RESULTS

1. General Characteristics of the Participant

Table 1 presents the general characteristics of the participants. The study included 81 males (35.1%) and 150 females (64.9%). The age distribution was as follows: 114 patients (49.4%) were aged 31–40 years, 51 patients (22.1%) were aged 21–30 years, 43 patients (18.6%) were aged 41–50 years, and 23 patients (10.0%) were aged 51 years or older. Most participants were employed (n = 196, 84.8%), and 116 patients (50.2%) were single. A total of 161 patients (69.7%) reported no underlying disease, exceeding those who reported underlying diseases (n = 70, 30.3%). The most common frequency of hospital visits was once every 3 months (n = 78, 33.8%), and the majority had been hospitalized twice (n = 107, 46.3%). Most participants reported no experience with patient safety incidents (n = 204, 88.3%) and had received patient safety education (n = 207, 89.6%).

2. Differences in RtK, PSP, and PP Based on General Characteristics

Table 2 shows differences in measured variables according to general characteristics. RtK significantly varied by sex ($t = -5.14$, $p < .001$), age ($F = 19.21$, $p < .001$), education level ($t = -3.36$, $p = .002$), occupation ($t = 2.34$, $p = .020$), marital status ($t = -5.21$, $p < .001$), frequency of hospital visits ($F = 9.84$, $p < .001$), and frequency of hospitalizations ($F = 8.63$, $p < .001$). Post hoc analysis indicated higher RtK scores among patients in their 20s compared to those in their 30s and 40s, and patients aged 51 years or older had higher RtK scores compared to those in their 40s. Additionally, patients visiting the hospital once a year had higher RtK scores than those visiting more frequently, and those hospitalized twice reported higher RtK scores compared to those hospitalized three or more times.

PSP significantly differed by sex ($t = -2.47$, $p = .014$), age ($F = 6.81$, $p < .001$), marital status ($t = -4.95$, $p < .001$), underlying disease ($t = 2.43$, $p = .016$), frequency of hospital visits ($F = 5.80$, $p = .001$), frequency of hospitalizations ($F = 13.52$, $p < .001$), patient safety incident experience ($t = 3.25$, $p = .001$), and patient safety education experience ($t = -3.24$, $p = .001$). Post hoc tests showed higher PSP scores in patients in their 20s compared to those in their 30s and 40s, patients visiting once a year compared to those visiting once every 6 months, and patients hospitalized twice com-

Table 1. General Characteristics of Participants (*N*=231)

Characteristics	Categories	n (%)
Sex	Male	81 (35.1)
	Female	150 (64.9)
Age (year)	21–30	51 (22.1)
	31–40	114 (49.4)
	41–50	43 (18.6)
	≥51	23 (10.0)
Education level	High school	41 (17.7)
	University	190 (82.3)
Occupation	No	35 (15.2)
	Yes	196 (84.8)
Marital status	Married	115 (49.8)
	Single	116 (50.2)
Underlying disease	No	161 (69.7)
	Yes	70 (30.3)
Frequency of hospital visits	Once a month	57 (24.7)
	Once every 3 months	78 (33.8)
	Once every 6 months	66 (28.5)
	At least once per year	30 (13.0)
Frequency of hospitalizations (times)	2	107 (46.3)
	3	70 (30.3)
	≥4	54 (23.4)
Patient safety incident	No	204 (88.3)
	Yes	27 (11.7)
Patient safety education	No	24 (10.4)
	Yes	207 (89.6)

pared to those hospitalized three or more times.

PP significantly varied by sex (t=–3.83, $p<.001$), age (F=9.82, $p<.001$), education level (t=–2.85, $p=.006$), marital status (t=–4.88, $p<.001$), underlying disease (t=2.76, $p=.006$), frequency of hospital visits (F=6.98, $p<.001$), and frequency of hospitalizations (F=9.66, $p<.001$). Post hoc analyses revealed higher PP scores for patients in their 20s compared to those in their 30s, higher scores for those in their 30s compared to those in their 40s, and higher scores among patients aged 51 or older compared to those in their 40s. Patients visiting once monthly or yearly had higher PP scores compared to those visiting once every 6 months, and those hospitalized twice had higher scores compared to those hospitalized three or more times.

3. Correlation among RtK, PSP, and PP

Table 3 presents correlations and descriptive statistics for RtK, PSP, and PP. The mean scores were 3.96 (±0.47) for RtK, 4.31 (±0.45) for PSP, and 4.33 (±0.45) for PP. Significant positive correlations were found between RtK and PSP (r=.68, $p<.001$), RtK and PP (r=.78, $p<.001$), and PSP and PP (r=.83, $p<.001$).

4. The Mediating Effect of PSP in the Relationship between the RtK and PP

Prior to mediation analysis, regression assumptions were verified. Skewness values for RtK, PSP, and PP were within ±2, and kurtosis values were under 7, confirming normality (Table 3). Durbin-Watson was 1.99, and variance inflation factor ranged from 1.25 to 2.31, indicating no autocorrelation or multicollinearity. Mediating effects were examined using the PROCESS Macro (Model 4), controlling for significant variables (sex, age, education, marital status, underlying disease, hospital visit frequency, and hospitalization frequency).

In Step 1, the independent variable, the RtK, had a significant positive effect on the mediating variable, PSP ($\beta=.64$, $p<.001$). In Step 2, RtK had a significant positive effect on the dependent variable, PP ($\beta=.74$, $p<.001$). In Step 3, the RtK had a significant positive effect on PP ($\beta=.37$, $p<.001$),

https://doi.org/10.7475/kjan.2025.0110

Table 2. Differences in RtK, PSP, and PP by General Characteristics (*N*=231)

Characteristics	Categories	RtK		PSP		PP	
		M±SD	t/F(*p*)	M±SD	t/F(*p*)	M±SD	t/F(*p*)
Sex	Male	3.75±0.43	–5.14 (<.001)	4.21±0.38	–2.47 (.014)	4.19±0.42	–3.83 (<.001)
	Female	4.07±0.45		4.36±0.48		4.42±0.44	
Age (year)	21–30^{a}	4.27±0.39	19.21 (<.001)	4.52±0.42	6.81 (<.001)	4.53±0.43	9.82 (<.001)
	31–40^{b}	3.88±0.41	a>b>c	4.28±0.43	a>b,c	4.32±0.41	a>b>c
	41–50^{c}	3.67±0.47	d>c	4.13±0.42		4.07±0.42	d>c
	≥51^{d}	4.15±0.42		4.29±0.55		4.46±0.47	
Education level	High school	3.69±0.60	–3.36 (.002)	4.23±0.52	–1.11 (.270)	4.13±0.54	–2.85 (.006)
	University	4.02±0.41		4.32±0.44		4.38±0.41	
Occupation	No	4.13±0.45	2.34 (.020)	4.31±0.50	0.07 (.946)	4.38±0.46	0.70 (.485)
	Yes	3.93±0.46		4.31±0.45		4.33±0.45	
Marital status	Married	3.81±0.49	–5.21 (<.001)	4.16±0.48	–4.95 (<.001)	4.20±0.48	–4.88 (<.001)
	Single	4.11±0.39		4.45±0.38		4.47±0.37	
Underlying disease	No	3.98±0.51	1.48 (.140)	4.35±0.46	2.43 (.016)	4.39±0.46	2.76 (.006)
	Yes	3.90±0.35		4.20±0.41		4.21±0.39	
Frequency of hospital visits	Once a month^{a}	4.00±0.41	9.84 (<.001)	4.35±0.49	5.80 (.001)	4.43±0.46	6.98 (<.001)
	3 months^{b}	3.94±0.42	d>a,b,c	4.30±0.38	d>c	4.31±0.39	a>c
	6 months^{c}	3.78±0.50		4.16±0.44		4.18±0.43	d>b,c
	Once per year^{d}	4.30±0.42		4.56±0.48		4.58±0.47	
Frequency of hospitalizations (times)	2^{a}	4.09±0.44	8.63 (<.001)	4.46±0.47	13.52 (<.001)	4.46±0.47	9.66 (<.001)
	3^{b}	3.87±0.45	a>b,c	4.23±0.35	a>b,c	4.26±0.40	a>b,c
	≥4^{c}	3.81±0.46		4.10±0.44		4.17±0.39	
PS incident	No	3.96±0.46	0.24 (.807)	4.34±0.44	3.25 (.001)	4.35±0.44	1.47 (.144)
	Yes	3.94±0.54		4.04±0.47		4.22±0.52	
PS education	No	3.81±0.50	–1.69 (.091)	4.03±0.51	–3.24 (.001)	4.18±0.48	–1.82 (.070)
	Yes	3.98±0.46		4.34±0.44		4.35±0.44	

Alphabets (a,b,c,d) refer to post hoc test results using Scheffé's method.
M=mean; PP=patient participation; PSP=patient safety perception; RtK=right to know; SD=standard deviation.

Table 3. Descriptive Statistics and Correlations of RtK, PSP, and PP (*N*=231)

Variables	r (*p*)		M±SD	Skewness	Kurtosis
	PSP	PP			
RtK	.68 (<.001)	.78 (<.001)	3.96±0.47	–0.25	–0.67
PSP		.83 (<.001)	4.31±0.45	–0.35	0.18
PP			4.33±0.45	–0.31	0.31

M=mean; PP=patient participation; PSP=patient safety perception; RtK=right to know; SD=standard deviation.

and the mediating variable, PSP, had a significant effect on PP (β=.57, $p<.001$). The explanatory power of the final model was 80.2% (adjusted R^2=.802, F=73.38, $p<.001$) (Table 4).

The indirect mediating effect of PSP was statistically significant because the 95% CI did not include 0 (B=.35, boot standard error=.06, 95% CI=0.27–0.44). In other words, it was confirmed that when perceptions of the RtK increased, PSP also increased, which could lead to higher levels of PP. The results of our research model are presented in Figure 1.

DISCUSSION

This study confirmed the mediating effect of PSP in the relationship between RtK and PP among inpatients in small and medium-sized hospitals. The results showed that inpatients' RtK was positively associated with increased PSP and PP.

First, PSP was identified as a mediator in the relationship between inpatients' RtK and their participation. Specifically, it was demonstrated that RtK perception directly in-

Table 4. Results of Mediating Effect Analysis (*N* = 231)

Step	DV	IV	B	SE	β	t	*p*	Adj. R^2	F (*p*)
1	PSP	RtK	0.62	0.06	.64	11.23	< .001	.516	21.24 (< .001)
2	PP	RtK	0.70	0.05	.74	15.05	< .001	.642	35.79 (< .001)
3	PP	RtK	0.35	0.04	.37	8.06	< .001	.802	73.38 (< .001)
		PSP	0.56	0.04	.57	13.22	< .001		

Adjusted for sex, age, education level, marital status, underlying disease, frequency of hospital visits, and frequency of hospitalizations.
DV = dependent variable; IV = independent variable; PP = patient participation; PSP = patient safety perception; RtK = right to know; SE = standard error.

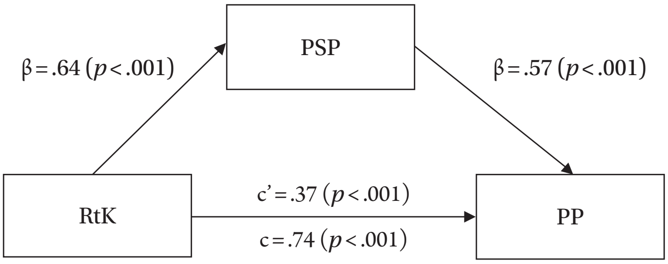


Figure 1. The mediating effect of patient safety perception (PSP) in the relationship between right to know (RtK) and patient participation (PP). The solid lines indicate significant path coefficients. c = total effect; c' = direct effect.

creased PP and that PSP further enhanced PP as a mediator. These findings partially align with previous studies indicating that higher PSP contributes to increased PP [14,27]. Prior research highlighted that patients believe being informed about their health enhances communication with healthcare providers, ultimately improving patient safety [31]. However, hospitalized patients often exhibit limited understanding of specific patient safety activities despite acknowledging their importance [7]. This may suggest that the passive role typically assumed by hospitalized patients leads to reduced awareness and engagement regarding patient safety management [32]. Therefore, targeted measures are needed to increase PSP, enabling patients to identify and participate effectively in safety activities crucial to their own well-being.

Second, PSP among patients admitted to small and medium-sized hospitals differed significantly based on sex, age, marital status, underlying diseases, frequency of hospital visits, hospitalizations, experience with patient safety incidents, and patient safety education. These findings are consistent with previous studies involving patients admitted to hematology and oncology departments [14], general hospitals [12], and the general public [27]. Additionally, previous studies reported that positive patient experiences [26], more favorable RtK perceptions and greater self-determination [25], and effective patient safety education [27] significantly improve PSP scores. PSP is influenced by both patient characteristics and environmental factors, such as healthcare institution systems, facilities, and programs. Patient experiences can enhance familiarity with institutional procedures and facilitate communication with medical staff. Past research emphasizes the close relationship between PSP and PP [15,18], highlighting patient safety education and RtK perceptions as critical components in promoting patient engagement. This study also underscores the importance of patient safety education, as PSP scores were higher among patients who received such education. This suggests that patient safety education provided by medical institutions effectively enhances patients' knowledge and coping skills within healthcare environments. Patients in small and medium-sized hospitals generally prefer personalized, one-on-one education from medical staff over videos or leaflets [7]. Thus, developing patient safety education programs tailored to the unique characteristics and complex factors of patients in smaller hospitals is necessary. Accordingly, revising the Patient Safety Act, currently applicable only to institutions with 200 or more beds, to include mandatory patient safety personnel for smaller hospitals is essential. Additionally, national policy support is crucial for promoting patient safety activities and improving the quality of patient safety education. Such policy initiatives will strengthen patient safety efforts in small and medium-sized hospitals and significantly enhance the quality of patient safety education.

Third, this study analyzed the effect of RtK on patients' PSP and participation, identifying a direct effect. Additionally, significant differences in RtK were observed based on sex, age, educational level, occupation, marital status, frequency of hospital visits, and hospitalization frequency. These findings align with previous research showing RtK differences by sex (female), age (20s), and educational level [22,25]. Although there is limited evidence explicitly demonstrating the impact of inpatients' RtK on PP, existing research confirms that higher RtK scores significantly enhance PSP [25]. Furthermore, a study of adults over 20 years old reported that RtK mediated satisfaction with medical services; patient satisfaction increased when medical staff provided sufficient explanations and tailored information according to patient-specific physical and social characteristics [24]. Interviews with patients aged over 60 revealed increased PP correlated with greater awareness of medical information about their condition [31]. Clear understanding of illness-related medical information enhances patients' self-efficacy and risk perception, thereby encouraging proactive safety behaviors [32]. RtK closely relates to the right to access and understand health information, ensuring patients are informed about their health [22]. Health literacy complements RtK, encompassing abilities to access, comprehend, evaluate, and use health information effectively for personal health management [15]. Previous studies have demonstrated health literacy's significant influence on PP [15], partially supporting the current findings regarding RtK. These results underscore the importance of appropriate health literacy and RtK about their condition, suggesting patients without these may struggle with effective health management. Therefore, providing tailored medical information based on age and education level, fostering an open safety culture where patients freely inquire about and verify treatment processes, and establishing a system to ensure that medical staff adequately inform patients are essential for promoting active PP.

Finally, this study confirmed differences in PP among inpatients in small and medium-sized hospitals based on sex, age, education level, marital status, underlying diseases, frequency of hospital visits, and hospitalization frequency. These findings partially align with previous research demonstrating PP variations according to age, education level, occupation, and underlying diseases among inpatients [14]. Active patient and family participation in the treatment process reportedly reduces patient safety incidents and positively affects clinical outcomes, including reduced mortality and readmission rates [19-21]. Major factors influencing PP include patient-staff relationships, patient safety incident experiences, and medical institution systems [12]. Patient safety education specifically increased PP [33]. Effective patient safety education should include practical, patient-performed actions, such as using memo sheets and preparation cards to help patients clarify questions about treatment and confirm medications, hospitalization, and surgery [33]. Thus, continuous support and management are needed to implement varied patient safety education strategies directly involving patients. However, hierarchical relationships with medical staff present barriers to PP [23]. With the rise of patient-centered care concepts, general and tertiary hospitals emphasize patient-centered nursing care, fostering therapeutic relationships and active patient engagement, positively influencing health outcomes and quality of life [34]. Implementing patient-centered nursing care in smaller hospitals requires multifaceted efforts to eliminate communication barriers between patients and healthcare professionals. Specifically, patients must recognize their critical role in ensuring patient safety and actively participate in treatment decision-making, promoting effective patient safety practices, thus fostering a robust safety culture.

This study has several limitations. First, since it targeted only three small and medium-sized hospitals in Seoul, South Korea, regional bias may limit generalizability. Future studies should expand sampling to include hospitals from other regions to obtain more representative data. Second, inpatient characteristics vary significantly across small and medium-sized hospitals due to structural differences (facilities, staffing, bed count), potentially affecting RtK and PSP. Factors such as diagnosis, severity, surgical procedures, and pain management were not explored regarding their influence on PP. Subsequent studies should investigate and control these factors to enhance result generalizability. Lastly, conducting patient safety research among inpatients in smaller hospitals substantially contributes to medical service quality improvement. Thus, it is essential to develop and verify interventions aimed at increasing PP, incorporating RtK and PSP elements. Such research will provide critical evidence for strengthening patient safety culture and encouraging PP in these healthcare settings.

CONCLUSION

This study confirmed the mediating role of PSP in the relationship between the RtK and PP. Specifically, inpatients' RtK was shown to promote PP through enhanced PSP. Additionally, RtK was positively correlated with both PSP and PP, indicating that ensuring patients' RtK is essential for improving patient safety. It is particularly significant to recognize the necessity of developing targeted interventions to build and enhance PSP among inpatients in small and medium-sized hospitals, thereby increasing PP. Future research should focus on patient safety to further enhance the quality of medical services provided to inpatients in small and medium-sized hospitals. Efforts should be directed toward establishing a patient safety culture that actively involves both medical staff and patients, enabling effective education and interventions in clinical settings. Finally, it is necessary to develop various patient safety education plans in which inpatients can directly participate. Continuous support and management should be provided so that these plans can be systematically applied.

ORCID

Sun-Hwa Shin, https://orcid.org/0000-0003-4052-9542
On-Jeon Baek, https://orcid.org/0000-0001-5057-406X

CONFLICTS OF INTEREST

Sun-Hwa Shin has been a public relations director at the *Korean Society of Adult Nursing* since 2024–2025. She was not involved in the review process of this manuscript. She had no other conflicts of interest.

AUTHORSHIP

Study conception and design acquisition - SHS; analysis - SHS and OJB; interpretation of the data - SHS; and drafting or critical revision of the manuscript for important intellectual content - SHS and OJB.

FUNDING

This paper was supported by a National Research Foundation of Korea (NRF) grant funded by the Korean government (NRF No. 2022R1F1A106447512).

ACKNOWLEDGEMENT

Thank you to all the patients who participated in the study.

DATA AVAILABILITY STATEMENT

The data can be obtained from the corresponding authors.

REFERENCES

1. World Health Organization. Patient safety [Internet]. Geneva: World Health Organization; 2023 [cited 2024 September 19]. Available from: https://www.who.int/news-room/fact-sheets/detail/patient-safety
2. Shin HH, Jeong SH, Yoo JW. Survey on the status of patient safety activities in medical institutions and measures to revitalize typography safety activities. Seoul: Korean Institute of Hospital Management; 2015 September. Report No.: KIHM 2014-03.
3. Korea Patient Safety Reporting and Learning System. Statistics portal [Internet]. Seoul: Korea Patient Safety Report Learn System; 2024 [cited 2024 September 19]. Available from: https://statistics.kops.or.kr/biWorks/dashBoardMain.do
4. Lee SI. The meaning and task of patient safety law. Health Welf Policy Forum. 2016;240:2-4.
5. Park SH, Kwak MJ, Kim CG, Lee SI, Lee SG, Cho YK, et al. Necessity of introducing assistant staff to support administrative tasks related patient safety. Qual Improv Health Care. 2020;26(1):46-54. https://doi.org/10.14371/QIH.2020.26.1.46
6. Korea Institute for Healthcare Accreditation. Accredited organizations 2019. Seoul: Korea Institute for Healthcare Accreditation; 2020 [cited 2024 September 19]. Available from: https://www.koiha.or.kr/member/kr/certStatus/certList.do
7. Baek OJ, Shin SH. An importance-performance analysis of patient safety activities for inpatients in small and medium-sized hospitals. J Korean Acad Soc Nurs Educ. 2024;30(2):170-81. https://doi.org/10.5977/jkasne.2024.30.2.170
8. Moon S, Lee J. Correlates of patient safety performance among nurses from hospitals with less than 200 beds. Korean J Adult Nurs. 2017;29(4):393-405. https://doi.org/10.7475/kjan.2017.29.4.393
9. Hall LH, Johnson J, Watt I, Tsipa A, O'Connor DB. Healthcare staff wellbeing, burnout, and patient safety: a systematic review. PLoS One. 2016;11(7):e0159015. https://doi.org/10.1371/journal.pone.0159015
10. Amaral C, Sequeira C, Albacar-Rioboo N, Coelho J, Pinho LG, Ferre-Grau C. Patient safety training programs for health care professionals: a scoping review. J Patient Saf. 2023;19(1):48-58. https://doi.org/10.1097/PTS.0000000000001067
11. Kim J, Kim M. The impact of patient-centered care on

the patient experience according to patients in a tertiary hospital. J Korean Acad Nurs Adm. 2023;29(3):288-97. https://doi.org/10.11111/jkana.2023.29.3.288

12. Kim AN, Park JS. Awareness of patient safety and performance of patient safety activities among hospitalized patients. J Korea Acad Ind Coop Soc. 2021;22(5):229-40. https://doi.org/10.5762/KAIS.2021.22.5.229
13. Kim KJ, Lee EH, Shin SH. Development and validation of the patient safety perception scale for hospitalized patients. Korean J Adult Nurs. 2018;30(4):404-16. https://doi.org/10.7475/kjan.2018.30.4.404
14. Kang SJ, Park JY. Patient safety perception and patient participation among hemato-oncology patients. Asian Oncol Nurs. 2019;19(4):224-32. https://doi.org/10.5388/aon.2019.19.4.224
15. Won MH, Shin SH. Mediating effects of patient safety perception and willingness to participate in patient safety on the relationship between health literacy and patient participation behavior among inpatients. Front Public Health. 2024;12:1349891. https://doi.org/10.3389/fpubh.2024.1349891
16. Kim JH, Lee JL, Kim EM. Patient safety culture and handoff evaluation of nurses in small and medium-sized hospitals. Int J Nurs Sci. 2021;8(1):58-64. https://doi.org/10.1016/j.ijnss.2020.12.007
17. World Health Organization. People-centered health care: a policy framework. Geneva: World Health Organization; 2007.
18. Song M, Kim M. Development and validation of a patient participation scale. J Adv Nurs. 2023;79(6):2393-403. https://doi.org/10.1111/jan.15593
19. Berger Z, Flickinger TE, Pfoh E, Martinez KA, Dy SM. Promoting engagement by patients and families to reduce adverse events in acute care settings: a systematic review. BMJ Qual Saf. 2014;23(7):548-55. https://doi.org/10.1136/bmjqs-2012-001769
20. Cai Y, Liu Y, Wang C, Liu S, Zhang M, Jiang Y. Patient and family engagement interventions for hospitalized patient safety: a scoping review. J Clin Nurs. 2024;33(6):2099-111. https://doi.org/10.1111/jocn.17022
21. Lee M, Lee NJ, Seo HJ, Jang H, Kim SM. Interventions to engage patients and families in patient safety: a systematic review. West J Nurs Res. 2021;43(10):972-83. https://doi.org/10.1177/0193945920980770
22. Ahn SH, Kim YS, Yoo MS, Bang KS. A patient's right to know and self-determination. Korean J Med Ethics. 2009;12(2):153-64. https://doi.org/10.35301/ksme.2009.12.2.153
23. Do YK, Kim JY, Lee JY, Lee HY, Cho MO. Research on the development of patient-centered evaluation model. Wonju: Health Insurance Review & Assessment Service; 2015. Report No.: G000E70-2015-87.
24. Lee YH, Lee JH. Effects of awareness of guarantee of medical service right and satisfaction of consumer competency on satisfaction of medical service. J Consum Policy Stud. 2014;45(3):81-111. http://doi.org/10.15723/jcps.45.3.201412.81
25. Lee H. Healthcare service consumer's perception of patient safety: relationship between perception of patient safety, right to know and self-determination [master's thesis]. Seoul: Yonsei University; 2016.
26. Baek OJ, Shin SH. The moderating effect of patient safety knowledge in the relationship between patient experience and patient safety perception for patients in primary care institutions. Korean J Adult Nurs. 2021;33(4):387-98. https://doi.org/10.7475/kjan.2021.33.4.387
27. Shin SH. A convergence study on the relationship among patient safety activity experience, patient safety perception and willingness to participate in the general population. J Korea Converg Soc. 2020;11(9):405-15. https://doi.org/10.15207/JKCS.2020.11.9.405
28. Choi HJ, Lee E. The effects of smartphone application to educate patient on patient safety in hospitalized surgical patients. Korean J Adult Nurs. 2017;29(2):154-65. https://doi.org/10.7475/kjan.2017.29.2.154
29. Giles SJ, Lawton RJ, Din I, McEachan RR. Developing a patient measure of safety (PMOS). BMJ Qual Saf. 2013;22(7):554-62. https://doi.org/10.1136/bmjqs-2012-000843
30. Hayes AF. Introduction to mediation, moderation, and conditional process analysis: a regression-based approach. 2nd ed. New York, NY: The Guilford Press; 2018.
31. Forsyth R, Maddock CA, Iedema RA, Lassere M. Patient perceptions of carrying their own health information: approaches towards responsibility and playing an active role in their own health - implications for a patient-held health file. Health Expect. 2010;13(4):416-26. https://doi.org/10.1111/j.1369-7625.2010.00593.x
32. Chung S, Hwang JI. Patients' experience of participation in hospital care. J Korean Acad Nurs Adm. 2018;23(5):504-14. https://doi.org/10.11111/jkana.2017.23.5.504
33. Joe S, Kim JH. The effects of patient participation education on the patient safety perception, patient participation, and patient-provider relationship in ROK mili-

tary hospital. Korean J Mil Nurs Res. 2022;40(2):21-34. https://doi.org/10.31148/kjmnr.2022.40.2.21

34. Hardy LR. Using big data to accelerate evidence-based practice. Worldviews Evid Based Nurs. 2018;15(2):85-7. https://doi.org/10.1111/wvn.12279

ORIGINAL ARTICLE

Korean J Adult Nurs Vol. 37 No. 2, 125-139, May 2025
eISSN: 2288-338X
https://doi.org/10.7475/kjan.2025.0114

KJAN
Korean Journal of
Adult Nursing

Experience of the COVID-19 Pandemic among Middle-Aged Individuals in the South Korean Community: Q Methodological Study

Eun-Ho Ha

Associate Professor, Department of Nursing, Jungwon University, Goesan, Korea

Received: January 14, 2025
Revised: March 25, 2025
Accepted: May 9, 2025

Corresponding author:
Eun-Ho Ha
Department of Nursing, Jungwon University, 85 Munmu-ro, Goesan-eup, Goesan 28024, Korea.
Tel: +82-43-830-8849
Fax: +82-43-830-8679
E-mail: rnhaeunho@jwu.ac.kr

Purpose: The subjective experiences of middle-aged individuals during the coronavirus disease 2019 (COVID-19) pandemic play a pivotal role in fostering resilience for reintegration into normal life post-pandemic and preparing for potential future infectious disease outbreaks. This study aimed to explore the experiences of middle-aged individuals during the COVID-19 pandemic using the Q methodology. **Methods:** Forty-six middle-aged individuals from 10 cities in South Korea participated in this study. The participants arranged and ranked 39 Q statements describing their experiences with the COVID-19 pandemic using a Q-sort table. Subsequently, the data were analyzed using the PQ method. **Results:** Three distinct viewpoints were identified: concerns regarding government policies related to COVID-19 (political perspective: consistent government policies are of utmost importance); concerns about personal loss related to COVID-19 (personal perspective: daily life is of the utmost importance); and concerns about social losses related to COVID-19 (social perspective: societal interests take precedence over individual needs). **Conclusion:** The nursing interventions recommended for these three factors serve as a strategic blueprint for effectively addressing future outbreaks of infectious diseases. These nursing intervention strategies can significantly enhance positive perceptions of the three identified elements of the COVID-19 experience, providing an opportunity to transform negative outlooks into positive ones.

Key Words: COVID-19; Middle aged; Pandemics

INTRODUCTION

Coronavirus disease 2019 (COVID-19), originating in Wuhan, China, at the end of 2019, spread globally over the past few years (2020–2022), resulting in unprecedented loss of life, widespread lockdowns, and significant social and economic impacts [1,2]. COVID-19 has substantially affected the physical and mental well-being of individuals across all age groups, disrupting their daily routines [3,4]. As of September 3, 2023, South Korea documented 34,436,586 confirmed COVID-19 cases and 35,812 deaths [5]. Despite the World Health Organization (WHO) announcing the end of the emergency phase of the COVID-19 pandemic in May 2023 and administering more than 13 billion vaccine doses globally by June 2023 [6], the global situation remains concerning. Furthermore, conditions continue to evolve in South Korea despite fewer official updates regarding COVID-19 [1,7].

In South Korea, following WHO guidelines for the COVID-19 pandemic, social distancing measures shifted most activities from outdoor to indoor settings [7]. Vulnerable populations, such as children and the elderly, underwent self-quarantine to protect themselves from the virus [8]. The transition from outdoor to indoor activities led to significantly increased economic and social responsibilities among middle-aged individuals, who are central to family caregiving [9]. Additional burdens such as acquiring hand sanitizers and masks, adhering to vaccination protocols, and supporting children's online learning have heightened financial and physical stress, negatively impacting the quality of midlife [10]. Social distancing-induced depression and anxiety have had detrimental effects on the mental well-being of middle-aged individuals [9,11]. Additionally, concerns about COVID-19 vaccination side effects, increased disposable waste from food deliveries, and environmental pollution due to the increased use of disposable medical supplies have drawn attention [3, 12,13].

Middle age (40–64 years) is recognized as a transitional period bridging early adulthood and old age, linking younger and older generations. With rising life expectancy and increased socioeconomic and political engagement, middle-aged individuals play a critical role in family and societal functions [14,15]. Middle-aged individuals provide opportunities for their children's healthy societal integration through family support, foster social order through active socioeconomic and political participation, and model societal behavior. Consequently, social expectations and responsibilities placed upon the middle-aged generation are inherently high [9,10]. Thus, middle-aged individuals' thoughts, attitudes, and experiences regarding social issues significantly influence the broader socioeconomic and political landscape, yielding either positive or negative outcomes [10,11,14,15].

As of February 2024, South Korea's population stood at 51,751,065 individuals, of whom 20,769,287 were classified as middle-aged, accounting for approximately 40.1% of the total population. The mean age of individuals in this middle-aged group was 46.1 years, expected to increase to 58.1 years by 2050 [16]. Over the recent 3 years, following the emergence of COVID-19, middle-aged individuals have assumed pivotal roles in managing health issues within families, educational settings, and social circles, positively influencing child and family health management and adherence to community quarantine measures [15]. Particularly during the COVID-19 pandemic, the subjective experiences—such as decision-making, attitudes, and habits related to infection prevention—of middle-aged individuals significantly impact families, society, and the nation overall [11,14,15]. Therefore, understanding the subjective experiences of middle-aged people during this period is crucial for fostering resilience and preparing effectively for future infectious disease outbreaks. However, there is a notable lack of data addressing this issue. Specifically, middle-aged parents' adherence to governmental infection control policies during the COVID-19 pandemic significantly affects their children and older parents, positively or negatively [8-10]. Furthermore, middle-aged parents' economic capacity and social roles might influence their compliance with these policies [15,16]. Thus, investigating the experiences of middle-aged individuals during the COVID-19 pandemic will assist the government and citizens in reflecting on the crisis and provide essential data for managing future infectious diseases.

Human subjectivity, which comprises individuals' interests, experiences, opinions, and thoughts influencing their behavior, is a critical research area in nursing due to its substantial role in modifying human attitudes and behaviors [17]. Q methodology quantitatively represents individuals' qualitative perspectives on specific topics, phenomena, or events [18]. Subjectivity—encompassing personal thoughts, opinions, and perspectives—is foundational in nursing as it shapes holistic care and provides insights crucial for developing nursing education, research, and policy strategies. Thus, Q methodology serves as an optimal research tool for identifying and implementing nursing interventions by quantifying middle-aged individuals' perspectives on their COVID-19 pandemic experiences. Additionally, middle-aged individuals' vivid experiences during the COVID-19 pandemic provide essential insights into educational strategies for future infectious disease prevention and management, nursing research related to infectious disease response, and policy considerations for training nurses specializing in infectious disease care.

Various domestic and international quantitative and qualitative studies on the COVID-19 pandemic have focused on middle-aged individuals, examining factors such as coping strategies [8], complementary and alternative therapies for stress reduction [9], psychosocial and behavioral influences [10,11], and vaccination [13]. However, few studies have employed Q methodology, which quantitatively assesses an individual's subjective experiences by integrating quantitative and qualitative approaches. The Q methodology uniquely captures middle-aged individuals' subjective experiences, thoughts, and attitudes related to the COVID-19 pandemic, categorizing perspectives based on similarities among participants and providing tailored interventions for each identified group. Furthermore, the subjectivity of middle-aged individuals during the COVID-19 pandemic can reflect broader societal trends in managing and overcoming infectious diseases. This approach facilitates profound analyses of human experiences often absent in traditional quantitative studies.

This study aimed to uncover middle-aged individuals' subjective experiences during the COVID-19 pandemic and explore tailored nursing interventions for each identified perspective. Customized nursing strategies for middle-aged individuals using Q methodology can significantly influence nursing practice, forming the basis for training nurses specializing in middle-aged care and enabling the development and implementation of targeted nursing education programs for this demographic.

METHODS

1. Study Design: Overview of Q Methodology

Introduced in 1935 by physicist-psychologist William Stephenson, Q methodology offers a comprehensive research approach that integrates qualitative and quantitative methods for the objective study of subjectivity. It aims to systematically explore individuals' operant subjectivity, including their ideas, attitudes, viewpoints, and perspectives on specific topics [19]. Q facilitates the identification of individuals' perceptions and viewpoints, capturing consensus or divergence on particular issues. Q methodology is particularly prevalent in medical and nursing research [17], playing a critical role in developing tailored intervention strategies by examining individuals' thoughts and reactions to health challenges such as COVID-19 or specific illnesses. Within nursing education, Q methodology is an effective and streamlined research tool to investigate the attitudes, experiences, and perceptions of individual students or student groups [17,20]. Its flexibility in capturing participants' subjectivity makes it suitable for educational research intended for broader populations [19].

2. Research Procedure

The Q methodology unfolds across five distinct steps, as illustrated in Figure 1. The inclusion criteria for the study were as follows: married adults of any gender, aged between 40 and 64, holding Korean citizenship and residing in community settings; individuals or their family members who have experienced COVID-19 infection; participants capable of reading and writing; individuals without visual or auditory impairments; and individuals free from cognitive deficits and capable of organizing Q cards. Individuals not meeting these criteria were excluded from the study.

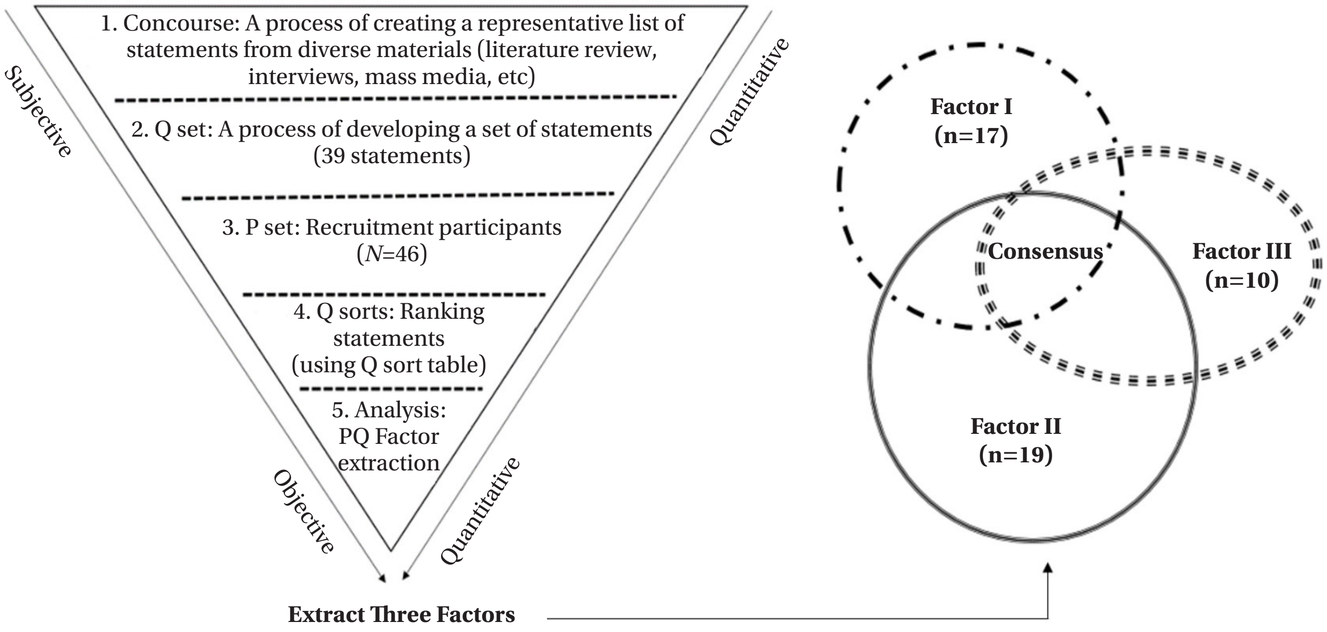


Figure 1. The study procedure and its outcomes.

1) Concourse (process of creating a representative list of statements)

The initial phase of Q methodology, constructing a concourse of statements, is foundational. This stage involves generating a comprehensive pool of opinion statements from diverse sources such as literature reviews, individual or focus group interviews (FGIs), social media, newspapers, and periodicals [17]. These materials aggregate the viewpoints and arguments of experts, groups, or organizations on contemporary issues or specific topics, such as COVID-19. Initially, the research team conducted an extensive review of scholarly journals, mass media coverage, and expert commentary on COVID-19. Additionally, opinions related to COVID-19 were collected from authoritative sources including the WHO, the U.S. Centers for Disease Control and Prevention, and the Korea Disease Control and Prevention Agency. Subsequently, FGIs were conducted with 25 middle-aged participants (five groups of five individuals each; age range: 42–55 years; gender distribution: 8 men and 17 women; employment status: six employed men and seven employed women; living arrangements: participants from five different areas living with family; all 25 participants had experienced COVID-19 infection). A snowball sampling method was utilized to deeply explore participants' subjective experiences of COVID-19. The research team interviewed the 25 participants using semi-structured questions developed during the review phase. Before conducting the FGIs, a pilot test was performed with two volunteers to ensure clarity and comprehensibility of the semi-structured questions and terminology used. The interviews took place in calm and welcoming settings (study café and researcher's office) to foster open and honest discussions of participants' experiences and perceptions. All interviews were audio-recorded with prior consent, and participants were informed that recordings would be deleted upon study completion. Additionally, some participants reviewed their transcripts personally to confirm accuracy. The semi-structured interview questions included the following: (1) Identifying the most challenging aspect of the COVID-19 pandemic; (2) Discerning any unexpected positive outcomes from the COVID-19 pandemic; (3) Sharing insights and personal experiences regarding preventive measures endorsed by the government to mitigate COVID-19 transmission, including hand hygiene and social distancing; (4) Reflecting on the involvement of healthcare professionals in managing the COVID-19 pandemic, highlighting any regrets or commendations; (5) Evaluating the government's response to COVID-19, including any aspects of regret or commendation; (6) Providing opinions on COVID-19 vaccination and, for those vaccinated, sharing experiences; (7) Offering any additional experiences related to COVID-19.

Based on data collected through the extensive literature review and FGIs, the researcher and eight research assistants undertook a process to eliminate duplicate or irrelevant statements, resulting in 134 initial statements. Typically, deriving a final set of statements from the initial pool is conducted by a panel of experts in Q methodology [17]. Accordingly, a panel comprising a Q methodologist, two nursing professors, and two hospital-based nurses, all experienced in Q methodology research, was assembled to evaluate the clarity and conciseness of the 134 statements. This panel reviewed the statements, eliminating or revising those deemed ambiguous or redundant. This selection process, characterized by collaboration between researchers and expert panels, involves gradually reducing the number of statements through careful assessment of redundancy and ambiguity [19]. Given that this iterative process is repeated multiple times to derive the final Q-set, meticulous selection of statements is crucial. In this study, each statement was scored on a scale ranging from 1 to 4 points. Statements receiving scores of 1 to 2 (indicating irrelevance or redundancy) were eliminated, while those scoring 3 to 4 were modified and refined to align with the research objectives. This iterative selection process was conducted seven times, resulting in a final set of 68 statements.

2) Q-set (process of developing a set of statements)

The second phase in Q methodology involves refining the previously broad concourse by removing ambiguous or redundant statements, thus establishing a precise and clear final set of statements known as the Q-set. The number of statements in a Q-set typically ranges from 20 to 100, and while the optimal quantity remains debated [17], achieving a balance is key. A larger statement set prolongs the Q-sorting process, which must be considered during the development of the Q-set. Brown [19] recommended an ideal Q-set size of approximately 40 to 50 statements; however, Hensel et al. [20], in their "A scoping review of Q methodology in nursing education studies," indicated that the number of stimuli for Q-sorting varied between 21 and 60 statements. Reflecting on these recommendations, a panel of five experts reviewed the initial 68 statements for redundancy and ambiguity, ultimately developing the final Q-set, consisting of 39 statements (Table 1). To verify the effectiveness of the Q-set, a pilot evaluation was conducted with six middle-aged volunteers (age range: 42–55 years; sex: 2 men, 4 women; employment status: 2 employed men, 3 employed women; living arrangements: residing with family in five different areas; all six individuals had experienced COVID-19 infection) before advancing to subsequent phases. Results

Table 1. Factor Arrays (Item by Ranked Position) ($N=46$)

Q-Statements	I (n = 17)	II (n = 19)	III (n = 10)
1. My daily routine disintegrated.	–4†	+2†	0
2. I was always anxious about contracting COVID-19.	0	+3	+2
3. **I felt isolated because of social distancing.**	–3	–1	–3
4. **My relationship with my parents has become distant due to social distancing.**	–4	–2	–2
5. **My time dwindled as my family spent more time at home.**	–2	–3	–3
6. My health deteriorated due to a decrease in outdoor activity.	–3	–1	–2
7. **Living while wearing a mask was inconvenient.**	+2	+3	+3
8. I was careful about avoiding infection from other people.	–1	+2	+1
9. The household economy has become challenging due to the prolonged COVID-19 pandemic.	–3†	+2†	0
10. Environmental pollution has become serious due to the increase in the use of single-use waste.	–2†	+1	+3†
11. It was heartbreaking for the self-employed to be severely affected.	0	+3†	0
12. Fake news related to COVID-19 has made me more anxious.	–2	–1	–2
13. It was disappointing that the students could not attend high-quality classes due to remote learning.	–1†	+2	+4†
14. It was nice to be able to skip family and work events.	–2†	–1	+2†
15. As social activity decreased, expenditures also decreased.	–1	–1	–1
16. Everyday life has changed to become family-centered.	0	0	0
17. Working from home freed me from commuting.	–1	–4	–4†
18. The environment was rather hygienic due to frequent disinfection.	+1	+1	0
19. I realized how precious life was before the COVID-19 pandemic.	0	+4	+4
20. The increase in the use of food delivery, online shopping, and parcel delivery has made life more convenient.	0	0	–2†
21. It was good not to care about appearance because of wearing a mask.	+1	0	–2†
22. I started avoiding places where many people gather.	+1	+2	+3
23. I became very strict about personal hygiene.	+4	0	+1
24. **Thank you for the sacrifice and dedication of the medical staff.**	+4	+4	+2
25. The rigid response of medical institutions solely following government quarantine guidelines was disappointing.	0	–2	–4
26. The government quarantine guidelines were overly formal and inconsistent with reality.	+1	0	0
27. The Korean people have complied with the government's quarantine guidelines.	+1	–1	–1
28. I was happy to receive the disaster aid.	+2	–2†	+2
29. I am satisfied with the COVID-19 policy.	–2	–4†	–1
30. A continuous infectious disease management system is necessary.	+3	+1	+1
31. It was too cumbersome to write in a guestbook, scan the QR code, and check body temperature.	+1	–2†	+2†
32 Accessing information related to COVID-19 was challenging due to a lack of familiarity with the Internet.	–1	–2	–1
33. The government's official daily briefing on COVID-19 was very helpful.	0	–3†	+1†
34. Strict punishment and regulations are necessary for non-compliance with quarantine rules.	+2	+1	0
35. It was good that tests and vaccines for COVID-19 were provided free of charge.	+2	0	+1
36. Vaccination is mandatory in the interest of public health.	–1	–3†	+1†
37. The COVID-19 vaccination is a voluntary choice and not mandatory.	+2†	0	–3†
38. There was significant anxiety about potential adverse reactions and side effects following COVID-19 vaccination.	+3†	+1	–1†
39. There is a necessity for a comprehensive management system concerning adverse reactions, reporting, and compensation associated with the COVID-19 vaccination.	+3†	+1	–1†

Bold fonts indicate three factors' consensus statement.

COVID-19 = coronavirus disease 2019; QR = quick response; †Distinguishing statement significant at $p<.01$.

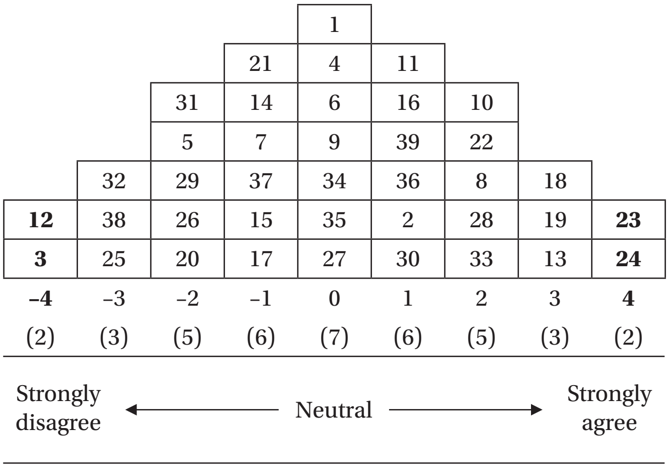
from the pilot test confirmed that the 39 statements were clear, readable, and free from ambiguity or redundancy.

3) P-set (process of recruiting study participants)

The third phase, known as the P-set phase, involves recruiting a group of participants tasked with categorizing the Q-set statements. This participant group, referred to as the P (person)-set or P-sample, is traditionally established following the principle of utilizing small sample sizes [17,19]. The focus in Q methodology is not on the number of participants, but rather on capturing individual perspectives regarding a specific issue. According to Brown [19], a sample of 40 to 60 participants is generally sufficient for most studies, although fewer participants may suffice for certain research contexts. In this study, a convenience sample of 46 middle-aged married individuals (both men and women) residing in Seoul Metropolitan City and other regions throughout South Korea was recruited. Data collection took place from March 15, 2022, to July 30, 2022. To achieve an even distribution of participants across various regions, research assistants from eight different locations collected data.

4) Q-sort (process of ranking a Q-set)

The fourth phase of Q methodology involves participants systematically ranking the Q-set statements, which are printed on small cards and placed at specific positions on a grid known as a Q-sort table. Numerical rankings on the Q-sort table typically range from –4 to +4, where –4 indicates the most disagreeable or strongly negative position, 0 represents neutrality, and +4 indicates the most agreeable or strongly positive position. During the Q-sorting process, participants arrange statements according to a predefined quasi-normal distribution, thereby minimizing researcher bias and maximizing the authentic representation of participants' perspectives. An example of a completed Q-sort from this study is illustrated in Figure 2. Following the Q-sorting activity, the research team asked all 46 participants to provide post-sorting narratives explaining their reasons for placing certain statements at the extreme ends (+4 and –4 positions) of the Q-sort table. These post-sorting narratives, conducted through brief interviews or written statements, are strongly recommended in Q methodology to further understand the rationale behind participants' extreme rankings. This supplementary qualitative information not only enriches the descriptions but also aids in comprehending the distinctive characteristics of each factor identified through factor analysis.



				1				
			21	4	11			
		31	14	6	16	10		
		5	7	9	39	22		
	32	29	37	34	36	8	18	
12	38	26	15	35	2	28	19	**23**
3	25	20	17	27	30	33	13	**24**
–4	–3	–2	–1	0	1	2	3	**4**
(2)	(3)	(5)	(6)	(7)	(6)	(5)	(3)	(2)

Figure 2. An example of 39 Q cards arrangement (participant 8). The number in parentheses indicates the number of cards.

5) Factor extraction and interpretation (process of analyzing collected data)

The fifth phase of Q methodology entails analyzing the collected data using a variant of the PQ method, which is specifically optimized for Q studies. The PQ method employs diverse statistical techniques that allow researchers to input statement rankings (Q-sorts) into the Q-sort table, subsequently calculating correlations between the Q-sorts. Factor analysis is then conducted using either centroid factor analysis or principal component analysis methods [17]. This analytical process produces multiple outputs, including tables displaying factor loadings, standardized factor scores (z-scores: greater than +1.0 indicating strong agreement; less than –1.0 indicating strong disagreement), statements distinguishing differences among identified factors, and consensus statements across factors.

3. Ethical Consideration

Before commencing the study, ethical approval (1044297-HR-202109-005-02) was obtained from the Institutional Review Board (IRB) of Jungwon University. Participants were assured of the anonymity and confidentiality of their participation. They were informed that they could withdraw from the study at any time and that the collected data would be securely stored in the research laboratory's archives, exclusively for research purposes. After clearly explaining the study's objectives and emphasizing voluntary participation, written informed consent was obtained from

https://doi.org/10.7475/kjan.2025.0114

all participants.

4. Rigor

To ensure the credibility and rigor of the Q methodology study, all research procedures and analyses strictly adhered to Brown's methodological principles and technical approaches [19]. Each step of the research process was validated using the reporting guidelines outlined by Churruca and the Assessment and Review Instrument for Q-methodology (ARIQ) checklist developed by Dziopa, ensuring rigorous adherence to established protocols [18,21]. Furthermore, the FGIs conducted during the concourse construction phase (Step 1) followed the Consolidated Criteria for Reporting Qualitative Research (COREQ), which includes a comprehensive 32-item checklist [22]. Similar to procedures employed in quantitative research, incorporating mixed methods within Q methodology enhances the study's validity and reliability. The validity of our Q study was underpinned by content and face validity evaluations and reinforced through the Q-sorting process. Content and face validity were evaluated by five expert reviewers, and Q-sorting data were collected from six middle-aged individuals of both genders, recruited via convenience sampling. Reliability was assured through the test-retest method, involving administering the same Q-sample to identical participants at two different time intervals, with an expected correlation coefficient of .80 or higher [17,19]. To confirm the study's reliability, a convenience sample of six middle-aged participants of both sexes underwent a test-retest procedure at two-week intervals, resulting in correlation coefficients ranging from 0.83 to 0.88 for each Q-sort.

RESULTS

Three distinct factors emerged from the 39 statements describing the COVID-19 pandemic experiences of middle-aged men and women (Figure 1). Table 1 illustrates the positioning of these 39 statements on the Q-sort grid for each of the three factors. An asterisk (*) indicates statistically significant differences ($p < .01$) in statement scores compared to the other factors. Statements presented in bold represent common viewpoints that were either positively or negatively agreed upon across all three factors. Identifying both distinct and common statements helps clarify differences and shared opinions among the identified factors. The eigenvalues of these three factors were 9.81, 7.17, and 2.72, respectively. Factor I accounted for 21.3% of the variance, factor II for 9.5%, and factor III for 5.9%, with a cumulative variance percentage of 36.7% for these three factors. Notably, the eigenvalue and variance percentage of factor I were conspicuously higher than those of factors II and III. Therefore, factor I explained the COVID-19 pandemic experiences among middle-aged individuals more effectively than the other two factors. The correlation coefficients among the three factors were as follows: $r = -.08$ between factors I and II, $r = .49$ between factors I and III, and $r = -.28$ between factors II and III (Table 2).

1. Factor I: Concerns about Government Policies Related to COVID-19 (Political Perspectives)

Out of the 46 participants, 17 (37.0%) were classified under factor I. Among these, nine (52.9%) were female, with an equal distribution between those in their 40s and those in their 50s. Furthermore, 11 participants (64.7%) reported having no religious affiliation. Educationally, 11 (64.7%) had college degrees or higher; 10 (57.8%) resided in metropolitan cities; 12 (70.6%) were employed; and nine (52.9%) described their financial status as average. Economic losses due to COVID-19 were reported by nine (52.9%) participants, while seven (41.2%) rated their health as good and eight (47.1%) as average. Notably, 15 participants (88.2%) had school-aged children. Ten participants (58.8%) indicated low levels of COVID-19 knowledge, 11 (64.7%) had undergone COVID-19 testing, 15 (88.2%) were vaccinated against COVID-19, and 11 (64.7%) rated the COVID-19 quarantine rules as average (Table 2).

Participants associated with factor I strongly agreed (+4, positive perspective) with statements Q23 (importance of strict personal hygiene) and Q24 (expressing gratitude toward medical staff), compared to participants in factors II and III. The most significant disagreements (–4, negative perspective) were with statements Q1 (disruption of daily routines) and Q4 (estranged relationships with parents) (Table 1). Representative remarks illustrating this factor included:

> Rather than offering free COVID-19 testing and vaccinations, it would have been more fiscally responsible to differentiate access based on economic status. (Participant 4)
>
> The government's COVID-19 policy has been incon-

Table 2. Demographic Characteristics (*N* = 46)

Characteristics	Categories	Factor I (n = 17)	Factor II (n = 19)	Factor III (n = 10)
Eigenvalue (variance, %)		9.81 (21.3)	7.17 (9.5)	2.72 (5.91)
Cumulative (%)		21.3	30.8	36.7
Sex	Men	8 (47.1)	9 (47.4)	3 (30.0)
	Women	9 (52.9)	10 (52.6)	7 (70.0)
Age (year)	40–50	9 (52.9)	5 (26.3)	7 (70.0)
	51–60	8 (47.1)	13 (68.4)	3 (30.0)
	61–64	0	1 (5.3)	0
Religion	Yes	6 (35.3)	7 (36.8)	4 (40.0)
	No	11 (64.7)	12 (63.2)	6 (60.0)
Education	High school	6 (35.3)	10 (52.6)	7 (70.0)
	College or higher	11 (64.7)	9 (47.4)	3 (30.0)
Residence	Seoul	3 (17.6)	4 (21.1)	1 (10.0)
	Metropolitan	10 (58.8)	12 (63.2)	8 (80.0)
	Province	4 (23.5)	3 (15.8)	1 (10.0)
Job	Employee	12 (70.6)	14 (73.7)	7 (70.0)
	No job	1 (5.9)	2 (10.5)	2 (20.2)
	Self employed	4 (23.5)	3 (15.8)	1 (10.0)
Financial status	Good	4 (23.5)	0	2 (20.0)
	Average	9 (52.9)	13 (68.4)	5 (50.0)
	Bad	4 (23.5)	6 (31.6)	3 (30.0)
Economic damage due to COVID-19	Yes	9 (52.9)	13 (68.4)	5 (50.0)
	No	8 (47.1)	6 (31.6)	5 (50.0)
Health status	Good	7 (41.2)	6 (31.6)	4 (40.0)
	Average	8 (47.1)	11 (57.9)	6 (60.0)
	Bad	2 (11.8)	2 (10.5)	0
School children	Yes	15 (88.2)	13 (68.4)	10 (10.0)
	No	2 (11.8)	6 (31.6)	0
Knowledge of COVID-19	Good	7 (41.2)	5 (26.3)	2 (20.0)
	Bad	10 (58.8)	14 (73.7)	8 (80.0)
Experience in COVID-19 test	Yes	11 (64.7)	13 (68.4)	6 (60.0)
	No	6 (35.3)	6 (31.6)	4 (40.0)
Experience in COVID-19 vaccination	Yes	15 (88.2)	17 (89.5)	10 (100)
	No	2 (11.8)	2 (10.5)	0
Thoughts on COVID-19 quarantine rules	Positive	2 (11.8)	4 (21.1)	3 (30.0)
	Average	11 (64.7)	11 (57.9)	7 (70.0)
	Negative	4 (23.5)	4 (21.1)	0
Correlation	Factor I	1.00		
	Factor II	–.08	1.00	
	Factor III	.49	–.28	1.00

Values are presented as number (%) unless otherwise indicated.
COVID-19 = coronavirus disease 2019.

> sistent and often confusing, as it has changed daily. In particular, the guidelines regarding vaccination, social distancing, and online learning have lacked clarity. (Participant 5)

Table 3 further illustrates the characteristics of factor I through post-sorting narratives, detailing participants' reasons for placing statements at the extreme ends (+4 and –4) of the grid. These perspectives reflect concerns primarily centered on government policies related to COVID-19.

2. Factor II: Concerns about Personal Loss Related to COVID-19 (Personal Perspectives)

Nineteen of the 46 participants (41.3%) were categorized under factor II. This group included 10 women (52.6%),

Table 3. Post-sorting Narratives of Three Factors

	Respondent descriptions
Factor I: Concerns about government policies related to COVID-19 (political perspectives)	"I had COVID-19 vaccination 3 times as the government ordered, but I suffered too much from the side effects. The government told me to get vaccinated, but follow-up management was too lax. I will not get vaccinated again in the future." (P3) "I went to the emergency room with a fever, but they only emphasized the government quarantine guidelines and prevented me from entering the hospital. Eventually, I got a shot outside the emergency room and returned home. The government and hospitals were outraged at the attitude of not taking responsibility for each other. The quarantine system was messed up." (P29) "It was so nice to work from home. There is no stress from commuting, so I thought I should work harder. I hope the telecommuting system will continue even after the COVID-19 is over." (P2)
Factor II: Concerns about personal loss related to COVID-19 (personal perspectives)	"Emergency COVID-19 relief funds were not helpful. It was not helpful for me either. It was more a problem for self-employed people. It breaks my heart to see so many people around me who have lost their jobs." (P26) "Due to COVID-19, my company was in economic trouble, and the salary was not coming out properly. I was worried about my children's tuition. Everything was messed up." (P42) "I'm worried about other people too, but first of all, I'm worried about my financial life. I've been hit so hard financially that I don't have time to look around. COVID-19 has made me selfish." (P40)
Factor III: Concerns about social losses related to COVID-19 (social perspectives)	"I believe in the government's quarantine policy. I think that COVID-19 vaccination should be carried out for the public interest. Even if there is dissatisfaction, we must endure it for the well-being of society." (P10) "The biggest problem is environmental pollution caused by disposable garbage. I feel guilty because there is so much garbage from delivered food and couriers. Now that COVID-19 has been eased a lot, we should refrain from using disposables." (P11)

COVID-19 = coronavirus disease 2019; P = participant.

with the majority, 13 participants (68.4%), aged between 51 and 60 years, and 12 (63.2%) reporting no religious affiliation. Educationally, 10 participants (52.6%) had completed high school. Twelve (63.2%) resided in metropolitan cities, and 14 (73.7%) were employed. Thirteen participants (68.4%) described their financial status as average, and an equal number reported experiencing economic losses due to COVID-19. Health was described as average by 11 participants (57.9%), and 13 (68.4%) had school-aged children. Low COVID-19 knowledge was indicated by 14 participants (73.7%); 13 (68.4%) had undergone COVID-19 testing, and 17 (89.5%) had received the COVID-19 vaccination. The effectiveness of quarantine rules was perceived as average by 11 (57.9%) (Table 2).

Participants associated with factor II strongly agreed (+4, positive perspective) with statements Q19 (realizing the importance of life before COVID-19) and Q24 (gratitude toward medical staff) compared to factors I and III. The strongest disagreements (–4, negative perspective) were with statements Q17 (preferring to work from home) and Q29 (satisfaction with government COVID-19 policies) (Table 1). Representative remarks illustrating this factor included:

> First and foremost, I am deeply frustrated by how COVID-19 has disrupted my personal life. I also feel a sense of self-loathing for my tendency to avoid social interactions. (Participant 20)
>
> While I recognize the importance of government policies, I am increasingly concerned about my future, given the current economic challenges. (Participant 41)

Table 3 provides additional insights into factor II through participants' post-sorting narratives, explaining their reasoning for extreme statement placements (+4 and –4). These narratives reflect significant concerns regarding personal losses due to COVID-19.

3. Factor III: Concerns about Social Losses Related to COVID-19 (Social Perspectives)

Ten participants (21.7%) aligned with factor III. This group comprised seven women (70.0%), evenly distributed between those in their 40s and 50s. Six participants (60.0%) reported no religious affiliation, and seven (70.0%) indicated high school graduation as their highest education level. Eight participants (80.0%) lived in metropolitan cities, seven (70.0%) were employed, and half described their financial status as average. Economic impacts due to COVID-19 were reported by five participants (50.0%), and six (60.0%) described their health as average. All 10 participants had school-aged children; eight (80.0%) indicated low knowledge about COVID-19, six (60.0%) had undergone COVID-19 testing, all were vaccinated, and seven (70.0%) viewed the quarantine rules as average (Table 2).

Participants associated with factor III strongly agreed (+4, positive perspective) with statements Q13 (disappointment regarding online classes) and Q19 (realizing life's importance before COVID-19) compared to participants in factors I and II. The strongest disagreements (–4, negative perspective) were with statements Q17 (preference for working from home) and Q25 (regrets regarding medical institutions) (Table 1). Representative remarks illustrating this factor included:

> As we navigate the COVID-19 pandemic, I am increasingly concerned about the environmental pollution resulting from disposable waste and medical waste, particularly masks. While I can accept the limitations on visiting my parents and the restrictions on gatherings due to social distancing, I am deeply troubled by the prospect of leaving a polluted future for my children. (Participant 11)
>
> I wish people would prioritize social benefits over personal inconveniences. I hope they will adhere to government policies, such as social distancing and vaccinations, to prevent the spread of infection. It is essential for society to remain orderly. (Participant 30)
>
> Parents and society should take the initiative to ensure that students can effectively engage in online education. The future of education should not be compromised due to the impact of COVID-19. (Participant 46)

Table 3 further illustrates the characteristics of factor III through post-sorting narratives, highlighting participants' reasons for placing statements at extreme positions (+4 and –4). This factor emphasizes prioritizing public and societal interests over personal inconvenience during the COVID-19 pandemic.

4. Consensus Statements between the Three Factors

Several statements revealed areas of agreement or disagreement shared among all three factors (see bold statements in Table 1). Specifically, all three factors collectively agreed with statement 7 ("Living while wearing a mask was inconvenient") and statement 24 ("Appreciation for the hard work of medical staff"). Conversely, all three factors disagreed with statements 3 ("Isolation due to social distancing"), 4 ("Relationship with parents strained due to social distancing"), and 5 ("Decreased personal time"). In other words, the three factors showed positive consensus regarding adherence to infection control guidelines during the COVID-19 pandemic and expressed gratitude toward medical personnel for their dedication. On the other hand, all respondents conveyed negative sentiments about inconveniences resulting from social distancing measures.

DISCUSSION

1. Factor I: Concerns about Government Policies Related to COVID-19 (Political Perspectives)

The distinguishing characteristic of factor I is its emphasis on concerns regarding government policies related to COVID-19. Members of this group highlighted the importance of government interventions such as diverse monitoring systems, quarantine measures, and social distancing protocols. Furthermore, this group prioritizes government policies over individual convenience, believing their daily routines have not been significantly disrupted and their relationships with family members have remained intact despite the pandemic (see Q1 and Q4 in Table 1). However, they expressed criticism of the government's inconsistent and chaotic approach to COVID-19 policies. Specifically, they appreciated the dedication of medical staff in treating COVID-19 (refer to Q24 in Table 1) but criticized hospitals for unclear strategies regarding patient treatment (refer to factor 1 in Table 3). Although participants recognized the importance of COVID-19 vaccination, their trust was diminished by unclear guidelines related to vaccination procedures and potential side effects (see Q38 and Q39 in Table 1).

These findings align with a study by El-Elimat et al. [13], which investigated attitudes toward the COVID-19 vaccine among 3,100 Jordanians and revealed a low acceptance rate (37.4%) along with prevalent conspiracy theories. Similarly, a survey of 15,087 Libyans conducted by Elhadi et al. [23] found that while 79.6% (12,066 participants) viewed the COVID-19 vaccine positively, 37% (5,579 participants) had concerns about severe side effects. Elhadi et al. [23] also noted that vaccine skepticism could lead to hesitancy and delay in vaccination, potentially causing widespread infections. Conversely, AlShurman et al. [12] reported that strong trust, social cohesion, and political belief in governmental COVID-19 measures were associated with greater vaccine acceptance and reduced anxiety regarding vaccine side effects.

Unlike factors II and III, factor I was characterized by participants with higher education levels but limited knowledge about COVID-19. Generally, individuals with less knowledge about COVID-19 tend to exhibit more negative attitudes toward government policies and vaccinations [24]. Conversely, increased knowledge and awareness of COVID-19 correlate positively with adherence to preventive measures [25]. Therefore, before mandating COVID-19 vaccinations, the government's provision of clear and comprehensive vaccine information and management of side effects could positively impact vaccine acceptance among individuals in factor I. Middle age represents a critical life phase characterized by significant responsibilities such as child-rearing, elder care, and family financial security. Positive perceptions and attitudes toward COVID-19 policies and vaccines among middle-aged individuals can potentially influence overall compliance and effectiveness of government policies. Opening easily accessible online communication channels, broadcasting media, and utilizing social networking services to provide real-time updates on governmental infectious disease policies and information can serve as effective strategies for supporting middle-aged individuals in family care. Additionally, establishing a specialized nursing counseling system tailored specifically for middle-aged people could further enhance the successful implementation of these policies.

2. Factor II: Concerns about Personal Loss Related to COVID-19 (Personal Perspectives)

Factor II is primarily characterized by concerns regarding the detrimental impact of COVID-19 on personal lives and the notable decline among independent small-business owners. Similar to factor I, participants in factor II were dissatisfied with government management of the COVID-19 pandemic; however, their criticisms focused mainly on negative economic consequences for individuals and self-employed persons (refer to Q9 and Q11 in Table 1), stemming from the government's inconsistent enforcement of COVID-19 measures. A unique characteristic of this group, unlike factors I and III, is their preference for avoiding social interactions to reduce the risk of COVID-19 transmission, as reflected in Q2 and Q22 of Table 1. Furthermore, factor II expressed stronger opposition toward compulsory government-mandated COVID-19 vaccinations than the other groups (refer to Q36 in Table 1). Factor II included a substantial proportion of participants aged 50 to 64 years (73.7%), a demographic that experienced particularly harsh economic repercussions due to COVID-19, leading to the emergence of sociocultural values prioritizing individual well-being and interests over collective considerations.

As of June 2021, during the COVID-19 outbreak in South Korea, the number of self-employed individuals without employees increased by 113,000, and 761,000 businesses had shut down—93.8% of which involved self-employed individuals [26]. By February 2024, although the numbers of self-employed without employees and related business closures had declined, the long-term economic impact of the COVID-19 pandemic persisted.

Shon and Moon [27] observed that the economic burden resulting from COVID-19 was primarily borne by self-employed, freelance, and low-income workers. Kim et al. [25], in their study on the impact of COVID-19 on the self-employed and government policies, similarly demonstrated that self-employed individuals experienced the most significant economic difficulties, especially within micro-enterprises. Research by Koyama et al. [28], involving 27,575 participants in Osaka, Japan, indicated that individuals experiencing economic hardship due to COVID-19 were more likely to postpone or avoid necessary dental care compared to their financially stable counterparts. Lee et al. [29] also identified a strong correlation between economic downturns due to COVID-19 and increased risk of depression. Therefore, tailored economic support addressing the financial volatility and challenges experienced by micro-enterprises during the COVID-19 crisis could positively influence factor II's perspectives. Additionally, factor II represents individuals of lower economic status who experienced financial losses and disruption to personal lives due to COVID-19, coupled with a limited understanding of the virus (refer to Q1 in Table 1, Table 2, and factor II in Table 3). The psychological stress and economic hardships caused by the COVID-19 pandemic can negatively impact physical health and psychosocial behaviors among middle-aged individuals [10,28]. Although universal support measures, such as emergency disaster relief funds, are beneficial, a comprehensive support framework addressing physical, mental, social, and economic aspects is essential for effectively assisting individuals categorized under factor II. Implementing specialized counseling and support centers specifically for self-employed individuals, as well as establishing counseling nurse programs focused on stress relief, represent effective strategies to address the concerns and challenges identified in factor II.

3. Factor III: Concerns about Social Losses Related to COVID-19 (Social Perspectives)

The most distinctive attribute of factor III is its broadly positive and cooperative stance toward government policies related to COVID-19, including quarantine measures and vaccination guidelines. Individuals in this group prioritize societal interests over personal ones and express particular concerns regarding significant environmental pollution resulting from disposable products used during the pandemic (see Q10, 25, 33, 36, 37, 38, and 39 in Table 1). They also exhibit apprehension about the closure of schools and the subsequent decline in educational quality due to the transition to online classes (see Q13). Notably, factor III, unlike other demographic groups, includes a substantial proportion of individuals in their 40s and 50s (70%). All of these individuals have school-aged children, leading them to emphasize the importance of maintaining a healthy environment, education system, and society for the future of their children rather than for their own immediate benefit.

A study by Islam et al. [24], involving 392 participants from Bangladesh exploring their experiences with the COVID-19 vaccine, found that despite 63.6% reporting side effects, 85.5% were satisfied with the vaccine administration process. Additionally, 88.0% supported vaccination as a means to rapidly achieve community-wide herd immunity, emphasizing that vaccination plays a crucial role in mitigating the impacts of COVID-19. Allington et al. [30], who surveyed 4,343 individuals in the United Kingdom regarding their views on COVID-19 vaccination, identified a positive correlation between decreased trust in government institutions and increased vaccine hesitancy. In contrast, Carrieri et al. [31] surveyed over 35,000 Europeans and found that greater confidence in government COVID-19 measures and scientific guidelines correlated with more favorable views toward COVID-19 vaccination, consequently reducing vaccine hesitancy. Providing accurate and timely information about governmental COVID-19 policies and vaccination through various media platforms is therefore crucial for individuals aligned with factor III. Specifically, establishing a text messaging system tailored for middle-aged individuals to disseminate vaccine information and organizing educational meetings on vaccination could be particularly beneficial.

Factor III's strong orientation toward social welfare highlights significant concerns about the environmental damage caused by disposable products during the COVID-19 pandemic. Researchers Roy and Chaube [3], along with Chakraborty et al. [1], observed that increased mass testing and biohazardous waste generation could have long-lasting adverse effects on global environmental and public health. Hantoko et al. [32] emphasized the necessity of developing short-term, mid-term, and long-term strategies to manage quarantine supplies, food, disposable plastics, and infectious waste effectively across homes, healthcare institutions, and quarantine centers. Iranmanesh et al. [33], in their review of 38 studies, noted that most countries experienced a reduction in household food waste during the pandemic. Vasko et al. [34], surveying 2,425 participants in Bosnia and Herzegovina, similarly observed decreased household food waste accompanied by the adoption of waste-minimizing behaviors during the pandemic. Conversely, Ikiz et al. [35] reported a 75% increase in household food waste during the pandemic, underscoring the importance of educational programs and campaigns to enhance waste management and reduction.

Given the potential for future pandemics and global lockdown scenarios similar to COVID-19, it is critical for governments to develop sustainable environmental protection strategies. Communities should be encouraged to minimize food waste and reduce the use of single-use products, while healthcare facilities must adopt efficient methods to handle biohazardous waste generated by infectious diseases. Strengthening the volume-based waste fee system and initiating competitions to encourage the reuse of disposable items could be particularly advantageous.

4. Strengths and Limitations

Q methodology provides a distinct advantage in terms of cost-effective research, as it typically requires only a single subject per session and a limited number of research participants overall. The primary strength of this study is its ability to systematically categorize the personal perspectives of middle-aged individuals—who bear significant responsibility for family health and caregiving—into distinct factors, and subsequently recommend specific nursing strategies tailored to each factor. However, several limitations must be acknowledged. First, because Q methodology emphasizes the exploration of subjective individual perspectives, the number of study participants is of lesser importance, and employing larger samples might obscure the unique views of individuals. Nevertheless, the small convenience sample utilized in this study may limit the generalizability of the findings to a broader population of middle-aged individuals across various national and cultural contexts. Second, this study specifically investigated the experiences of middle-aged South Korean residents during the COVID-19 pandemic; therefore, variations in policies and responses to COVID-19 in other countries could potentially influence the transferability of these findings. Third, although participants were recruited from across South Korea, a balanced regional distribution of participants was not achieved due to restrictions related to social distancing measures. Consequently, caution should be exercised when generalizing the study's results. Fourth, although there is no absolute threshold established for cumulative variance in Q methodology, a cumulative variance of 25% to 30% or higher is generally considered meaningful in this field [19]. In this study, the cumulative variance was 36.7%, indicating significant findings. Nonetheless, developing a diverse range of statements related to COVID-19 experiences proved challenging due to reliance on convenience sampling for participant interviews, potentially influencing the derivation of factors and the cumulative variance. Therefore, conducting a follow-up study after the complete resolution of the COVID-19 pandemic would likely capture a broader array of experiences not included in this study. To enhance the objectivity and reliability of future research examining middle-aged individuals' experiences with COVID-19, it is recommended that probability sampling methods be used. Although probability sampling methods can be costly and time-consuming, they significantly enhance the representativeness of the sample, thereby increasing the reliability of findings in Q-methodological studies, which often face challenges related to generalizability. Given that COVID-19 has affected individuals across all age groups and not just middle-aged populations, follow-up studies that include adolescents and elderly populations could be particularly beneficial for developing life-cycle-specific nursing education programs focused on infectious disease prevention.

CONCLUSION

The analysis of the forced distribution of the 39 statements in the Q-sort table by 46 middle-aged participants identified three distinct factors representing experiences, thoughts, and attitudes of middle-aged South Koreans regarding the COVID-19 pandemic. These statements offer valuable insights for understanding government responses to infectious diseases, vaccine implementation strategies, societal changes resulting from COVID-19, and lifestyle adaptations during the pandemic in South Korea. Recommended nursing interventions for these three factors provide a strategic framework for effectively managing future infectious disease outbreaks. Based on the study's findings, it is crucial for government officials, societal stakeholders, and nursing policy developers to collaborate on designing and implementing diverse educational initiatives addressing infectious diseases such as COVID-19. Such initiatives can significantly foster positive perceptions regarding the three identified factors, ultimately transforming negative attitudes into positive ones. Most importantly, these findings offer nursing practitioners working in clinical settings, public health centers, and community-based services valuable insights into managing and responding to infectious diseases. Additionally, the study serves as a practical resource for developing and implementing targeted nursing interventions tailored specifically to the identified factors.

ORCID

Eun-Ho Ha, https://orcid.org/0000-0002-6053-582X

CONFLICTS OF INTEREST

The author declared no conflict of interest.

FUNDING

None.

ACKNOWLEDGEMENT

I am genuinely grateful to the middle-aged individuals who participated in this study for sharing their thoughts and viewpoints about the COVID-19 pandemic.

DATA AVAILABILITY STATEMENT

The data can be obtained from the corresponding authors.

REFERENCES

1. Chakraborty P, Kumar R, Karn S, Srivastava AK, Mondal P. The long-term impact of coronavirus disease 2019 on environmental health: a review study of the bi-directional effect. Bull Natl Res Cent. 2023;47(1):33. https://doi.org/10.1186/s42269-023-01007-y
2. Lundstrom K. COVID-19 vaccines: where did we stand at the end of 2023? Viruses. 2024;16(2):203. https://doi.org/10.3390/v16020203
3. Roy N, Chaube R. Environmental impact of COVID-19 pandemic in India. Int J Biol Innov. 2021;3(1):48-57. https://doi.org/10.46505/IJBI.2021.3103
4. World Health Organization. WHO COVID-19 dashboard [Internet]. Geneva: World Health Organization; 2024 [cited 2024 May 26]. Available from: https://data.who.int/dashboards/covid19/cases?n=c
5. CoronaBoard. COVID-19 real-time board [Internet]. Seoul: CoronaBoard; 2023 [cited 2024 June 5]. Available from: https://coronaboard.kr/en/
6. World Health Organization. Weekly epidemiological update on COVID-19, Edition 158 [Internet]. Geneva: World Health Organization; 2023 [cited 2024 May 1]. Available from: https://www.who.int/publications/m/item/weekly-epidemiological-update-on-covid-19---1-september-2023
7. Choi SY, Ryu B, Jeong SJ, Jang M, An M, Park SY, et al. Characteristics and trends of COVID-19 deaths in the Republic of Korea (January 20, 2020–August 30, 2023). Public Health Wkly Rep. 2024;17(19):802-22. https://doi.org/10.56786/PHWR.2024.17.19.2
8. Gu M, Woo H, Sok S. Factors influencing coping skills of middle-aged adults in COVID-19, South Korea. Front Public Health. 2024;12:1248472. https://doi.org/10.3389/fpubh.2024.1248472
9. Liu YY, Yeh YC. Complementary and alternative medicines used by middle-aged to older Taiwanese adults to cope with stress during the COVID-19 pandemic: a cross-sectional survey. Healthcare (Basel). 2022;10(11):2250. https://doi.org/10.3390/healthcare10112250
10. Chakrawarty A, Ranjan P, Klanidhi KB, Kaur D, Sarkar S, Sahu A, et al. Psycho-social and behavioral impact of COVID-19 on middle-aged and elderly individuals: a qualitative study. J Educ Health Promot. 2021;10:269. https://doi.org/10.4103/jehp.jehp_1458_20
11. de Feijter M, Kocevska D, Blanken TF, van der Velpen IF, Ikram MA, Luik AI. The network of psychosocial health in middle-aged and older adults during the first COVID-19 lockdown. Soc Psychiatry Psychiatr Epidemiol. 2022;57(12):2469-79. https://doi.org/10.1007/s00127-022-02308-9
12. AlShurman BA, Khan AF, Mac C, Majeed M, Butt ZA. What demographic, social, and contextual factors influence the intention to use COVID-19 vaccines: a scoping review. Int J Environ Res Public Health. 2021;18(17):9342. https://doi.org/10.3390/ijerph18179342
13. El-Elimat T, AbuAlSamen MM, Almomani BA, Al-Sawalha NA, Alali FQ. Acceptance and attitudes toward COVID-19 vaccines: a cross-sectional study from Jordan. PloS One. 2021;16(4):e0250555. https://doi.org/10.1371/journal.pone.0250555
14. Brown RT, Covinsky KE. Moving prevention of functional impairment upstream: is middle age an ideal time for intervention? Womens Midlife Health. 2020;6:4. https://doi.org/10.1186/s40695-020-00054-z
15. Infurna FJ, Gerstorf D, Lachman ME. Midlife in the 2020s: opportunities and challenges. Am Psychol. 2020;75(4):470-85. https://doi.org/10.1037/amp0000591
16. Korean Statistical Information Service. Republic of Korea by population [Internet]. Daejeon: Korean Statistical Information Service; 2023 [cited 2024 March 29]. Available from: https://kosis.kr/visual/populationKorea/PopulationDashBoardMain.do
17. Akhtar-Danesh N, Baumann A, Cordingley L. Q-methodology in nursing research: a promising method for the study of subjectivity. West J Nurs Res. 2008;30(6):759-73. https://doi.org/10.1177/0193945907312979
18. Churruca K, Ludlow K, Wu W, Gibbons K, Nguyen HM, Ellis LA, et al. A scoping review of Q-methodology in healthcare research. BMC Med Res Methodol. 2021;21(1):125. https://doi.org/10.1186/s12874-021-01309-7
19. Brown SR. Political subjectivity: application of Q methodology in political science. New Haven, CT: Yale University Press; 1980.
20. Hensel D, Toronto C, Lawless J, Burgess J. A scoping review of Q methodology nursing education studies. Nurse Educ Today. 2022;109:105220. https://doi.org/10.1016/j.nedt.2021.105220
21. Dziopa F, Ahern K. A systematic literature review of the

applications of Q-technique and its methodology. Methodology. 2011;7(2):39-55. https://doi.org/10.1027/1614-2241/a000021

22. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. Int J Qual Health Care. 2007;19(6):349-57. https://doi.org/10.1093/intqhc/mzm042
23. Elhadi M, Alsoufi A, Alhadi A, Hmeida A, Alshareea E, Dokali M, et al. Knowledge, attitude, and acceptance of healthcare workers and the public regarding the COVID-19 vaccine: a cross-sectional study. BMC Public Health. 2021;21(1):955. https://doi.org/10.1186/s12889-021-10987-3
24. Islam MR, Hasan M, Nasreen W, Tushar MI, Bhuiyan MA. The COVID-19 vaccination experience in Bangladesh: findings from a cross-sectional study. Int J Immunopathol Pharmacol. 2021;35:20587384211065628. https://doi.org/10.1177/20587384211065628
25. Kim YK, Lim YG, Boo YJ. Factors affecting the practice of coronavirus (COVID-19) in a community population. J Korea Acad Ind Coop Soc. 2021;22(8):478-85. https://doi.org/10.5762/KAIS.2021.22.8.478
26. Statistics Korea. Employment trends in June 2021 [Internet]. Daejeon: Statistics Korea; 2022 [cited 2024 May 2]. Available from: https://www.gov.kr/portal/gvrnPublish/view/H2107000000811332
27. Shon BD, Moon HJ. Who suffers the most financial hardships due to COVID-19? Korean J Soc Welf. 2021;73(3):9-31. https://doi.org/10.20970/kasw.2021.73.3.001
28. Koyama S, Aida J, Mori Y, Okawa S, Odani S, Miyashiro I. COVID-19 effects on income and dental visits: a cross-sectional study. JDR Clin Trans Res. 2022;7(3):307-14. https://doi.org/10.1177/23800844221094479
29. Lee DH, Kim YJ, Lee DH, Hwang HH, Nam SK, Kim JY. The influence of public fear, and psycho-social experiences during the coronavirus disease 2019 (COVID-19) pandemic on depression and anxiety in South Korea. Korean J Couns Psychother. 2020;32(4):2119-56. https://doi.org/10.23844/kjcp.2020.11.32.4.2119
30. Allington D, McAndrew S, Moxham-Hall V, Duffy B. Coronavirus conspiracy suspicions, general vaccine attitudes, trust and coronavirus information source as predictors of vaccine hesitancy among UK residents during the COVID-19 pandemic. Psychol Med. 2023;53(1):236-47. https://doi.org/10.1017/S0033291721001434
31. Carrieri V, Guthmuller S, Wubker A. Trust and COVID-19 vaccine hesitancy. Sci Rep. 2023;13(1):9245. https://doi.org/10.1038/s41598-023-35974-z
32. Hantoko D, Li X, Pariatamby A, Yoshikawa K, Horttanainen M, Yan M. Challenges and practices on waste management and disposal during COVID-19 pandemic. J Environ Manage. 2021;286:112140. https://doi.org/10.1016/j.jenvman.2021.112140
33. Iranmanesh M, Ghobakhloo M, Nilashi M, Tseng ML, Senali MG, Abbasi GA. Impacts of the COVID-19 pandemic on household food waste behaviour: a systematic review. Appetite. 2022;176:106127. https://doi.org/10.1016/j.appet.2022.106127
34. Vasko Z, Ostojic A, Ben Hassen T, Berjan S, El Bilali H, Durdic I, et al. Food waste perceptions and reported behaviours during the first wave of the COVID-19 pandemic: evidence from Bosnia and Herzegovina. Waste Manag Res. 2023;41(2):312-27. https://doi.org/10.1177/0734242X221122495
35. Ikiz E, Maclaren VW, Alfred E, Sivanesan S. Impact of COVID-19 on household waste flows, diversion and reuse: the case of multi-residential buildings in Toronto, Canada. Resour Conserv Recycl. 2021;164:105111. https://doi.org/10.1016/j.resconrec.2020.105111

ORIGINAL ARTICLE

Korean J Adult Nurs Vol. 37 No. 2, 140-152, May 2025
eISSN: 2288-338X
https://doi.org/10.7475/kjan.2025.0117

KJAN
Korean Journal of
Adult Nursing

Preliminary Evaluation of Experiential Learning–Based Fall and Medication Error Prevention Education (EFMPE) using a Virtual Reality Room of Errors Program: A Randomized Controlled Trial

Hyeran Park[1], JuHee Lee[2], Eun Kyoung Choi[3], Seung Eun Lee[3], Eunbae B. Yang[4], Yoonju Lee[5]

[1] *Postdoctoral Researcher, College of Nursing and Brain Korea 21 FOUR Project, Yonsei University, Seoul, Korea*
[2] *Professor, College of Nursing · Mo-Im Kim Nursing Research Institute, Yonsei University, Seoul, Korea*
[3] *Associate Professor, College of Nursing · Mo-Im Kim Nursing Research Institute, Yonsei University, Seoul, Korea*
[4] *Professor, Department of Medical Education, College of Medicine, Yonsei University, Seoul, Korea*
[5] *Professor, College of Nursing, Pusan National University, Yangsan, Korea*

Received: January 17, 2025
Revised: March 28, 2025
Accepted: April 25, 2025

Corresponding author:
JuHee Lee
College of Nursing · Mo-Im Kim
Nursing Research Institute, Yonsei
University, 50-1 Yonsei-ro, Seodaemun-gu, Seoul 03722, Korea.
Tel: +82-2-2228-3346
Fax: +82-2-2227-8303
E-mail: jhl@yuhs.ac

Purpose: Falls and medication errors are the most common patient safety incidents globally. Kolb's experiential learning theory supports the application of cognitive learning in clinical settings. This study examined the effectiveness of Experiential Learning–Based Fall and Medication Error Prevention Education (EFMPE), utilizing virtual reality and room of errors. **Methods:** A randomized controlled trial was conducted with 28 fourth-year nursing students (15 experimental, 13 control). The experimental group participated in EFMPE from February 1 to 6, 2024, comprising six sessions of 2 hours each. The control group received traditional lectures. Safety control confidence and course interest were measured before and immediately after the intervention; safety control confidence was reassessed 6 weeks later. **Results:** Both groups showed immediate improvement; however, only the experimental group sustained increased safety control confidence after 6 weeks (Wald $\chi^2=13.21$, $p<.001$). Course interest was significantly higher in the experimental group post-intervention (Wald $\chi^2=10.64$, $p=.001$). **Conclusion:** These preliminary findings suggest that EFMPE potentially supports the prevention of falls and medication errors in clinical practice.

Key Words: Education, nursing; Medical errors; Students, nursing; Virtual reality

INTRODUCTION

Medical error refers to the failure to perform intended healthcare activities or inadequate planning of these activities, leading to patient safety incidents. Since the initiation of the Korean Patient Safety Incident Reporting & Learning System in 2016, falls and medication errors have consistently been reported as the most frequent patient safety incidents, as documented in the latest 2023 Patient Safety Statistics Annual Report [1]. Falls represent a significant global clinical challenge, frequently causing severe consequences such as hip fractures, intracranial hemorrhages, and fatalities [1,2].

Medication errors significantly contribute to preventable harm within healthcare settings, resulting in adverse drug reactions, prolonged hospitalizations, and elevated medical costs worldwide [1,3]. The global economic impact of medication errors is substantial, with country-specific ex-

---

amples highlighting their severity. In England's National Health Service, approximately 237 million medication errors occur annually, incurring an economic burden of about £98,462,582 per year [3]. Given the substantial clinical and economic impacts, falls and medication errors are critical topics for educators developing medical error prevention programs.

Nursing students, as future healthcare providers, play a crucial role in identifying and preventing medical errors. Students encountering patient safety incidents in clinical settings often experience heightened alertness, stress, and self-doubt regarding their knowledge and skills, potentially leading them to consider discontinuing their studies [4]. Discrepancies between theoretical knowledge and practical clinical experience, particularly concerning patient safety risks, contribute to feelings of disappointment and frustration [5]. Thus, education methods that effectively bridge theoretical knowledge and clinical application are essential.

Experiential learning is a valuable approach in clinical education for addressing the gap between theory and practice [6,7]. Kolb's experiential learning theory posits that learning is a cyclical process, where individuals first engage in concrete experiences, then reflect on those experiences, develop abstract concepts based on their reflections, and finally test these concepts through active experimentation (concrete experience [CE]) [8]. This cycle enhances the internalization of knowledge [7,8]. Experiential methods such as simulation and contextual games in nursing education have improved key clinical competencies, including critical thinking and clinical reasoning [9,10].

Virtual reality (VR) technology delivers immersive experiences directly to users and has proven effective in various educational settings [11]. Clinical education on managing medical errors can be challenging due to patient safety and rights concerns. However, VR-based learning safely simulates clinical error scenarios, allowing students to directly manipulate virtual objects [11,12]. VR technology thus supports Kolb's experiential learning stages, notably CE and active experimentation. This study employed VR technology to facilitate firsthand experiences for students.

A "Room of Errors" (ROE) is a simulation method where learners enter a simulated environment to identify potential risks such as falls, medication errors, and patient identification issues [13,14]. Numerous studies have used ROE to evaluate learners' error recognition abilities [13]. Furthermore, research has demonstrated ROE's positive effects on learners' attitudes, self-efficacy, confidence, and skills in error identification and risk management [13,14]. Since ROE simulates error scenarios difficult to experience in real clinical environments, it enables students to actively recognize and correct errors. This study uses ROE to support experiential learning effectively.

Previous ROE studies were mainly conducted in simulation labs, where students primarily observed and identified errors [13,14]. VR technology, however, allows active interaction and hands-on engagement beyond mere observation [11]. Integrating VR technology into ROE enhances experiential learning by providing a more immersive, interactive method for students to identify and correct errors.

Safety control confidence refers to an individual's belief in their capability to influence working conditions to prevent hazards [15], directly affecting their actions and outcomes [16]. In nursing practice, safety control confidence directly and indirectly impacts nursing performance [17,18]. Course interest involves personal curiosity or excitement within educational contexts, driving students' motivation to engage in learning [19]. Experiential learning theory suggests that increased course interest fosters greater motivation to learn [10,20]. Based on experiential learning theory, safety control confidence and course interest support sustained competency development in preventing falls and medication errors.

This study aimed to develop an Experiential Learning–Based Fall and Medication Error Prevention Education (EFMPE) incorporating a VR-based ROE program and to evaluate its effectiveness by assessing nursing students' safety control confidence and course interest. The study hypotheses were as follows: Hypothesis 1, The experimental group receiving EFMPE will demonstrate higher safety control confidence than the control group; Hypothesis 2, The experimental group receiving EFMPE will demonstrate higher course interest than the control group.

METHODS

1. Study Design

This study utilized a randomized controlled trial to preliminarily evaluate the effectiveness of the EFMPE. The study protocol was not pre-registered in a clinical trial registry since it was designed as a preliminary evaluation. This study was conducted and reported in accordance with the Consolidated Standards of Reporting Trials (CONSORT) guideline.

2. Theoretical Framework

The education was based on Kolb's experiential learning theory [8], which promotes the application of learned concepts to clinical practice. Experiential learning is learner-centered and emphasizes real-world experiences to facilitate the understanding of new concepts, enhance problem-solving skills, and enable knowledge application [7,21].

Kolb outlined experiential learning as a cycle comprising four stages: CE, reflective observation (RO), abstract conceptualization (AC), and active experimentation (AE) [8]. The CE stage involves direct engagement with real-world situations in an open, unbiased manner. RO consists of interpreting and reflecting upon learners' experiences from multiple perspectives, allowing them to consider experiences, interpret their significance, and gain insights. In the AC stage, learners integrate their observations and reflections into new theories or concepts. During this stage, learners synthesize and organize new ideas derived from previous stages into coherent concepts or hypotheses. The AE stage involves applying insights from AC to practical decision-making and problem-solving. This action continues the cyclical learning process by leading back to the CE stage, promoting continuous recognition, reflection, and prevention of falls and medication errors in clinical practice. Thus, structuring EFMPE based on Kolb's experiential learning cycle supports the expectation of sustained learning outcomes beyond the educational period.

3. Development of the EFMPE

The analysis, design, development, implementation, and evaluation (ADDIE) model guided the creation and evaluation of the EFMPE [22]. During the analysis phase, previous studies employing the ROE approach were reviewed to identify risk situations associated with falls or medication errors. A systematic literature search was conducted in PubMed, EMBASE, CINAHL, Cochrane Library, and RISS using combinations of keywords such as "nursing students," "nurses," "Room of Errors," and "education." Fall-related errors identified from the literature included situations like "bed rails down" and "spill on the floor," whereas medication-related errors included "prepared allergic medication for a patient with a known allergy" and "IV fluids not labeled," among others.

Additionally, six nurses participated in a brainstorming session to share clinical experiences regarding falls and medication errors. The nurses were selected from general wards of a tertiary hospital with over 1,000 beds, each with up to 3 years of clinical experience to capture the perspectives of newer nurses. Participants were asked to describe direct or indirect experiences related to falls and medication errors in the hospital. New fall-related errors such as "caregiver bed with non-locking wheels" and "wearing inappropriate shoes" were identified during this session. For medication errors, participants added "barcode mismatched prescription" and "omissions in verbal prescription orders."

In the design phase, the EFMPE was structured into six sessions. Session 1 focused on "understanding of medical errors." Sessions 2 and 3 delivered experiential-based fall prevention education, and sessions 4 and 5 provided experiential-based medication error prevention education, incorporating both theoretical and practical elements. Session 6 addressed "post-patient safety incident management." Educational content was derived from patient safety literature related to falls and medication errors.

In the development phase, the error situations identified from literature and brainstorming sessions were incorporated. A professional software engineer reviewed the situations for feasibility within a VR setting, using Unity software. The VR ROE was designed with two modules: one for falls and another for medication errors. Both modules were situated in a single-bed room setting. The fall VR ROE module included a storage area containing additional items such as fall caution signs and wall handrails. In the medication VR ROE module, a medication preparation station was positioned adjacent to the bed to minimize user movement. The program operated using Oculus Quest 2, consisting of a head-mounted display and two controllers, allowing learners to set up or correct fall and medication error situations. For example, in the fall VR ROE module, users could increase patient risk by lowering bed rails, dropping items on the floor, or spilling water intentionally. In the medication VR ROE module, medication errors could be induced by misaligning a 3-way valve to obstruct intravenous fluid flow or mislabeling syringes (Figure 1). The fall VR ROE module included 15 interactive virtual objects or conditions, while the medication VR ROE module featured 18.

A group of six experts, comprising three nursing professors and three clinical nurses, validated the EFMPE con-

https://doi.org/10.7475/kjan.2025.0117

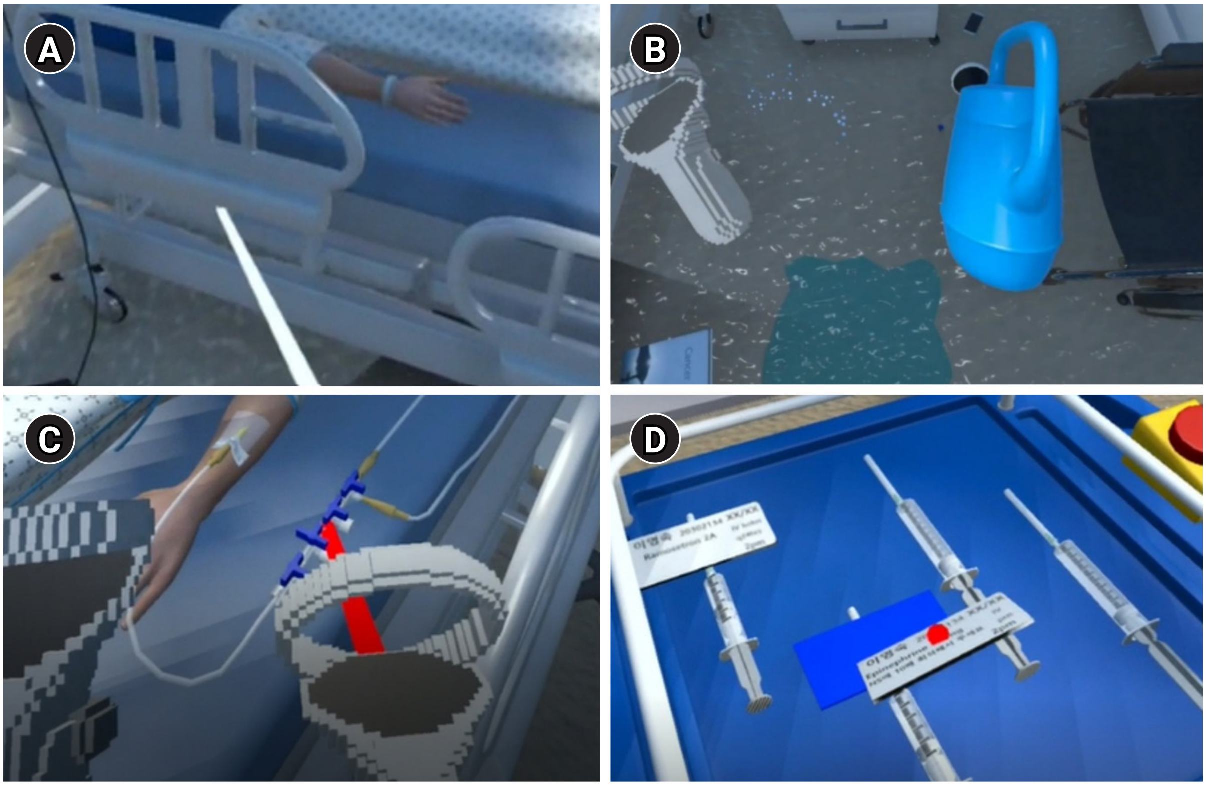


Figure 1. Screenshots of virtual reality (VR) room of errors (ROE) practices: (A) lowering bedside rails in the fall VR ROE practice, (B) tilting a container to spill water on the floor in the fall VR ROE practice, (C) misaligning a 3-way valve in the medication VR ROE practice, (D) mislabeling syringes in the medication VR ROE practice.

tent. One clinical nurse had over ten years of clinical experience and two years in educational roles within a healthcare institution, while the other two had more than seven years of combined clinical and educational experience. Experts reviewed educational materials and demonstration videos of the VR ROE practices, assessing content and timing validity. Based on expert feedback, the EFMPE was revised to include additional explanations of complex terminology, removal of peer evaluation components, and modification of learning objectives. The final version of the EFMPE is presented in Table 1.

4. Participants

The study population consisted of fourth-year nursing students who had gained experience in hospital environments and patient safety-related nursing through clinical practicums. Inclusion criteria were as follows: (1) nursing students in their fourth year as of 2024, and (2) current enrollment at the university. Students without clinical experience were excluded to prevent potential confusion, as the VR-simulated hospital room included specific items selected for learning purposes. Additionally, students who had taken a leave of absence during a previous semester or who had previously participated in a VR learning program within the nursing curriculum were excluded. This study determined a minimum of 13 participants per group was necessary for preliminary evaluation based on Hertzog's suggestion (2008) that 10 to 40 subjects per group are sufficient for preliminary studies [23], and a previous nursing study that reported positive outcomes with 13 subjects [24]. With an anticipated dropout rate of 20%, the planned recruitment was 16 participants per group, totaling 32.

Participants were recruited from Kosin University in Busan, Korea. Recruitment was facilitated through announcements posted on an online bulletin board and social networking services specifically targeted at fourth-year students. The researcher assigned numbers to all 29 consenting participants in the order they provided informed consent, and these numbers were entered into a '*Random Group Assignment*' application. Participants were randomly assigned to either the experimental group (n = 15) or the control group (n = 14) using simple randomization. Group allocations were finalized after recruitment, and partici-

Table 1. Final Version of the EFMPE

Session	Title	Contents	Delivery methods	Time
1	Understanding of medical errors	Definition of patient safety and related concepts Risk factors and intervention for preventing medical errors	Lecture	2
2	EFPE (1)	Definition, risk factors and preventive interventions for falls	Lecture	2
		Review of Rt. TKR patient information on preventable fall risk 1) Individually searching the fall risks in the case 2) Presenting the identified fall risks individually 3) Discussing and determining the presented risk factors by all class members	Scenario review	
3	EFPE (2)	Fall VR ROE - Pre-briefing: Listing the errors to be implemented in the VR ROE practice - Practice (1): Setting up the errors for the opposing team - Practice (2): Correcting the errors set by the opposing team - Individual reflection: Reviewing the actions performed - Team reflection: Discussing and evaluating actions in terms of patient risk - Debriefing and discussion: Assessing the significance of risks and anticipating their application in the clinical setting	Simulation	2
4	EMPE (1)	Definition, risk factors, and preventive interventions for medication errors	Lecture	2
		Review of laparoscopic myomectomy patient information on preventable medication errors 1) Individually searching the medication error risks in the case 2) Presenting the identified medication error risks individually 3) Discussing and determining the presented risk factors by all class members	Scenario review	
5	EMPE (2)	Medication VR ROE - Pre-briefing: Listing the errors to be applied in the VR ROE practice - Practice (1): Setting up the errors for the opposing team - Practice (2): Correcting the errors set by the opposing team - Individual reflection: Reviewing the actions performed - Team reflection: Discussing and evaluating actions in terms of patient risk - Debriefing and discussion: Assessing the significance of risks and anticipating their application in the clinical setting	Simulation	2
6	Post patient safety incident management	Summarizing the entire content of the education and learning the process after patient safety incidents	Lecture	2
		Creating checklists to prevent fall	Activity	
		Creating checklists to prevent medication errors	Activity	

EFMPE = Experiential Learning–Based Fall and Medication Error Prevention Education; EFPE = experiential learning-based fall prevention education; EMPE = experiential learning-based medication error prevention education; ROE = Rom of Errors; Rt. = right; TKR = total knee replacement; VR = virtual reality.

pants were informed of their group assignments immediately prior to pretest 1. One control group participant withdrew before pretest 1 due to health issues, resulting in 15 participants in the experimental group and 13 in the control group (Figure 2).

5. Measurements

Safety control confidence was assessed using a seven-item questionnaire developed by Anderson et al. [15] and translated into Korean by Chung [25]. Each item was rated on a 5-point Likert scale (1 = completely disagree, 5 = completely agree), with higher scores indicating greater

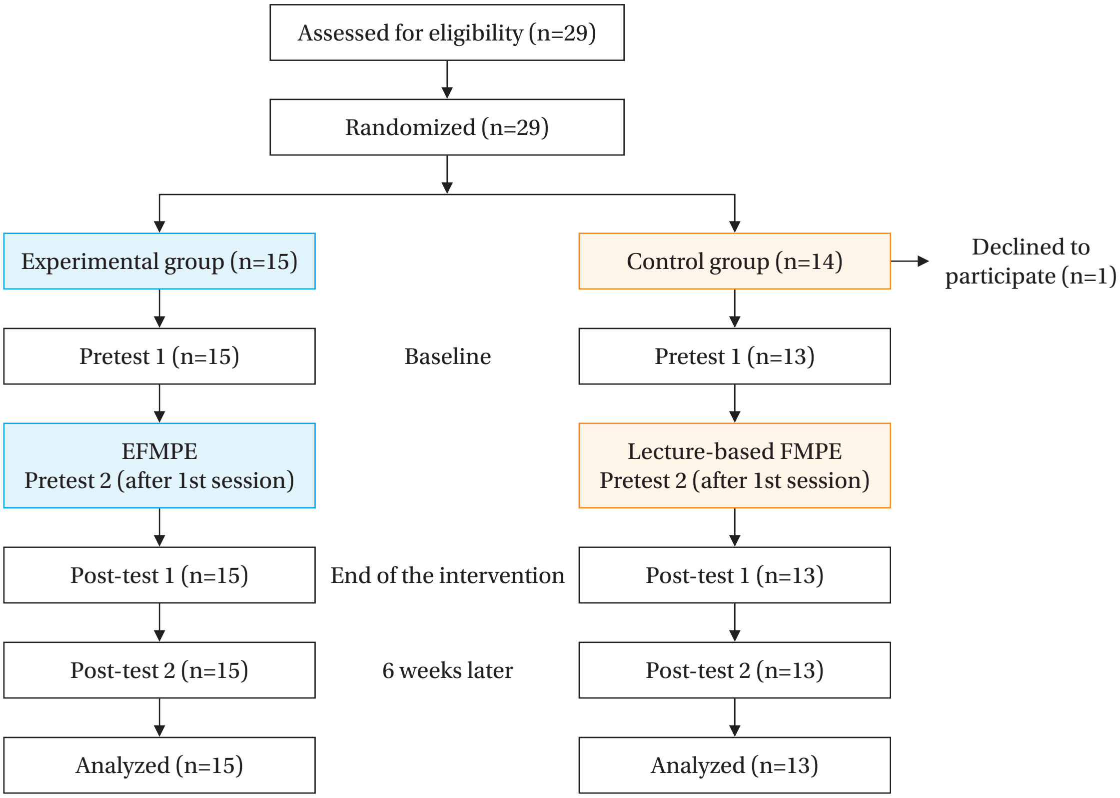


Figure 2. Flow diagram of the allocation. EFMPE = experiential learning-based fall and medication error prevention education; FMPE = fall and medication error prevention education.

safety control confidence. Cronbach's alpha for the questionnaire was .85 in Chung's study, and ranged from .78 to .88 across the three measurement points in this study.

Course interest was measured using the Course Interest Survey (CIS), originally developed by Keller in 1987 [19]. This study employed a Korean version adapted by Kim [26] with the original author's permission. This adapted CIS comprises 20 items, reduced from the original 34, covering four subdomains: attention (5 items), confidence (3 items), relevance (5 items), and satisfaction (7 items). Items were rated on a 5-point Likert scale (1 = not true, 5 = very true), with higher scores reflecting greater learning interest. The original instrument had a Cronbach's alpha of .95, while this study's adapted CIS had a Cronbach's alpha of .92 at pre-measurement and .96 at post-measurement.

6. Implementation of Intervention and Data Collection

The EFMPE intervention was conducted from February 1 to 6, 2024, consisting of six 2-hour sessions. Session 1, common to both experimental and control groups, provided foundational knowledge about patient safety and medical errors through lectures. Pretest 1, measuring safety control confidence and general participant characteristics, occurred before session 1. Pretest 2, measuring course interest, was administered immediately following session 1.

Sessions 2 and 4 covered fall prevention and medication error prevention knowledge through lectures and scenario reviews. VR ROE practices were conducted in sessions 3 and 5, representing the CE stage of Kolb's experiential learning cycle, with session 3 focusing on nursing care for a right total knee replacement patient and session 5 addressing a laparoscopic myomectomy patient. Each VR ROE session included pre-briefing, two practice rounds, and debriefing. In the first round, students set up error situations for opposing teams; in the second round, they corrected the errors. RO was incorporated through individual reflection journals, and AC was fostered through team discussions and evaluations regarding patient safety and error prevention during debriefings.

Session 6 summarized educational content and focused on post-incident patient safety management. This aligned with the AE stage as students applied learned concepts to develop checklists for preventing falls and medication errors. Post-test 1, assessing safety control confidence and course interest, was conducted immediately after all sessions. Post-test 2, exclusively assessing safety control confidence, occurred 6 weeks later because the CIS targets specific content unsuitable for long-term evaluation. The 6-week interval was chosen based on Kosin University's curriculum structure to ensure uniformity in students' experiences. After the intervention, students were split into two groups, each alternating between 3 weeks of clinical practicum and 3 weeks of on-campus practicum. Random group assignment ensured standardized conditions, and post-test 2 was scheduled to control potential confounding variables and ensure standardized conditions across all participants.

The control group received identical educational content via lectures without VR ROE practices. Separate schedules were arranged for experimental and control groups starting from session 2 to prevent information diffusion.

7. Ethical Considerations

After obtaining approval from the Institutional Review Board of Yonsei University Health System, Severance Hospital (approval number: 4-2023-1498), nursing students who expressed interest in participating were recruited on a voluntary basis. The researcher provided detailed explanations regarding the study's objectives, procedures, potential benefits, and risks. Participants were assured that their personal information would remain confidential and that collected data would not be used for any purpose other than the study. All participants provided written informed consent prior to their participation in the research.

To prevent any confusion between participation in this study and regular coursework, especially if professor names appeared in recruitment announcements, this research was conducted exclusively with students from Kosin University in Busan, ensuring that none of the research team members were affiliated with this university. The informed consent explicitly clarified that the study was independent of the students' curriculum and assured participants that their involvement would remain confidential and would not be disclosed to their professors. Additionally, to uphold ethical standards for the control group, these participants were informed that they could receive extra opportunities to practice fall and medication error situations using the VR ROE modules after the study concluded if they desired.

8. Data Analysis

Data analysis was performed using IBM SPSS Statistics version 28.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics, including frequencies, percentages, means, and standard deviations, summarized participant characteristics. Mean values and standard deviations for all measured variables were reported. Group homogeneity was assessed using independent t-tests and Fisher's exact tests. Generalized Estimating Equations (GEEs) evaluated outcome measure changes over time.

Blinding in data analysis was maintained by having a research assistant, uninvolved in intervention delivery, enter the collected data into a computer file. Data were secured, anonymized, and then provided to the researcher for statistical analysis.

RESULTS

1. General Characteristics and Homogeneity between Groups

Data from 15 participants in the experimental group and 13 participants in the control group were collected and analyzed. Table 2 summarizes the participants' general characteristics and presents the homogeneity test results between groups. No statistically significant differences in participants' general characteristics were observed between the experimental and control groups.

2. Hypothesis Test

Safety control confidence was assessed at three time points for both groups: pretest 1, post-test 1, and post-test 2. The experimental group exhibited higher safety control confidence than the control group at both post-test 1 and post-test 2, as illustrated in Table 3. The GEE analysis showed a statistically significant interaction between group and time regarding changes in safety control confidence (Wald $\chi^2=13.21$, $p<.001$), thereby supporting Hypothesis 1 (Table 3). Course interest was measured twice for both groups: at pretest 2 and post-test 1. Both groups experienced an increase in course interest following the intervention. GEE analysis indicated a statistically significant greater increase in course interest for the experimental group compared to the control group over time (Wald $\chi^2=10.64$, $p=.001$), supporting Hypothesis 2 (Table 3).

Table 2. General Characteristics of Participants and Homogeneity between Groups at Baseline ($N=28$)

Variables	Categories	n (%) or M ± SD		t/χ^2	*p*
		Exp. (n=15)	Cont. (n=13)		
Age (year)		21.5±0.99	22.2±1.63	−1.24	.226
Sex	Female	14 (93.3)	10 (76.9)		.311
	Male	1 (6.7)	3 (23.1)		
GPA in last semester	≥2.5 to <3.0	2 (13.3)	2 (15.4)		>.99
	≥3.0 to <3.5	4 (26.7)	3 (23.1)		
	≥3.5 to <4.0	7 (46.7)	6 (46.2)		
	≥4.0	2 (13.3)	2 (15.4)		
Satisfaction in major†		3.47±0.74	3.62±0.96	−0.46	.648
Satisfaction in clinical practicum†		3.33±0.82	3.23±1.09	0.28	.779
Satisfaction in on-campus practicum†		3.53±0.83	3.38±0.77	0.49	.630

Cont.=control group; Exp.=experimental group; GPA=grade point average; M=mean; SD=standard deviation; †Possible range: 1–5.

Table 3. Changes in Safety Control Confidence and Course Interest between Groups ($N=28$)

Variables	M±SD			Parameters	Regression coefficient	SE	Wald χ^2	*p*
	Pretest†	Post-test 1	Post-test 2					
Safety control confidence								
Exp. (n=15)	3.63±0.47	4.62±0.38	4.46±0.37	Group (ref. Cont.)	−0.02	0.19	0.01	.918
Cont. (n=13)	3.65±0.57	4.35±0.38	3.90±0.42	Time 1 (ref. Pretest)	0.70	0.20	12.09	<.001
				Time 2 (ref. Pretest)	0.25	0.09	8.77	.003
				Group* Time 1 (ref. Cont. * Pretest)	0.29	0.25	1.30	. 255
				Group* Time 2 (ref. Cont. * Pretest)	0.58	0.16	13.21	<.001
Course interest								
Exp. (n=15)	4.18±0.47	4.73±0.33	-	Group (ref. Cont.)	0.02	0.17	0.01	.932
Cont. (n=13)	4.17±0.48	4.35±0.54	-	Time 1 (ref. Pretest)	0.19	0.06	8.97	.003
				Group* Time 1 (ref. Cont. * Pretest)	0.36	0.11	10.64	.001
Attention								
Exp. (n=15)	4.41±0.50	4.75±0.73	-	Group (ref. Cont.)	0.11	0.23	0.21	.648
Cont. (n=13)	4.31±0.35	4.35±0.68	-	Time 1 (ref. Pretest)	0.05	0.14	0.11	.741
				Group* Time 1 (ref. Cont. * Pretest)	0.29	0.16	3.34	.068
Relevance								
Exp. (n=15)	4.43±0.53	4.79±0.56	-	Group (ref. Cont.)	0.01	0.20	0.00	.955
Cont. (n=13)	4.42±0.38	4.57±0.42	-	Time 1 (ref. Pretest)	0.15	0.11	1.84	.175
				Group* Time 1 (ref. Cont. * Pretest)	0.21	0.16	1.75	.186
Confidence								
Exp. (n=15)	3.91±0.60	4.62±0.59	-	Group (ref. Cont.)	−0.09	0.22	0.17	.682
Cont. (n=13)	4.00±0.40	4.26±0.60	-	Time 1 (ref. Pretest)	0.26	0.07	12.04	.001
				Group* Time 1 (ref. Cont. * Pretest)	0.46	0.18	6.09	.014
Satisfaction								
Exp. (n=15)	3.95±0.55	4.71±0.45	-	Group (ref. Cont.)	0.00	0.18	0.00	.984
Cont. (n=13)	3.96±0.37	4.23±0.59	-	Time 1 (ref. Pretest)	0.28	0.12	5.08	.024
				Group* Time 1 (ref. Cont. * Pretest)	0.49	0.17	7.95	.005

Cont.=control group; Exp.=experimental group; M=mean; Ref.=reference; SD=standard deviation; SE=standard error; Time 1=post-test 1; Time 2=post-test 2; †The pretest of safety control confidence was pretest 1; the pretest of course interest was pretest 2.

Upon examining the subdomains of course interest, posttest 1 scores were consistently higher than pretest 2 scores for both groups. GEE analysis indicated that differences between groups over time were not significant for the attention (Wald χ^2=3.34, p=.068) and relevance (Wald χ^2=1.75, p=.186) subdomains. However, differences were significant for the confidence (Wald χ^2=6.09, p=.014) and satisfaction (Wald χ^2=7.95, p=.005) subdomains. Changes in variables between the two groups are visually represented in the graph provided in Appendix 1.

DISCUSSION

This study developed and applied the EFMPE, enhancing experiential learning with VR and ROE, among nursing students. Its effectiveness was demonstrated through significant improvements in safety control confidence and course interest.

Both groups in this study showed immediate increases in safety control confidence following the intervention; however, only the experimental group maintained elevated levels 6 weeks later, underscoring the intervention's lasting impact. Although research on VR-based ROE patient safety programs specifically for nursing students is limited, our results align with prior experiential learning studies reporting increased safety control confidence [14,27]. Kim and Chun [27] research team provided nursing students a VR environment simulating urinary retention in surgical patients, significantly increasing students' safety control confidence by offering highly immersive experiences. Similarly, Jung et al. [14] introduced nursing students to various simulated errors—such as medication errors, fall risks, procedural safety issues, and hospital-associated infections—learning error recognition in small teams. They concluded that exposure to diverse error scenarios boosted students' safety control confidence. Thus, VR and ROE-based experiential learning environments has the potential to effectively increase nursing students' safety control confidence, though further research is necessary for definitive evidence.

Experiential learning is widely acknowledged for its sustained impact on healthcare professionals' competencies [7]. For example, Torkshavand and colleagues demonstrated long-term competency improvements related to elderly patient care through simulation-based learning, where students directly experienced sensory impairments using special equipment [28]. These outcomes align with our findings, underscoring experiential learning's lasting educational effects. According to experiential learning theory, learners continuously restructure their knowledge through a cyclic process of experiencing, reflecting, conceptualizing, and experimenting [8]. In contrast, lecture-based approaches, though informative, typically involve passive student participation, limiting long-term knowledge retention [29]. After the EFMPE, students may encounter environments where fall and medication errors could occur during their scheduled clinical and on-campus practicums. These repeated experiences would prompt students to recall and reflect on the learning content from the EFMPE, engaging in reflection and AC. This ongoing learning cycle would be expected to contribute to the retention and enhancement of their knowledge, supporting their development of sustained fall and medication error prevention competencies.

In this study, course interest increased significantly in the experimental group compared to the control group, with notable improvements particularly in the confidence and satisfaction subdomains. Course interest—comprising attention, relevance, confidence, and satisfaction—motivates ongoing learning [19].

In the current study, confidence in course interest increased in the experimental group after the intervention compared to the control group. Confidence, which contributes to course interest, is defined as the extent to which learners believe they can control their own learning [19,26]. This belief is strengthened by accumulating successful experiences [26]. Previous studies employing pre-learning activities have successfully boosted learner confidence [30,31]. For instance, a neonatal resuscitation program that used preliminary online videos enhanced student confidence, subsequently improving hands-on performance [30]. Similarly, preparatory mobile learning assignments on communicating with foreign patients significantly increased students' classroom engagement by improving their learning confidence [31]. In the current study, comprehensive theoretical preparation enabled students to successfully engage in VR ROE practices, likely enhancing their sense of achievement and subsequent learning confidence.

Satisfaction, a component of course interest, also significantly improved in the experimental group. Satisfaction rewards learning achievement through intrinsic and extrinsic reinforcement [19,26]. During VR practice sessions, supportive instructor feedback, such as "You saved the patient," positively reinforced students' actions aligned with learning objectives, thus fostering intrinsic motivation [32]. In team debriefings, recognition from peers and instructors for correctly identifying errors further bolstered student satisfaction and positive emotions associated with learning, enhancing motivation [33,34]. Previous research involving task-centered virtual learning environments reported positive correlations between satisfaction and realistic task simulations [32]. Interactive methods such as peer recognition and collaboration have also been recognized as effective strategies for boosting academic motivation [35]. Our findings suggest that both intrinsic and extrinsic motivational factors contributed significantly to student satisfaction in course interest.

This study has several limitations. First, participants were recruited from a single university in Korea, potentially limiting the generalizability of findings to other institutions or regions. Second, the study exclusively measured safety control confidence and course interest. Future research should incorporate additional outcome measures—such as knowledge, skills, and attitudes related to falls and medication error management—for a comprehensive evaluation of educational effectiveness. Lastly, the study utilized only quantitative measures, with findings interpreted through experiential learning theory. Incorporating qualitative data, such as open-ended responses, could provide deeper insights into the observed improvements in safety control confidence and course interest among students in the experimental group.

This study is significant as it successfully implemented experiential learning by integrating VR technology and the ROE approach into the EFMPE. These methods offered students structured opportunities to engage safely with patient safety incidents, which are otherwise challenging to replicate in actual clinical environments. Additionally, this study contributes valuable evidence supporting the efficacy of experiential learning theory. By demonstrating that experiential learning-based nursing education programs can significantly enhance both safety control confidence and course interest, these findings may encourage wider adoption of experiential learning strategies in nursing education.

The notable improvements observed in this preliminary study regarding safety control confidence and course interest highlight the potential of the EFMPE for enhancing nursing students' patient safety competencies. The EFMPE could effectively serve as a structured educational resource, assisting students in developing essential skills for preventing patient safety incidents and reducing preventable errors in clinical settings. Future simulations should incorporate clinically relevant scenarios, both common and rare, such as patient falls during transfers or medication administration errors. Diversifying case scenarios and integrating realistic clinical situations would further enhance the educational value and comprehensiveness of the EFMPE as a patient safety training tool.

CONCLUSION

The EFMPE, grounded in Kolb's experiential learning theory, demonstrated potential for improving nursing students' safety control confidence and course interest. Further research is recommended to validate these findings by assessing additional competencies directly related to fall and medication error prevention, employing varied outcome measures. Developing realistic clinical simulation scenarios and expanding the curriculum to cover broader patient safety topics—such as infection control, medical device management, and documentation practices—may support the comprehensive incorporation of patient safety education into nursing curricula.

ORCID

Hyeran Park, https://orcid.org/0000-0002-0182-8542
JuHee Lee, https://orcid.org/0000-0002-2805-1622
Eun Kyoung Choi, https://orcid.org/0000-0003-4622-2437
Seung Eun Lee, https://orcid.org/0000-0002-4173-3337
Eunbae B. Yang, https://orcid.org/0000-0002-6771-1929
Yoonju Lee, https://orcid.org/0000-0001-9378-7022

CONFLICTS OF INTEREST

The authors declared no conflict of interest.

AUTHORSHIP

Study conception and/or design acquisition - HP, JL, EKC, SEL, EBY, and YL; analysis - HP; interpretation of the data - HP and JL; and drafting or critical revision of the manuscript for important intellectual content - HP, JL, EKC, SEL, EBY, and YL.

FUNDING

The study was conducted with the support of the 2022

Health Fellowship Foundation. The author Hyeran Park received a scholarship from Brain Korea 21 FOUR Project funded by National Research Foundation (NRF) of Korea, Yonsei University College of Nursing.

ACKNOWLEDGEMENT

The authors gratefully acknowledge the assistance of all participants in data collection. We would like to express our gratitude to Professor Kijun Song for his valuable statistical guidance and support, which greatly contributed to the completion of this study. This article is a revision of the first author's doctoral dissertation from Yonsei University.

DATA AVAILABILITY STATEMENT

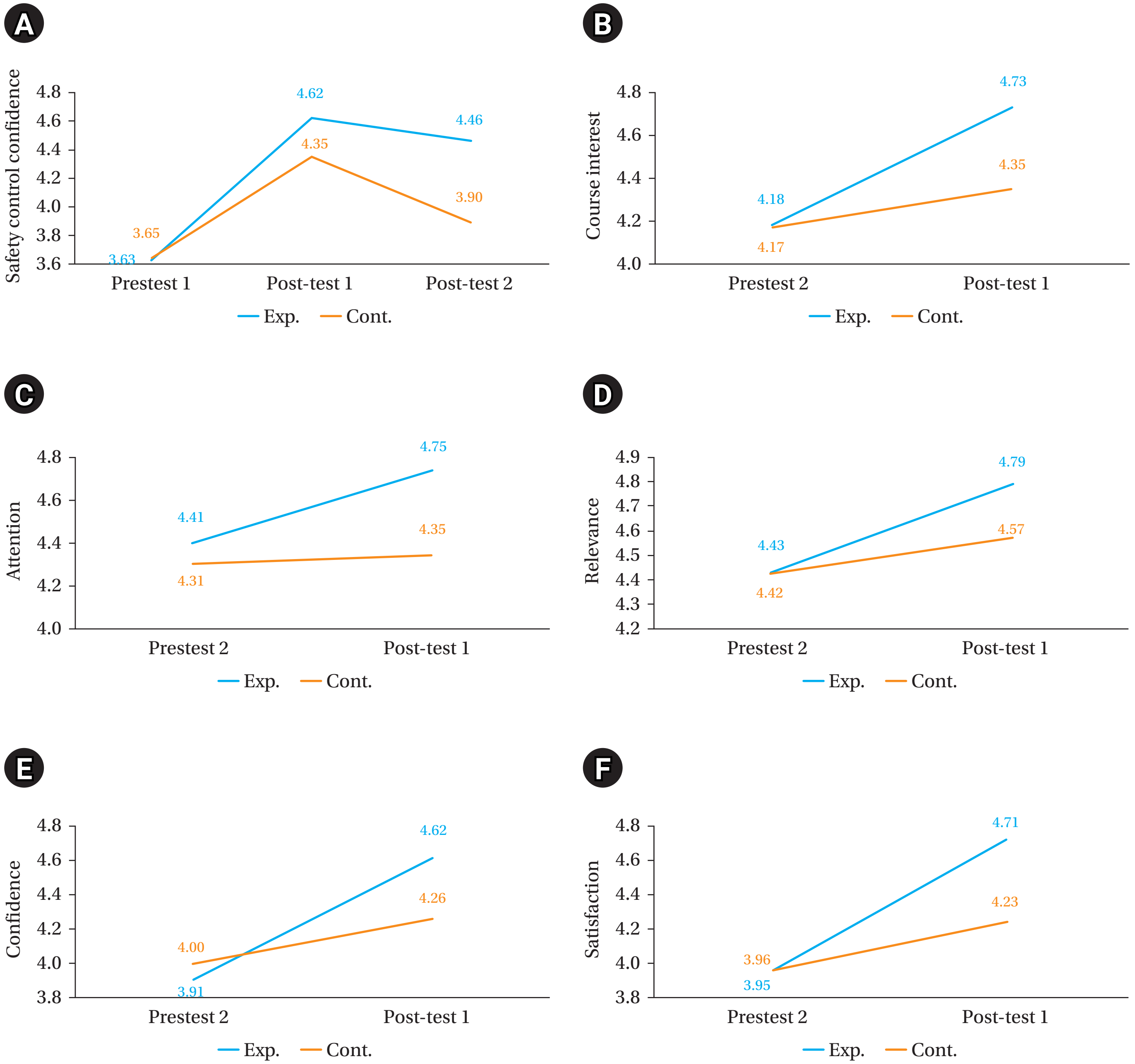
The data can be obtained from the corresponding authors.

REFERENCES

1. Korea Institute for Healthcare Accreditation. Patient safety statistics annual report [Internet]. Seoul: Korea Patient Safety Reporting & Learning System; 2024 [cited 2024 December 15]. Available from: https://www.kops.or.kr/portal/board/statAnlrpt/boardDetail.do
2. Cochran L, Foley P. Pursuing zero harm from patient falls: one organization's initiatives along the way. Nurs Manage. 2022;53(11):24-33. https://doi.org/10.1097/01.NUMA.0000891464.12616.70
3. Elliott RA, Camacho E, Jankovic D, Sculpher MJ, Faria R. Economic analysis of the prevalence and clinical and economic burden of medication error in England. BMJ Qual Saf. 2021;30(2):96-105. https://doi.org/10.1136/bmjqs-2019-010206
4. Van Slambrouck L, Verschueren R, Seys D, Bruyneel L, Panella M, Vanhaecht K. Second victims among baccalaureate nursing students in the aftermath of a patient safety incident: an exploratory cross-sectional study. J Prof Nurs. 2021;37(4):765-70. https://doi.org/10.1016/j.profnurs.2021.04.010
5. Lee Y, Choi B, An S. Nursing student's cinical practice experience. J Humanit Soc Sci. 2021;12(2):531-46. https://doi.org/10.22143/HSS21.12.2.38
6. Murray R. An overview of experiential learning in nursing education. Adv Soc Sci Res J. 2018;5(1):1-6. https://doi.org/10.14738/assrj.51.4102
7. Nurunnabi AS, Rahim R, Alo D, Mamun AA, Kaiser AM, Mohammad T, et al. Experiential learning in clinical education guided by the Kolb's experiential learning theory. Int J Hum Health Sci. 2022;6(2):155-60. https://doi.org/10.31344/ijhhs.v6i2.438
8. Kolb DA. Experiential learning: experience as the source of learning and development. Englewood Cliffs, NJ: Prentice Hall; 1984.
9. Uppor W, Klunklin A, Viseskul N, Skulphan S. Effects of experiential learning simulation-based learning program on clinical judgment among obstetric nursing students. Clin Simul Nurs. 2024;92:101553. https://doi.org/https://doi.org/10.1016/j.ecns.2024.101553
10. Chang CY, Kao CH, Hwang GJ, Lin FH. From experiencing to critical thinking: a contextual game-based learning approach to improving nursing students' performance in electrocardiogram training. Educ Technol Res Dev. 2020;68(3):1225-45. https://doi.org/https://doi.org/10.1007/s11423-019-09723-x
11. Choi J, Thompson CE, Choi J, Waddill CB, Choi S. Effectiveness of immersive virtual reality in nursing education: systematic review. Nurse Educ. 2022;47(3):E57-61. https://doi.org/10.1097/NNE.0000000000001117
12. Shorey S, Ng ED. The use of virtual reality simulation among nursing students and registered nurses: a systematic review. Nurse Educ Today. 2021;98:104662. https://doi.org/10.1016/j.nedt.2020.104662
13. Lee SE, Repsha C, Seo WJ, Lee SH, Dahinten VS. Room of horrors simulation in healthcare education: a systematic review. Nurse Educ Today. 2023;126:105824. https://doi.org/10.1016/j.nedt.2023.105824
14. Jung SY, Kim HJ, Lee EK, Park JH. Effects of "room of errors" simulation education for nursing students on patient safety management behavior intention and confidence in performance. J Korean Soc Simul Nurs. 2023;11(2):107-20. https://doi.org/10.17333/JKSSN.2023.11.2.107
15. Anderson L, Chen PY, Finlinson S, Krauss AD, Huang YH. Roles of safety control and supervisory support in work safety. Paper presented at: Annual Meeting of the Society for Industrial and Organizational Psychology; 2004 May 27-30; Chicago, IL.
16. Gottlieb M, Chan TM, Zaver F, Ellaway R. Confidence-competence alignment and the role of self-confidence in medical education: a conceptual review. Med Educ. 2022;56(1):37-47. https://doi.org/10.1111/medu.14592

17. Kalsoom Z, Victor G, Virtanen H, Sultana N. What really matters for patient safety: correlation of nurse competence with international patient safety goals. J Patient Saf Risk Manag. 2023;28(3):108-15. https://doi.org/10.1177/25160435221133955
18. Kim K, Mun MY. Influence of confidence in performance of patient safety management and clarity of communication on behavior of patient safety management in nursing students. J Learn Cent Curric Instr. 2023;23(3):85-95. https://doi.org/10.22251/jlcci.2023.23.3.85
19. Keller JM. Motivational design for learning and performance. New York: Springer; 2010.
20. Kong Y. The role of experiential learning on students' motivation and classroom engagement. Front Psychol. 2021;12:771272. https://doi.org/10.3389/fpsyg.2021.771272
21. Morris TH. Experiential learning: a systematic review and revision of Kolb's model. Interact Learn Environ. 2020;28(8):1064-77. https://doi.org/10.1080/10494820.2019.1570279
22. Branch RM, Kopcha TJ. Instructional design models. In: Spector JM, Merrill MD, Elen J, Bishop MJ, editors. Handbook of research on educational communications and technology. New York: Springer; 2014. p. 77-87.
23. Hertzog MA. Considerations in determining sample size for pilot studies. Res Nurs Health. 2008;31(2):180-91. https://doi.org/10.1002/nur.20247
24. Delaney MC. Caring for the caregivers: Evaluation of the effect of an eight-week pilot mindful self-compassion (MSC) training program on nurses' compassion fatigue and resilience. PLoS One. 2018;13(11):e0207261. https://doi.org/10.1371/journal.pone.0207261
25. Chung SK. A structural model of safety climate and safety compliance of hospital organization employees [dissertation]. Seoul: Yonsei University; 2010.
26. Kim MR. Validity verification of ARCS evaluation models for promoting university students' learning motivation. J Korea Contents Assoc. 2017;17(12):77-91. https://doi.org/10.5392/JKCA.2017.17.12.077
27. Kim HY, Chun J. Effects of a patient experience-based virtual reality blended learning program on nursing students. Comput Inform Nurs. 2022;40(7):438-46. https://doi.org/10.1097/CIN.0000000000000817
28. Torkshavand G, Khatiban M, Soltanian AR. Simulation-based learning to enhance students' knowledge and skills in educating older patients. Nurse Educ Pract. 2020;42:102678. https://doi.org/10.1016/j.nepr.2019.102678
29. Woodhouse J. Strategies for healthcare education: how to teach in the 21st century. Boca Raton, FL: CRC Press; 2019.
30. Yang SY, Oh YH. The effects of neonatal resuscitation gamification program using immersive virtual reality: a quasi-experimental study. Nurse Educ Today. 2022;117:105464. https://doi.org/10.1016/j.nedt.2022.105464
31. Zhang D, Zhang J, Cao M, Zhu Y, Yang G. Testing the effectiveness of motivation-based teaching in Nursing English course: a quasi-experimental study. Nurse Educ Today. 2023;122:105723. https://doi.org/10.1016/j.nedt.2023.105723
32. Zwart DP, Goei SL, Van Luit JE, Noroozi O. Nursing students' satisfaction with the instructional design of a computer-based virtual learning environment for mathematical medication learning. Interact Learn Environ. 2022;31(10):7392-407. https://doi.org/10.1080/10494820.2022.2071946
33. Liu M. Exploring the motivation-engagement link: the moderating role of positive emotion. J Psychol Lang Learn. 2022;4(1):e415022. https://doi.org/10.52598/jpll/4/1/3
34. Plunkett A. Embracing excellence in healthcare: the role of positive feedback. Arch Dis Child Educ Pract Ed. 2022;107(5):351-4. https://doi.org/10.1136/archdischild-2020-320882
35. Saeedi M, Ghafouri R, Tehrani FJ, Abedini Z. The effects of teaching methods on academic motivation in nursing students: a systematic review. J Educ Health Promot. 2021;10:271. https://doi.org/10.4103/jehp.jehp_1070_20

APPENDICES



Appendix 1. Changes in variables between two groups: (A) safety control confidence, (B) course interest, (C) attention, (D) relevance, (E) confidence, and (F) satisfaction. (C–F) Subdomains of course interest. Cont. = control group; Exp. = experimental group.

ORIGINAL ARTICLE

Korean J Adult Nurs Vol. 37 No. 2, 153-164, May 2025
eISSN: 2288-338X
https://doi.org/10.7475/kjan.2025.0210

KJAN
Korean Journal of
Adult Nursing

Impact of Interprofessional Communication and Person-centered Care on Perceived Quality of Death in Intensive Care Units by Nurses: A Cross-Sectional Study

Hye-Jin Kim[1], **So-Hi Kwon**[2]

[1] *Registered Nurse, Kyungpook National University Hospital, Daegu, Korea*
[2] *Professor, College of Nursing, Kyungpook National University, Daegu, Korea*

Received: February 10, 2025
Revised: April 24, 2025
Accepted: May 13, 2025

Corresponding author:
So-Hi Kwon
College of Nursing, Kyungpook National University, 680 Gukchaebosang-ro, Jung-gu, Daegu 41944, Korea.
Tel: +82-53-950-4480
Fax: +82-53-950-4460
E-mail: sh235@knu.ac.kr

Purpose: Over 10% of intensive care unit (ICU) patients die; however, research aimed at assessing and improving the quality of their deaths remains scarce. This study investigated the impact of communication among healthcare professionals and person-centered care provided by ICU nurses on the quality of dying and death (QODD) experienced by ICU patients. **Methods:** We measured general characteristics of ICU nurses, interprofessional communication, and person-centered care, and identified their impact on the quality of death for patients who died in the ICU. Participants consisted of 103 ICU nurses employed at two tertiary hospitals in South Korea. Data were collected between January and May 2023. Descriptive statistics, the t-test, analysis of variance, the Mann-Whitney U test, Pearson correlation coefficients, and multiple linear regression analyses were conducted using SPSS version 23.0. **Results:** The mean QODD score was 44.73±21.26. QODD was positively correlated with openness (nurse-physician), understanding (nurse-physician), satisfaction (nurse-physician), and person-centered care. Factors significantly influencing QODD included nurse-physician communication, specifically understanding ($\beta = .35$, $p = .010$), and person-centered care ($\beta = .19$, $p = .033$), explaining 20.2% of the total variance ($F = 7.44$, $p < .001$). **Conclusion:** Improved communication among healthcare professionals and enhanced person-centered care are essential for improving the QODD for ICU patients. To achieve this, educational initiatives focusing on end-of-life care and communication training programs for healthcare professionals should be implemented.

Key Words: Communication; Death; Intensive care units; Nurses; Patient-centered care

INTRODUCTION

In South Korea, approximately 744.6 per 100,000 people are admitted to intensive care units (ICUs) annually, and 102.9 per 100,000 die in ICUs [1]. Despite advancements in technology and treatments, ICUs remain environments in which many patients face death. As ICUs predominantly focus on life-extending interventions, they frequently fall short of adequately supporting end-of-life preparations for patients and their families [2]. Studies have highlighted the high prevalence of symptoms such as pain, dyspnea, agitation, anxiety, depression, confusion, and fatigue among ICU patients, contributing significantly to poor-quality dying and death [3]. Quality of death is a multidimensional concept reflecting an individual's dying experience, including effective pain and symptom management, preservation of autonomy and control, and the ability to die with dignity and respect

[4]. When death becomes imminent and unavoidable, treatment should prioritize alleviating suffering while safeguarding human dignity and autonomy [4]. Consequently, assessing and examining the quality of death is essential to ensuring meaningful final moments for each patient and for improving healthcare approaches.

Improving the quality of death in ICUs begins with its accurate measurement using a valid and comprehensive assessment tool and by identifying the nursing factors influencing it. However, evaluating the quality of death from the deceased individual's perspective is inherently impossible, and family evaluations can be affected by grief and stress [5]. Instead, nurses, who closely observe the dying process, may provide more objective assessments [6]. Given nurses' close proximity to patients, examining how their care influences the quality of death could offer valuable insights for improvement.

Research on quality of death has primarily examined the influence of various factors from the perspectives of family members or healthcare professionals [5,7-10]. Prior studies on factors influencing the quality of death among terminal ICU patients have mostly concentrated on patient- and treatment-related characteristics. Significant influencing factors include the presence of malignant tumors, the use of life-support devices [7], invasive procedures such as life-sustaining equipment and cardiopulmonary resuscitation (CPR) [8], and analgesic administration [9]. Recently, research examining the impacts of person-centered care and interprofessional communication on the quality of death of terminal patients has increased [8,10]. Nevertheless, studies specifically addressing the influence of nurse-related variables on quality of dying and death (QODD) in ICU patient populations remain scarce. In research assessing interprofessional communication's impact on end-of-life care in ICUs, collaborative and consistent communication among healthcare professionals was found to enhance patients' end-of-life experiences [11]. Furthermore, a study conducted among ICU nurses in South Korea reported that nurses' person-centered care significantly influenced patients' quality of death [10].

Effective communication between patients and healthcare professionals is crucial for ensuring a good quality of death [12]. In ICUs, where verbal communication with patients is often limited and patients are isolated from their families, nurses assume a critical role in decision-making by conveying patients' wishes to other healthcare professionals and encouraging patient and family involvement [13]. Interprofessional communication can help uphold the autonomy and dignity of terminally ill patients and support decisions regarding life-prolonging treatments [12]. Effective communication includes open dialogue, timely information exchange, and shared understanding of care goals among nurses and between nurses and physicians, thus ensuring patient safety and high-quality care [14]. However, excessive workloads, hierarchical organizational structures, and an emphasis on curative treatments often hinder communication and limit nurses' ability to advocate effectively for patients [15]. Therefore, further exploration of the impact of interprofessional communication on patients' quality of death in ICUs is necessary.

Person-centered care emphasizes respecting patients' individuality, responding empathically, and ensuring comfort as defined by the patients themselves, based on their values and needs [16]. In ICUs, person-centered care involves understanding patients' conditions, offering emotional support, preserving dignity, and encouraging active participation in care [17]. Such an approach by ICU nurses promotes physical and emotional stability, improving overall patient satisfaction [18]. However, the ICU environment, characterized by life-support devices and urgent clinical situations, frequently restricts nurse-patient interactions and reduces patients to treatment objects rather than unique individuals [19]. A task-oriented nursing environment may hinder the delivery of person-centered care, compromising patients' dignity and respect at the end of life and negatively influencing the quality of death. In light of this, empirical evidence is required to understand how person-centered care delivered by ICU nurses affects quality of death. Therefore, this study aims to assess interprofessional communication, person-centered care, and the quality of death, and to identify factors influencing the quality of death in ICU settings.

METHODS

1. Study Design

This descriptive research study examined the impact of interprofessional communication and person-centered care provided by ICU nurses on the quality of death among ICU patients. This study was reported following the STROBE (Strengthening the Reporting of Observational

Studies in Epidemiology) guidelines (https://www.strobe-statement.org/).

2. Participants

This study employed a convenience sampling method, targeting nurses who provided care for adult patients (aged ≥18 years) admitted to ICUs of two general hospitals with over 900 beds located in Daegu. Nurses were included if they had cared for patients who stayed in the ICU longer than 6 hours, as shorter durations would not permit meaningful implementation of person-centered care or effective interprofessional communication, both of which are important for assessing the quality of death. Death in children is perceived differently in social and emotional terms, often involving greater feelings of loss and frustration. Consequently, perceptions of death quality and decision-making surrounding end-of-life care may differ significantly. For these reasons, patients younger than 18 years were excluded from this study. Additionally, to ensure familiarity with the organizational structure and promote team cohesion, only nurses with over 6 months of ICU experience were included [20].

The required sample size was calculated using G*Power 3.1.9.7, assuming an effect size of 0.25 based on prior studies [10], an α error of 0.05, power of 0.85, and 14 predictors (including 9 subscales for interprofessional communication, person-centered care, patient characteristics such as ICU stay duration, age, and CPR administration within 24 hours before death, and nurses' clinical experience). The calculated sample size necessary for regression analysis was 94 [21]. Accounting for an approximate dropout rate of 10%, 105 questionnaires were distributed, and 103 valid responses were included in the final analysis after excluding two duplicates.

3. Measurements

1) Quality of death

Patients' quality of death was assessed using the Korean version of the QODD instrument, version 3.2, developed by Patrick et al. [5] and adapted specifically for ICU nurses. The Korean version, translated and validated by Cho et al. [6], was used with permission from the original authors and translators. The QODD questionnaire is a validated instrument that evaluates end-of-life experiences from the perspectives of family members and healthcare providers, encompassing domains such as symptom control, preparation, connectedness, and transcendence [22]. The 25-item tool consists of four subdomains: patient experiences during ICU stay (15 items), medical treatment at death (5 items), experiences at the moment of death (3 items), and overall evaluation of care (2 items). Each item comprises two questions: one assessing whether a specific experience occurred and another assessing the quality of the experience, rated from 0 ("terrible") to 10 ("almost perfect"). Total scores, calculated according to the SPSS scoring method for QODD version 3.2 [23], range from 0 to 100, with higher scores indicating better quality of death. Cronbach's α reliability was .89 in the original development study [22], above .80 in the Korean version [6], and .91 in the current study. Although the original instrument permits one nurse to assess multiple patients, this study measured only one patient per nurse to precisely evaluate the impact of caregiving on death quality.

2) Interprofessional communication

Communication among healthcare providers was evaluated using the Korean version of the ICU Nurse-Physician Questionnaire, originally developed by Shortell et al. [14] and adapted by Cho et al. [24]. Permission to use this tool was obtained from the original authors and translators. The tool includes 30 items divided into nine subscales: openness (nurse-physician, nurse-nurse), accuracy (nurse-physician, nurse-nurse), understanding (nurse-physician), shift communication (nurse-nurse), timeliness (nurse-nurse and physician), and satisfaction (nurse-physician, nurse-nurse). Interpretation of the tool relies on subscale scores rather than a total score. Each item is rated on a 5-point Likert scale from 1 ("strongly disagree") to 5 ("strongly agree"), with higher scores indicating more positive perceptions of communication. Seven negatively worded items (2, 4, 7, 18, 20, 22, and 24) were reverse-scored. Cronbach's α ranged from .64 to .88 in the original version [14], from .59 to .89 in Cho et al. [24], and from .58 to .91 in the present study.

3) Person-centered care

Person-centered care was assessed using the Person-centered Critical Care Nursing (PCCN) tool developed by Kang et al. [16], reflecting the local conditions and cultural context of ICU nurses. Permission for use was obtained from the original authors. This tool comprises 15 items grouped into four subscales: compassion (4 items), individuality (4 items), respect (4 items), and comfort (3 items). Items are rated on a 5-point Likert scale ranging from 1 (“not at all”) to 5 (“very much”), with higher scores indicating greater provision of person-centered care by ICU nurses. Cronbach’s α reliability was .84 in the original development study [16] and .82 in this study.

4. Data Collection

Survey data were collected from January 2 to May 15, 2023, from nurses working in seven ICU units—medical ICU (MICU), surgical ICU, emergency ICU, neurosurgical ICU, trauma ICU (TICU), coronary care unit/stroke unit, and cardiac ICU—at two general hospitals in Daegu. Approval was obtained from the nursing departments of each hospital. The researcher visited each ICU to explain the study purpose and methods, and personally distributed questionnaires.

The questionnaires were placed in sealed envelopes in the head nurse’s office. It was emphasized that each nurse should complete the QODD for only one deceased patient. The head nurse oversaw questionnaire distribution to prevent duplication. Nurses completed questionnaires within 48 hours following a patient’s death. The attending nurse at the time of death was prioritized; however, if unavailable (e.g., due to vacation or limited patient familiarity), another nurse who had cared for the deceased patient completed the questionnaire. Participants provided written informed consent, completed the questionnaire, and sealed it individually. The researcher visited the ICUs biweekly to collect questionnaires and monitor participation rates. Participants received a small gift coupon upon completing the questionnaire.

5. Ethical Considerations

The Institutional Review Board (IRB) of Kyungpook University Hospital (KNUH 2022-11-018-001, KNUCH 2022-11-029-001) approved this study. Participants were recruited after being informed about the study purpose and procedures, and voluntarily provided written consent. Participants were informed of their right to withdraw at any time without penalty and were assured that no associated costs or risks would occur. Data and personal information were coded, stored securely, and will be disposed of safely after three years.

6. Data Analysis

Data were analyzed using IBM SPSS Win 23.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics (frequencies, percentages, means, standard deviations) summarized the general characteristics of participants and terminally ill patients. Levels of interprofessional communication, person-centered care, and quality of death were expressed using means and standard deviations. Differences based on participants’ general characteristics were examined using the independent-sample t-test, Analysis of Variance (ANOVA), and the Mann-Whitney U test. Similarly, differences in quality of death based on patients’ general and disease-related characteristics were analyzed using the t-test and ANOVA. Pearson’s correlation coefficients were used to assess relationships among quality of death, interprofessional communication, and person-centered care. The effects of communication and person-centered care on terminally ill ICU patients’ quality of death were evaluated using multiple linear regression.

RESULTS

1. Quality of Death According to the General Characteristics of ICU Nurses, and Deceased Patients’ Characteristics

The study participants were predominantly female nurses (84.5%), with a mean age of 28.12±4.52 years. Most nurses had no religious affiliation (78.7%) and had completed a bachelor's degree (97.1%). The average clinical experience of nurses was 58.66±50.80 months. Nearly all nurses (97.1%) reported not having received any post-graduation education on end-of-life care. No statistically significant differences were observed in QODD scores based on the nurses’ general characteristics.

Among the 103 deceased patients, 58.3% were male, with a mean age of 63.85±19.45 years. The mean duration of hospitalization was 11.63±15.35 days, and the average ICU stay was 8.16±11.18 days. The most common ICU type was the TICU (21.3%), followed by the MICU (19.4%). Of these patients, 24.3% received CPR, and 82.5% utilized life-support devices within 24 hours before death. QODD scores did not significantly differ based on patients’ general or disease-related characteristics (Table 1).

Table 1. Quality of Death Based on Deceased Patients' Characteristics and the General Characteristics of ICU Nurses (*N* = 103)

	Characteristics	Categories	n (%) or M ± SD	QODD	
				M ± SD	t/Z or F (*p*)
ICU nurses	Sex	Men	16 (15.5)	47.94 ± 22.45	0.82 (.414)
		Women	87 (84.5)	42.99 ± 22.11	
	Age (year)	≤ 25	30 (29.1)	45.38 ± 22.37	2.86 (.062)
		26–29	47 (45.7)	47.53 ± 22.78	
		≥ 30	26 (25.2)	35.08 ± 18.80	
			28.12 ± 4.52		
	Religion	Yes	22 (21.4)	47.58 ± 18.89	0.91 (.365)
		No	81 (78.6)	42.73 ± 22.92	
	Clinical career (month)	6–12	13 (12.6)	44.25 ± 28.45	0.97 (.413[†])
		13–36	25 (24.3)	45.67 ± 16.70	
		37–60	32 (31.1)	47.01 ± 26.62	
		≥ 61	33 (32.0)	38.98 ± 18.01	
			58.66 ± 50.80		
	Education	Bachelor	100 (97.1)	44.84 ± 21.37	–0.11 (.919[‡])
		≥ Master	3 (2.9)	41.31 ± 20.43	
	Training in end-of-life care	Yes	3 (2.9)	53.83 ± 41.06	–0.55 (.595[‡])
		No	100 (97.1)	44.46 ± 20.71	
Deceased patients assigned to ICU nurses	Sex	Men	60 (58.3)	43.78 ± 21.60	–0.53 (.595)
		Women	43 (41.7)	46.06 ± 20.95	
	Age (year)	18–40	16 (15.5)	49.69 ± 21.00	0.98 (.404)
		41–60	13 (12.7)	51.24 ± 26.81	
		61–75	41 (39.8)	41.98 ± 22.00	
		≥ 76	33 (32.0)	43.20 ± 17.81	
			63.85 ± 19.45		
	Length of hospital stay (day)	≤ 3	38 (36.9)	47.50 ± 21.62	0.97 (.381)
		4–10	33 (32)	45.62 ± 23.57	
		≥ 11	32 (31.1)	40.54 ± 18.07	
			11.63 ± 15.35		
	Length of ICU stay (day)	≤ 4	55 (53.4)	46.19 ± 21.32	0.74 (.459)
		> 4	48 (46.6)	43.06 ± 21.29	
			8.16 ± 11.18		
	Type of ICU	CCU/SU	17 (16.5)	50.22 ± 20.39	2.18 (.051)
		CICU	4 (3.9)	49.43 ± 21.36	
		EICU	18 (17.5)	40.83 ± 19.56	
		MICU	20 (19.4)	37.33 ± 19.75	
		NSICU	5 (4.9)	29.67 ± 6.54	
		SICU	17 (16.5)	42.15 ± 24.94	
		TICU	22 (21.3)	54.98 ± 20.11	
	Primary diagnosis	CVD	36 (34.9)	48.20 ± 20.49	1.49 (.229)
		Cancer	12 (11.7)	36.08 ± 15.27	
		Others	55 (53.4)	44.35 ± 22.56	
	CPR within 24 hours of death	Yes	25 (24.3)	39.56 ± 18.01	–1.40 (.163)
		No	78 (75.7)	46.39 ± 22.04	
	LSE within 24 hours of death	Yes	85 (82.5)	44.10 ± 21.58	0.65 (.512)
		No	18 (17.5)	47.74 ± 19.92	
	Number of LSE[§] (n = 85)	< 2	52 (61.2)	45.02 ± 21.39	0.19 (.845)
		≥ 2	33 (38.8)	44.13 ± 21.28	

CCU/SU = coronary care unit/stroke unit; CICU = cardiac ICU; CPR = cardiopulmonary resuscitation; CVD = cardiovascular disease; EICU = emergency ICU; ICU = intensive care unit; LSE = life-support equipment; M = mean; MICU = medical ICU; NSICU = neurosurgical ICU; QODD = quality of dying and death; SD = standard deviation; SICU = surgical ICU; TICU = trauma ICU; [†]Equal variance not assumed; [‡]Mann-Whitney U test; [§]LSE includes continuous renal replacement treatment, extracorporeal membrane oxygenation, intra-aortic balloon pump, pacemaker or ventilator; multiple responses allowed.

2. Quality of Death in ICU Patients

The mean QODD score for the 103 patients was 44.73±21.26 out of 100. Valid sample sizes for individual items ranged from 49 to 103. Among the QODD domains, the item scoring highest was “having desired people present at the time of death” (6.89±2.75). Conversely, the items with the lowest scores were “being able to feed oneself” (1.90±2.81) and “having a spiritual service or ceremony before death” (2.82±3.23). In terms of medical care experiences at the end of life, “receiving mechanical ventilation” and “receiving dialysis” were rated relatively higher (5.05±2.77 and 5.28±2.69, respectively), whereas discussions with doctors about end-of-life care occurred less frequently (3.57±2.61) (Table 2).

3. Communication with Health Professionals and PCCN

Interprofessional communication scores exhibited variability, with nurse-nurse communication rated higher in openness (3.85±0.69) and accuracy (3.35±0.61) compared to nurse-physician communication (2.86±0.79 and 2.85±0.60, respectively). Satisfaction with communication was also rated higher in nurse-nurse interactions (3.88±0.67) than in nurse-physician interactions (2.77±0.84).

The mean person-centered care score was 3.47±0.44 out of 5. Among the subscales, the highest ratings were for comfort (3.77±0.62) and respect (3.74±0.60), followed by compassion (3.37±0.57) and individuality (3.03±0.63) (Table 3).

4. Correlations between QODD and Independent Variables

Among communication-related variables, significant positive correlations were identified between QODD and openness in nurse-physician communication ($r=.20$, $p=.040$) and understanding in nurse-physician communication ($r=.39$, $p<.001$). Additionally, satisfaction with nurse-physician communication showed a moderate positive correlation with QODD ($r=.36$, $p<.001$). The total PCCN score was positively correlated with QODD ($r=.27$,

Table 2. Levels of Quality of Death ($N=103$)

QODD	M±SD	No. of valid	Range
Total score	44.73±21.26	103	0–100
Patient experiences at the end of life			
Having pain under control	4.96±2.58	68	0–10
Having control over what is going on around oneself	3.17±2.59	53	0–10
Being able to feed oneself	1.90±2.81	63	0–10
Being able to breath comfortably	4.20±3.20	88	0–10
Feeling at peace with dying	3.80±3.22	54	0–10
Feeling unafraid of dying	4.06±3.04	50	0–10
Being able to laugh and smile	2.93±3.23	58	0–10
Keeping one’s dignity and self-respect	3.97±3.17	62	0–10
Spending time with family and friends	4.85±3.57	87	0–10
Spending time alone	4.18±2.98	71	0–10
Being touched or hugged by loved ones	4.77±3.57	86	0–10
Saying goodbye to loved ones	3.72±3.76	71	0–10
Clearing up bad feelings	3.08±3.36	49	0–10
Having one or more visits from a religious or spiritual advisor	2.97±3.40	63	0–10
Having a spiritual service or ceremony before death	2.82±3.23	68	0–10
Medical care at the end of life			
Experience of receiving mechanical ventilation	5.05±2.77	83	0–10
Experience of receiving dialysis	5.28±2.69	64	0–10
Having discussed end-of-life care wishes with your doctor	3.57±2.61	60	0–10
Experience at moment of death			
Having desired people present at the time of death	6.89±2.75	87	0–10
State at moment of death (i.e., asleep, awake, unconscious)	4.88±2.50	80	0–10

M=mean; QODD=quality of dying and death; SD=standard deviation.

https://doi.org/10.7475/kjan.2025.0210

Table 3. Level of CHP and PCCN ($N = 103$)

Variables		M ± SD	Range
CHP	Openness (N-P)	2.86 ± 0.79	1–5
	Openness (N-N)	3.85 ± 0.69	1–5
	Accuracy (N-P)	2.85 ± 0.60	1–5
	Accuracy (N-N)	3.35 ± 0.61	1–5
	Shift Communication (N-N)	3.83 ± 0.61	1–5
	Understanding (N-P)	2.87 ± 0.69	1–5
	Timeliness (N-N & N-P)	3.85 ± 0.56	1–5
	Satisfaction (N-P)	2.77 ± 0.84	1–5
	Satisfaction (N-N)	3.88 ± 0.67	1–5
PCCN	Compassion	3.37 ± 0.57	1–5
	Individuality	3.03 ± 0.63	1–5
	Respect	3.74 ± 0.60	1–5
	Comfort	3.77 ± 0.62	1–5
	Total	3.47 ± 0.44	1–5

CHP = communication with health professionals; M = mean; N-N = nurse-nurse; N-P = nurse-physician; PCCN = person-centered critical care nursing; SD = standard deviation.

$p = .005$), indicating that higher levels of compassion, individuality, respect, and comfort in patient care correlated with improved QODD outcomes (Table 4).

5. Factors Influencing Quality of Death

The factors influencing QODD in terminally ill ICU patients were analyzed using multiple linear regression. Predictor variables included those significantly correlated with QODD in the univariate analyses: openness, understanding, and satisfaction in nurse-physician communication, and PCCN. Tolerance values ranged from 0.43 to 0.93, and variance inflation factors ranged from 1.06 to 2.31, indicating that multicollinearity was not a concern. The Durbin-Watson statistic (2.08) confirmed residual independence. The regression model was statistically significant ($F = 7.44$, $p < .001$), explaining 20.2% of the variance (adjusted $R^2 = .202$). Among the subscales of interprofessional communication, understanding in nurse-physician communication was the most influential factor ($\beta = .35$, $p = .010$), followed by person-centered care ($\beta = .19$, $p = .033$), with significant impacts on quality of death in ICU patients (Table 5).

DISCUSSION

This study aimed to assess interprofessional communication, person-centered care, and the quality of death in ICUs, as well as to identify key factors influencing quality of death, thereby informing future interventions in end-of-life care. The findings indicated that mutual understanding among healthcare professionals—particularly between nurses and physicians—and person-centered care significantly affected patients' quality of death. The discussion below expands on these results.

In this study, all dimensions of interprofessional communication—including openness, accuracy, mutual understanding, and satisfaction—scored below 4 ("agree") for nurse-to-nurse communication, and below 3 ("neutral") for nurse-to-physician communication. These findings align with previous research assessing nurses' perceptions of interprofessional communication in Korean general hospitals [24]. Such scores suggest the need for improvement in both nurse-to-nurse and nurse-to-physician communication. However, the particularly low nurse-to-physician communication scores underscore an urgent need for targeted interventions. Lower scores in nurse-physician communication compared to nurse-nurse interactions may result from factors such as heavy workloads, physicians' primary focus on disease treatment, and hierarchical structures within clinical environments [13]. Improving interprofessional communication—especially between nurses and physicians—is crucial for promoting collaboration, facilitating shared decision-making, and ultimately improving the quality of death for ICU patients.

The level of person-centered care reported in this study was similar to that found in a previous Korean study [25], which evaluated person-centered care among ICU nurses

Table 4. Correlations among Variables

Variables		r (*p*)										
		1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2	3
1	CHP											
1.1	Openness (N-P)	1										
1.2	Openness (N-N)	.44 (< .001)	1									
1.3	Accuracy (N-P)	.21 (.032)	.03 (.738)	1								
1.4	Accuracy (N-N)	.08 (.381)	.18 (.069)	.50 (< .001)	1							
1.5	Shift Communication (N-N)	.41 (< .001)	.63 (< .001)	.21 (.030)	.27 (.005)	1						
1.6	Understanding (N-P)	.68 (< .001)	.33 (.001)	.33 (.001)	.14 (.152)	.41 (< .001)	1					
1.7	Timeliness (N-N & N-P)	.43 (< .001)	.48 (< .001)	.24 (.014)	.12 (.218)	.52 (< .001)	.48 (< .001)	1				
1.8	Satisfaction (N-P)	.65 (< .001)	.33 (.001)	.36 (< .001)	.17 (.071)	.37 (< .001)	.68 (< .001)	.46 (< .001)	1			
1.9	Satisfaction (N-N)	.30 (.002)	.72 (< .001)	.01 (.952)	.26 (.007)	.72 (< .001)	.27 (.006)	.49 (< .001)	.34 (< .001)	1		
2	PCCN	.22 (.023)	.30 (.002)	.25 (.010)	.32 (.001)	.20 (.035)	.23 (.017)	.34 (< .001)	.20 (.040)	.28 (.004)	1	
3	QODD	.20 (.040)	.18 (.067)	.16 (.088)	.10 (.303)	.06 (.511)	.39 (< .001)	.18 (.064)	.36 (< .001)	.18 (.068)	.27 (.005)	1

CHP = communication with health professionals; N-N = nurse-nurse; N-P = nurse-physician; PCCN = person-centered critical care nursing; QODD = quality of dying and death.

Table 5. Factors Affecting Quality of Death (*N* = 103)

Variables	B	SE	ß	t	*p*
Constant	–17.04	15.35		–1.11	.270
CHP					
Openness (N-P)	–6.29	3.46	–.23	–1.81	.072
Understanding (N-P)	10.73	4.11	.35	2.61	.010
Satisfaction (N-P)	5.96	3.26	.23	1.82	.071
PCCN	9.35	4.32	.19	2.16	.033
F (*p*)	7.44 (< .001)				
R^2	.233				
Adj.R^2	.202				
Durbin-Watson	2.08				

CHP = communication with health professionals; N-P = nurse-physician; PCCN = person-centered critical care nursing; SE = standard error.

and identified related predictors. Among subscales, the “individuality” domain scored lowest, likely due to ICU restrictions limiting patients’ personal preferences and activities, including family visitation [19]. To overcome these challenges, practical interventions such as the “Get to Know Me Board,” which displays personal details like nicknames and hobbies, can reinforce patient identity beyond clinical status [26]. Supporting patient individuality, adapting care within ICU constraints, and allowing more flexible visitation policies could enhance patients’ quality of death in ICU settings.

In this study, the quality of death score in the ICU was approximately 45 points, considerably lower than the scores of approximately 60–70 points reported in studies from the United States and the Netherlands [27]. One key reason for the comparatively lower quality of death in Korean ICUs appears to be inadequate education and training regarding end-of-life care [6,9,10]. Indeed, 97% of the nurses in this study had never received end-of-life care training since graduating from nursing school. In South Korea, fewer than one-quarter of undergraduate nursing programs offer courses on end-of-life care [28], indicating that insufficient nursing education likely contributes to the lower quality of death experienced by ICU patients. Previous studies have shown that end-of-life care education significantly improves nurses' knowledge and performance regarding palliative care [29], while systematic approaches to managing terminal care help reduce stress, anxiety, and depression among patients and their families, thus improving quality of death [30]. Providing ICU nurses with explicit guidelines and targeted education on communication and mourning practices is therefore essential. Additionally, the decision-making process surrounding end-of-life care in Korea may be another contributing factor. Unlike Western cultures that prioritize individual autonomy, Korean culture typically avoids direct discussions about prognosis and death, and the views of family members and medical staff usually outweigh patient preferences in treatment decisions [31]. The score for patient-doctor discussions about end-of-life wishes in this study was below 40%, substantially lower than scores from international studies employing the same instrument [27]. As of December 2024, over 2.5 million advance directives have been registered since the enactment of the Life-Sustaining Treatment Decision Act in 2008 [32]. However, public and professional awareness about this Act remains limited, and insufficient training and experience continue to hinder its effective implementation [33]. Expanding educational efforts and promoting awareness of the Act among the public and medical institutions are essential steps for improving decision-making and care quality for terminally ill patients.

In this study, the score for religious and spiritual care among the QODD sub-items was below 3 points, notably lower than in a U.S. study, where the median score was 8, with an interquartile range of 5 to 10 [27]. In Korea, hospitalized patients frequently express moderate to high spiritual needs, encompassing love, holistic care, forgiveness, and the search for meaning and purpose [34]. However, variations in hospital policies regarding religious groups and differences in nurses' perceptions of spiritual care, shaped by religious backgrounds and experiences with end-of-life care, hinder consistent spiritual support [15]. Addressing these barriers requires a national evaluation of hospitals' spiritual support systems and the integration of spiritual nursing education into undergraduate curricula.

The regression analysis identified interprofessional communication—specifically mutual understanding between nurses and physicians—as the most significant factor influencing ICU patients' quality of death, followed by person-centered care. Higher levels of mutual understanding between nurses and physicians correlated with better quality of death. Mutual understanding here refers to a shared comprehension of care goals and plans, effective communication during shift changes, and a collaborative approach among healthcare professionals [16]. Collaboration characterized by mutual understanding and respect improves nursing performance and organizational commitment [35]. Such understanding facilitates the effective exchange of patient-related information, promotes proactive attitudes toward end-of-life care, and supports life-sustaining treatment decisions aligned with patients' values and preferences, thus enhancing death preparedness. Promoting mutual respect between nurses and physicians is therefore essential. Regular communication opportunities should be established, and targeted programs aimed at improving interprofessional communication should be implemented.

Additionally, the finding that ICU nurses who provide higher levels of person-centered care contribute to improved quality of death aligns with results from a previous study examining factors influencing ICU patients' quality of death through an online survey among ICU nurses in South Korea [10]. ICU patients have distinct characteristics, such as experiencing severe symptoms, communication challenges, isolation from their families, and receiving care primarily focused on life-sustaining treatments [2]. Under these challenging conditions, person-centered care significantly contributes to improving quality of death. Specifically, person-centered care alleviates patients' emotional distress through compassionate interactions, preserves patients' identities by employing strategies that respect individual differences (e.g., the "Get to Know Me Board"), and enhances autonomy and trust by aligning care with patient values and preferences. Additionally, effective symptom management and the creation of a comfortable care environment foster patient comfort and facilitate a more peaceful dying process within the ICU. Therefore, enhancing person-centered care in ICU settings requires targeted educational programs and training to increase nurses' sensitivity to individual patient needs, alongside the development of institutional policies that support personalized care practices even in high-acuity environments.

This study is academically significant within the field of nursing as it highlights the influence of nurses on ICU patients' quality of death. From a practical standpoint, these findings suggest that when nurses treat patients not merely as individuals with diseases but holistically as human beings—and when nurses and physicians actively strive to share understanding and knowledge across disciplines—the quality of death can be enhanced.

Despite these strengths, this study has several limitations. First, it was conducted in only two hospitals, thus limiting generalizability. Second, patient quality of death was assessed exclusively by nurses, potentially introducing subjective bias. Third, two items in the QODD assessment had valid response rates below 50%, with a median of 71 valid responses overall. Due to the design of the QODD tool, responses are recorded only when patients have specific experiences or nurses possess sufficient information to evaluate those experiences, resulting in a lower number of valid responses [5]. However, the number of valid responses in this study is consistent with previous studies [7,9]. Lastly, the study's exclusive focus on nursing practices such as communication and person-centered care restricts interpretation regarding other relevant factors, such as patient consciousness, decisions about life-sustaining treatments, and CPR refusal.

CONCLUSION

This study aimed to examine the relationships among interprofessional communication, person-centered care, and the quality of death among ICU patients, emphasizing the role of ICU nurses. Furthermore, it sought to identify nurse-related factors influencing ICU patients' quality of death. The results demonstrated that higher mutual understanding between nurses and physicians, as well as greater implementation of person-centered care, were significantly associated with improved quality of death for ICU patients. Therefore, this study underscores the importance of developing targeted strategies to enhance interprofessional communication and support person-centered care practices, ultimately improving ICU patients' quality of death.

Based on these findings, several recommendations are proposed. First, as this study was limited to ICU nurses in specific regions, future research should expand geographic scope and participant sampling. Second, considering the identified lack of end-of-life education for nurses in Korea, future studies should focus on developing and evaluating the effectiveness of comprehensive end-of-life educational programs for clinical nurses. Third, given the impact of interprofessional communication and person-centered care on patients' quality of death, research should be conducted to develop educational programs facilitating effective communication and evaluate the efficacy of flexible visitation policies, nursing practices tailored to individual patient needs, and interventions involving family participation in treatment. Fourth, due to the limited research on quality of death in ICU settings, further quantitative and qualitative studies addressing diverse variables are required to establish a systematic foundation for improving the quality of death.

ORCID

Hye-Jin Kim, https://orcid.org/0009-0000-6700-8945
So-Hi Kwon, https://orcid.org/0000-0002-5640-0463

CONFLICTS OF INTEREST

The authors declared no conflict of interest.

AUTHORSHIP

Study conception and/or design acquisition - HJK and SHK; analysis - HJK; interpretation of the data - HJK; and drafting or critical revision of the manuscript for important intellectual content - HJK and SHK.

FUNDING

None.

ACKNOWLEDGEMENT

This article is a revision of Hye-Jin Kim's master's thesis from Kyungpook National University.

DATA AVAILABILITY STATEMENT

The data can be obtained from the corresponding authors.

https://doi.org/10.7475/kjan.2025.0210

REFERENCES

1. Park J, Jeon K, Chung CR, Yang JH, Cho YH, Cho J, et al. A nationwide analysis of intensive care unit admissions, 2009-2014: the Korean ICU National Data (KIND) study. J Crit Care. 2018;44:24-30. https://doi.org/10.1016/j.jcrc.2017.09.017
2. Seol EM, Koh CK. Experiences of critical care nurses caring for dying patients. J Korean Crit Care Nurs. 2018;11(2):1-10.
3. Cran A. The prevalence of symptoms in intensive care unit patients: a systematic review and meta-analysis. BMJ Support Palliat Care. 2020;10:A8.
4. Stewart AL, Teno J, Patrick DL, Lynn J. The concept of quality of life of dying persons in the context of health care. J Pain Symptom Manage. 1999;17(2):93-108. https://doi.org/10.1016/s0885-3924(98)00131-6
5. Patrick DL, Engelberg RA, Curtis JR. Evaluating the quality of dying and death. J Pain Symptom Manage. 2001;22(3):717-26. https://doi.org/10.1016/s0885-3924(01)00333-5
6. Cho JY, Lee J, Lee SM, Park JH, Kim J, Kim Y, et al. Transcultural adaptation and validation of quality of dying and death questionnaire in medical intensive care units in South Korea. Acute Crit Care. 2018;33(2):95-101. https://doi.org/10.4266/acc.2017.00612
7. Lee YJ, Ahn S, Cho JY, Park TY, Yun SY, Kim J, et al. Change in perception of the quality of death in the intensive care unit by healthcare workers associated with the implementation of the "well-dying law". Intensive Care Med. 2022;48(3):281-9. https://doi.org/10.1007/s00134-021-06597-7
8. Naya K, Sakuramoto H, Aikawa G, Ouchi A, Yoshihara S, Ota Y, et al. Family members' feedback on the "quality of death" of adult patients who died in intensive care units and the factors affecting the death quality: a systematic review and meta-analysis. Cureus. 2024;16(4):e58344. https://doi.org/10.7759/cureus.58344
9. Cho JY, Park JH, Kim J, Lee J, Park JS, Cho YJ, et al. Factors associated with quality of death in Korean ICUs as perceived by medical staff: a multicenter cross-sectional survey. Crit Care Med. 2019;47(9):1208-15. https://doi.org/10.1097/CCM.0000000000003853
10. Lee H, Choi SH. Factors associated with quality of dying and death in Korean intensive care units: perceptions of nurses. Healthcare (Basel). 2021;9(1):40. https://doi.org/10.3390/healthcare9010040
11. Boyle DK, Miller PA, Forbes-Thompson SA. Communication and end-of-life care in the intensive care unit: patient, family, and clinician outcomes. Crit Care Nurs Q. 2005;28(4):302-16. https://doi.org/10.1097/00002727-200510000-00002
12. Moon JY, Kim JO. Ethics in the intensive care unit. Tuberc Respir Dis. 2015;78(3):175-9. https://doi.org/10.4046/trd.2015.78.3.175
13. Frank RK. Shared decision making and its role in end of life care. Br J Nurs. 2009;18(10):612-8. https://doi.org/10.12968/bjon.2009.18.10.42466
14. Shortell SM, Rousseau DM, Gillies RR, Devers KJ, Simons TL. Organizational assessment in intensive care units (ICUs): construct development, reliability, and validity of the ICU nurse-physician questionnaire. Med Care. 1991;29(8):709-26. https://doi.org/10.1097/00005650-199108000-00004
15. Ahn K, Kong BH, Song YJ. A study on the life-sustaining treatment decision-making and end-of-life care experiences of intensive care nurses after the enforcement of the life-sustaining treatment decision-making act. J Korean Bioeth Assoc. 2020;21(2):31-53. https://doi.org/10.37305/jkba.2020.12.21.2.31
16. Kang J, Cho YS, Jeong YJ, Kim SG, Yun S, Shim M. Development and validation of a measurement to assess person-centered critical care nursing. J Korean Acad Nurs. 2018;48(3):323-34.
17. Hong HJ, Kang J. A qualitative content analysis of the person-centered care experienced by critical care patients. J Korean Crit Care Nurs. 2018;11(2):21-33.
18. Jeon KB, Park MH. A concept analysis of person-centered care in intensive care units. Pers Bioeth. 2021;11(1):129-76.
19. Jakimowicz S, Perry L. A concept analysis of patient-centred nursing in the intensive care unit. J Adv Nurs. 2015;71(7):1499-517. https://doi.org/10.1111/jan.12644
20. Yang YS, Kang YH. ICU new nurses' job stress, job satisfaction, organizational commitment and turnover intention. Nurs Sci. 2013;25(2):47-58.
21. Faul F, Erdfelder E, Buchner A, Lang AG. Statistical power analyses using G*Power 3.1: tests for correlation and regression analyses. Behav Res Methods. 2009;41(4):1149-60. https://doi.org/10.3758/BRM.41.4.1149
22. Downey L, Curtis JR, Lafferty WE, Herting JR, Engelberg RA. The Quality of Dying and Death Questionnaire (QODD): empirical domains and theoretical perspectives. J Pain Symptom Manage. 2010;39(1):9-22. https://

doi.org/10.1016/j.jpainsymman.2009.05.012
23. UW School of Medicine. Healthcare professional after-death self-administered questionnaire [Internet]. Washington, D.C: UW School of Medicine; 2023 [cited 2023 August 16]. Available from: https://depts.washington.edu/eolcare/products/instruments/
24. Cho YA, Kim MK, Cho MS, Nam EY. Nurses' communications with health professionals. J Korean Clin Nurs Res. 2013;19(1):20-32. https://doi.org/10.22650/JKCNR.2013.19.1.20
25. Youn H, Lee M, Jang SJ. Person-centred care among intensive care unit nurses: a cross-sectional study. Intensive Crit Care Nurs. 2022;73:103293. https://doi.org/10.1016/j.iccn.2022.103293
26. Ahmad SR, Rhudy L, Fogelson LA, LeMahieu AM, Barwise AK, Gajic O, et al. Humanizing the intensive care unit: perspectives of patients and families on the get to know me board. J Patient Exp. 2023;10:23743735231201228. https://doi.org/10.1177/23743735231201228
27. Gerritsen RT, Koopmans M, Hofhuis JG, Curtis JR, Jensen HI, Zijlstra JG, et al. Comparing quality of dying and death perceived by family members and nurses for patients dying in US and Dutch ICUs. Chest. 2017;151(2):298-307. https://doi.org/10.1016/j.chest.2016.09.003
28. Kim MW, Park JM, Han AK. Analysis of curriculum of 4-year nursing schools. J Korean Acad Soc Nurs Educ. 2011;17(3):414-23. https://doi.org/10.5977/jkasne.2011.17.3.414
29. Woo YW, Kim KH, Kim KS. Death anxiety and terminal care stress among nurses and the relationship to terminal care performance. Korean J Hosp Palliat Care. 2013;16(1):33-41. https://doi.org/10.14475/kjhpc.2013.16.1.033
30. Detering KM, Hancock AD, Reade MC, Silvester W. The impact of advance care planning on end of life care in elderly patients: randomised controlled trial. BMJ. 2010;340:c1345. https://doi.org/10.1136/bmj.c1345
31. Kim SH, Kim SH. The attitude of primary caregivers of critically ill elderly patients on do-not-resuscitate status. J Korean Geriatr Soc. 2008;12(4):215-21.
32. National Agency for Management of Life-Sustaining Treatment. Advance directives: monthly statistics [Internet]. Seoul: Korea National Institute for Bioethics Policy; 2024 [cited 2024 January 20]. Available from: https://www.lst.go.kr/comm/monthlyStatistics.do
33. Jeon H, Choi J, Lee I. Experiences with a life-sustaining treatment decision system: focus group interview. Bio Ethics Policy. 2023;7(1):25-47. https://doi.org/10.23183/konibp.2023.7.1.002
34. Song HS, Kim KH. A study for the spiritual well-being and the spiritual needs of inpatients. Chung-Ang J Nurs. 2002;6(2):27-35.
35. Kwon EO, Lee MH, Jeong SH, Kim HS. Effects of nurse-physician collaboration on nursing performance and organizational commitment in intensive care unit nurses. J Korean Acad Nurs Adm. 2019;25(3):186-97. https://doi.org/10.11111/jkana.2019.25.3.186

ORIGINAL ARTICLE

Korean J Adult Nurs Vol. 37 No. 2, 165-176, May 2025
eISSN: 2288-338X
https://doi.org/10.7475/kjan.2025.0217

KJAN
Korean Journal of
Adult Nursing

Effects of the Abdominal Draw-in Maneuver and Body Mechanics on Low Back Pain Relief in Nurses: A Quasi-Experimental Study

Saeun Cheon[1], **Seung-bin Park**[2], **Insoon Kang**[3]

[1]*Nurse, Pusan National University Hospital, Busan, Korea*
[2]*Graduate Student, College of Nursing, Pusan National University, Yangsan, Korea*
[3]*Professor, College of Nursing, Pusan National University, Yangsan, Korea*

Received: February 17, 2025
Revised: April 1, 2025
Accepted: April 25, 2025

Corresponding author:
Seung-bin Park
College of Nursing, Pusan National University, 49 Busandaehak-ro, Mulgeum-eup, Yangsan 50612, Korea.
Tel: +82-51-510-8356
E-mail: inicole@naver.com

Purpose: This study evaluated the effectiveness of an intervention combining the abdominal draw-in maneuver (ADIM) and body mechanics for nurses with chronic low back pain (LBP). **Methods:** A non-equivalent control group pretest-posttest design was used, with data collected from August 30 to December 29, 2023. Participants were nurses experiencing chronic LBP ($\geq$3 months) from a university hospital. Participants were allocated by ward units, with the experimental group ($n=30$) enrolled first, followed by the control group ($n=30$). The experimental group received ADIM and body mechanics training, performed ADIM exercises three times weekly for 6 weeks, and received daily text reminders. Exercise adherence and body mechanics usage were monitored weekly. The control group received educational materials upon request after study completion. Outcomes included LBP intensity, LBP disability, lumbar flexibility, and body mechanics performance, analyzed using SPSS version 27.0 through descriptive statistics, the chi-squared test, the Fisher exact tests, the independent t-test, the Mann-Whitney U test, and analysis of covariance. **Results:** Compared to the control group, the experimental group showed significant reductions in LBP intensity ($Z=4.65$, $p<.001$) and LBP disability ($F=7.04$, $p=.010$), as well as improvements in lumbar flexibility ($t=6.15$, $p<.001$) and body mechanics performance ($t=6.91$, $p<.001$). **Conclusion:** The intervention effectively alleviated LBP, reduced disability due to LBP, and improved lumbar flexibility and body mechanics performance. Thus, integrating ADIM with body mechanics may represent a practical and beneficial approach for reducing pain and enhancing functional outcomes among nurses experiencing chronic LBP in clinical settings.

Key Words: Abdominal core; Exercise therapy; Low back pain; Nurses

INTRODUCTION

Nurses face a high risk of musculoskeletal disorders due to the physically demanding nature of patient care and clinical procedures [1]. Among these disorders, low back pain (LBP) is the most common. Previous studies reported that over 50% of nurses experience LBP lasting at least one day per year, and more than 30% suffer chronic LBP persisting for more than one week or recurring at least monthly [2]. Additionally, more than 50% of nurses reported experiencing LBP rated 4 or higher on a Visual Analog Scale [3]. LBP is not only a source of physical discomfort but is also linked to decreased job satisfaction, reduced work efficiency, and increased absenteeism, making it a significant occupational health concern [1,3,4].

LBP in nurses commonly results from patient handling, repetitive bending, prolonged standing, and operating heavy equipment. These activities decrease lumbar strength and flexibility, placing excessive strain on the spine [5]. Furthermore, improper application of body mechanics intensifies lumbar stress and exacerbates LBP [6]. Thus, strategies aimed at enhancing lumbar stability and promoting proper body mechanics are crucial for preventing and managing LBP among nurses.

As most LBP cases resolve naturally over time, non-pharmacological interventions are generally preferred over medication-based treatments [7]. Specifically, chronic nonspecific LBP—defined as pain lasting more than 12 weeks without a clear pathoanatomical cause—is typically managed with non-pharmacological methods, unlike acute or disease-specific LBP [7]. Although various treatments, including massage, acupuncture, manual therapy, and physical therapy, have shown effectiveness, they often require specialized equipment or visits to medical facilities, resulting in financial burden and reliance on professional intervention [8]. In contrast, exercise-based interventions are cost-effective, sustainable, and can be performed independently without specialized equipment or professional supervision [7].

Several studies have investigated exercise interventions for managing LBP in nurses [9,10]. However, these interventions often include between 5 and 22 different exercises, rendering them complex and challenging to maintain, particularly when additional equipment such as stability balls is necessary. Furthermore, shift work and fatigue limit nurses' ability to participate in structured exercise routines, with many nurses prioritizing rest or sleep over physical activity during limited free time [11,12]. Therefore, simpler, practical, and sustainable exercise approaches are required.

Core stabilization exercises strengthen deep spinal muscles, enhance lumbar stability and flexibility, increase range of motion, and reduce LBP disability, making them particularly beneficial for managing chronic LBP [13]. Specifically, activating deep core muscles helps prevent persistent pain and muscle atrophy in chronic LBP patients [14]. Among core stabilization exercises, the abdominal draw-in maneuver (ADIM) has been recognized as an effective method for increasing intra-abdominal pressure by activating the transversus abdominis and internal oblique muscles. Unlike other core stabilization exercises, ADIM requires no specialized equipment or large space, making it highly practical. Previous studies reported that core stabilization exercises, including ADIM, effectively reduced LBP and LBP disability, and improved lumbar flexibility among office workers and chronic LBP patients [13,15,16].

Nurses frequently experience lumbar strain resulting from patient handling and clinical procedures. Without the correct application of body mechanics, the risk of LBP significantly increases. However, structured exercise programs are challenging to adopt due to nurses' shift work and high workloads. Thus, an intervention combining ADIM with body mechanics, as a practical and easily applicable strategy, is necessary. This approach is anticipated to effectively reduce LBP and associated disability, and improve lumbar flexibility and body mechanics performance.

The aim of this study was to investigate the effects of an intervention integrating ADIM and body mechanics performance among nurses experiencing chronic LBP. The primary outcomes measured were LBP intensity and LBP disability, while the secondary outcomes were lumbar flexibility and body mechanics performance.

To achieve this objective, the following hypotheses were formulated: hypothesis 1, that nurses in the experimental group who receive the intervention consisting of ADIM and body mechanics will experience a greater reduction in LBP intensity compared to nurses in the control group; hypothesis 2, that they will experience a greater reduction in LBP disability; hypothesis 3, that they will exhibit greater improvement in lumbar flexibility; and hypothesis 4, that they will demonstrate greater improvement in body mechanics performance.

METHODS

1. Study Design

This quasi-experimental study employed a non-equivalent control group pretest-posttest design to assess the effects of an intervention incorporating the ADIM and body mechanics performance on LBP, LBP disability, lumbar flexibility, and body mechanics performance. This study was reported in accordance with the TREND (Transparent Reporting of Evaluations with Nonrandomized Designs) statement to ensure comprehensive and transparent reporting of nonrandomized intervention data.

2. Participants

The participants were nurses working three shifts in general wards at Pusan National University Hospital who experienced chronic LBP for more than 3 months—defined according to international guidelines [17] and previous studies [7,13]—understood the purpose of the study, and voluntarily consented to participate. Specific inclusion and exclusion criteria were as follows:

Inclusion criteria were nurses working three shifts in general wards, with LBP lasting more than three months, and a mild to moderate pain level (Numeric Rating Scale [NRS] score 1–5). Exclusion criteria included those with lumbar conditions (e.g., herniated disc, spinal stenosis, spondylolisthesis, spinal tumors, or prior lumbar surgery), urological, gynecological, or cardiovascular diseases, pregnancy, a history of hernia, abdominal trauma or surgery, participation in a regular exercise program within the past month, and those working in specialized units such as intensive care units (ICUs) or emergency departments.

Sample size calculation was performed using G*Power version 3.1.9.4 (Heinrich-Heine University, Düsseldorf, Germany). Based on the mean and standard deviations reported in a previous study [15], an effect size (d) of 0.81 was calculated. With an α-level of .05, statistical power (1–β) of .90, and the computed effect size of 0.81, an independent t-test analysis indicated that 26 participants per group were required. To account for potential dropouts, the sample size was increased to 30 per group. No participants withdrew during the study, and no missing data were reported, resulting in a final analytic sample of 60 participants (30 per group) (Figure 1).

3. Research Instruments

1) Participant characteristics

Participant characteristics were collected using 10 items. These included seven general characteristics (sex, age, height, weight, marital status, average daily housework time, and smoking status), two work-related characteristics (department and total clinical experience), and one item regarding LBP-related experiences (hospital treatment, over-the-counter treatment, sick leave, occupational injury claims, job transfer due to LBP, or other relevant experiences). Body mass index was calculated as weight (kg) divided by height squared (m^2).

2) Low back pain

LBP intensity was measured using an NRS, with participants rating their pain from 0 (no pain) to 10 (worst possible pain). Based on a previous study [18], pain was categorized as mild (1–3), moderate (4–5), or severe (6–10).

3) LBP disability

LBP-related disability was assessed using the Korean version of the Oswestry Disability Index (KODI) [19], adapted from the Oswestry Low Back Pain Disability Index [20]. The original tool included 10 items: pain intensity, personal hygiene, lifting, walking, sitting, sleeping, standing, social activities, sexual activity, and traveling. The sexual activity item was excluded due to its low response rate [19], resulting in nine items for this study.

Each item was rated on a scale of 0–5, and the scores were converted to percentages reflecting levels of disability: minimal (0%–20%), moderate (20%–40%), severe (40%–

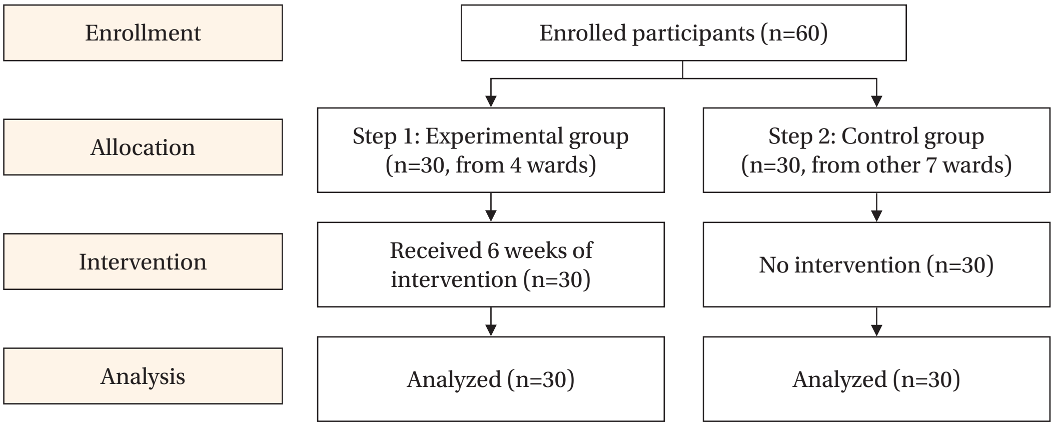


Figure 1. Flow diagram of study participants.

60%), very severe (60%–80%), and extreme disability (80%–100%) [20]. The original study reported a reliability coefficient (Cronbach's alpha) of .92, while in the current study, Cronbach's alpha was .82.

4) Lumbar flexibility

Lumbar flexibility (in cm) was measured using a passive sit-and-reach tester (NFM-888, Nispo, Seoul, Korea), with a measurement range from –20 cm to 43 cm and a minimum measurable unit of 0.1 cm. Following a previous study [21], participants removed their shoes, placed their feet against the vertical plane of the tester, extended their arms forward, and reached as far as possible while keeping their knees straight. Two trials were conducted, with the highest value recorded. Higher scores indicated greater lumbar flexibility.

5) Body mechanics performance

Body mechanics performance was assessed using a 7-item instrument developed by Lee [22], evaluating nurses' adherence to proper body mechanics during work tasks. This tool included assessment of functional posture maintenance, balance, widening of the support base, use of leg muscles, proximity to objects, utilization of body weight, and safe object-handling techniques (e.g., rolling, sliding, pushing, or pulling rather than lifting). Each item was scored on a 5-point Likert scale ranging from 1 ("never") to 5 ("always"), with total scores between 7 and 35. Higher scores indicated greater adherence to correct body mechanics. To ensure understanding, the researchers provided clear explanations and examples. Cronbach's alpha was .84 in the original study and .93 in this study.

4. Intervention Structure

The intervention administered to the experimental group comprised three components: a single session of small-group education, a 6-week period of self-training, and weekly monitoring.

1) Small-group education

The small-group educational session lasted 50 minutes and included lectures, demonstrations, and hands-on practice. Educational materials were provided in PowerPoint format (Microsoft Corp., Redmond, WA, USA) (Table 1).

(1) Proper body mechanics

The first topic, proper body mechanics, was based on principles of postural stability and covered seven key as-

Table 1. Contents of Small Group Education

	Category	Contents	Teaching Method	Duration (minute)
1	Proper body mechanics	Importance and significance of body mechanics Proper body mechanics techniques - Maintaining functional posture - Keeping balance - Widening the base of support and lowering the center of gravity - Using leg muscles - Approaching objects closely - Utilizing body weight - Moving objects (e.g., rolling, sliding, pushing, or pulling rather than lifting)	Lecture	20
2	Abdominal draw-in maneuver (ADIM)	Core stabilization exercises - Introduction to core and deep core muscles - Definition of core stabilization exercises - Benefits and implications of core stabilization exercises What is the ADIM? How to perform the ADIM Practical training using a pressure biofeedback device	Lecture, Demonstration, and Practice	25
3	Precautions	Precautions for self-training after education	Lecture	5

pects: maintaining functional posture, ensuring balance, widening the base of support, using leg muscles, approaching objects closely, using body weight, and applying proper object-handling techniques. Educational content was developed according to previous studies [22,23] and aligned with the measurement instruments utilized in this study. Practical examples were provided to help participants effectively apply body mechanics in clinical practice.

(2) Abdominal draw-in maneuver

The second topic, the ADIM, introduced the concept, benefits, and importance of core stabilization exercises, including specific instructions and hands-on practice. Content and training methods were based on previous literature related to core stabilization exercises [7,16]. Although the ADIM can be performed in standing, supine, and seated positions, prior research has indicated that the seated position is more effective than the supine position and easier to integrate into daily routines [24]. Therefore, this study emphasized the seated position for both training and self-practice.

During the practical session, an air-pressure biofeedback device (Stabilizer, Chattanooga Group, Chattanooga, TN, USA) was used to demonstrate correct movements. This device consists of an inflatable pressure bag connected to a pressure gauge, enabling participants to monitor subtle movements of the spine or abdomen. After the demonstration, participants performed the exercise under supervision from a researcher or research assistant. A portable timer was provided to support self-directed practice.

The ADIM practice procedure using the biofeedback device was adapted from a previous study [24] and conducted as follows: Participants sat upright on a chair with both feet flat on the floor, maintaining knees and hip joints at a 90° angle, and positioning the hips near the edge of the chair. The biofeedback device was placed under the lower back, and participants were instructed to maintain a neutral spine. The biofeedback device was inflated to 40 mmHg while monitoring the pressure gauge. Participants contracted their abdominal wall without moving their spine or pelvis, increasing the pressure reading to 50 mmHg. Participants maintained a pressure of 50 mmHg while drawing the navel inward and upward. They were advised to avoid leaning backward and to minimize tension in the thighs and pelvis.

Finally, important precautions for independent practice were explained, and participants were instructed to contact the researcher via message or phone with any inquiries or concerns.

2) Self-training

Participants performed the ADIM three times weekly for 6 weeks and practiced proper body mechanics during their daily activities. Exercise schedules were adjusted individually.

(1) Abdominal draw-in maneuver

Participants performed ADIM as follows: Participants sat upright on a chair without leaning against the backrest. The lower abdomen was drawn inward toward the spine and held for 10 seconds while maintaining relaxed breathing and avoiding movement of the pelvis or chest. After holding the contraction for 10 s, the lower abdomen was relaxed for 5 seconds. This cycle was repeated 10 times to complete a single set. Five sets were performed per day (50 repetitions) at least three times per week.

(2) Body mechanics practice

On days when exercises were not scheduled, participants received text messages reminding them of body mechanics principles. Messages included key points from educational sessions along with images or illustrations, encouraging participants to incorporate proper body mechanics into daily routines.

3) Weekly monitoring

Adherence to ADIM and body mechanics practice was monitored weekly.

(1) Abdominal draw-in maneuver

To track participation and maintain motivation, individualized exercise logs were created in image format. These logs were sent weekly, accompanied by encouraging messages supporting adherence to the intervention.

(2) Body mechanics practice

Each week, the researcher sent an online self-assessment form via text message. Participants recorded their adherence to body mechanics practices using a 5-point scale: “always,” “often,” “moderate,” “rarely,” or “never.” Self-assessment items aligned with educational content and measurement instruments. Based on participant responses, the researcher provided tailored feedback and sent additional messages reinforcing key body mechanics principles.

After drafting the educational materials and intervention procedures, content validity was reviewed by an expert panel, including a nursing professor, an orthopedic specialist, two ward nurses with experience in LBP, two physical therapists, and three exercise instructors. The materials were revised and finalized based on the panel's feedback.

Before conducting the study, the researcher was trained by a physical therapist experienced in rehabilitation, focusing on the correct performance of the ADIM and use of the air-pressure biofeedback device. The researcher practiced under the physical therapist's supervision and was reassessed over 20 days to ensure accuracy. Training also covered appropriate force application and effective instructional methods for participant education.

The research assistant was a licensed nurse trained in research ethics, whose duties included measuring lumbar flexibility, distributing questionnaires, and assisting with practical exercises. Training was provided in advance to ensure standardized procedures were consistently followed.

5. Study Procedure and Data Collection

Data were collected between August 30 and December 29, 2023. Participants were recruited using convenience sampling via posters and announcements through Pusan National University Hospital's groupware and internal messaging systems. To minimize contamination risks between groups, participants were non-randomly allocated based on their ward units. The experimental group (n = 30) was selected first from four wards, followed by the control group (n = 30) from seven separate wards. All participants were informed of their group allocation before beginning the study.

Pre-intervention assessments were conducted before or after hospital shifts. The experimental group completed assessments in 11 small groups (2–4 participants each), arranged according to their educational session schedules. Control group participants underwent assessments individually upon recruitment. After explaining the study and obtaining written consent, participants completed the survey and submitted it in a sealed envelope. Subsequently, the researcher and research assistant measured lumbar flexibility. This entire assessment process took approximately 10 minutes per participant.

For the small-group education sessions, experimental participants were divided into 11 groups of 2–4 members. Considering shift schedules, nurses on day shifts attended the sessions after work, while evening shift nurses attended before work. After completing pre-intervention assessments, these educational sessions were conducted in a conference room at Pusan National University Hospital, equipped with a projector and sufficient space for education and practice. Printed educational materials were distributed, and PowerPoint presentations were used to teach body mechanics and the ADIM. The researcher demonstrated the techniques, after which participants practiced under supervision and received personalized feedback. Following the practical session, key intervention details and precautions were reviewed.

Exercise adherence was monitored via text messaging; participants sent an "O" after completing each session. If participants missed a session, reminders, and schedule adjustments were provided. Regular communication was maintained throughout the intervention period.

Post-intervention assessments were conducted at the hospital before or after shifts. Experimental group assessments occurred after the 6-week intervention period, while control group assessments took place 6 weeks after the pretest, completed within 3 days considering shift schedules. Participants completed sealed surveys, and lumbar flexibility was measured again. For ethical reasons, control group participants were informed they could request educational materials or training after the study; one participant made such a request and received materials.

6. Ethical Considerations

This study was approved by the Institutional Review Board (IRB no. PNU IRB/2023_98_HR) of Pusan National University and the nursing department of Pusan National University Hospital. Participants were informed about the study's purpose, procedures, measures for anonymity and confidentiality, secure storage of coded data, and restrictions on using data beyond the research context. Participants were also informed of their right to withdraw at any point before signing the consent form. They were advised to report any discomfort or exacerbation of symptoms during the 6-week intervention; however, no issues were reported. After the post-intervention assessments, control group participants who wished to receive educational materials or training were provided with these resources. All participants received a small token of appreciation for their involvement.

7. Data Analysis

Data were analyzed using IBM SPSS version 27.0 (IBM Corp., Armonk, NY, USA), with the significance level set at $p<.05$. Descriptive statistics (frequency, percentage, mean, and standard deviation) were used to summarize participant characteristics, LBP, LBP disability, lumbar flexibility, and body mechanics performance. Baseline homogeneity between the experimental and control groups was tested using the independent t-test, chi-square test, Fisher exact test, and Mann-Whitney U test. The normality of the dependent variables was evaluated using the Kolmogorov-Smirnov test. As LBP did not follow a normal distribution, the Mann-Whitney U test was used for group comparisons, while the independent t-test was performed for lumbar flexibility and body mechanics performance. Since the baseline disability scores were not homogeneous between groups, analysis of covariance (ANCOVA) was conducted to adjust for this covariate. The reliability of the measurement tools was assessed using Cronbach's alpha coefficients.

RESULTS

1. Baseline Homogeneity Test

1) Participant characteristics

The baseline homogeneity analysis of participant characteristics revealed no significant differences between the experimental and control groups, confirming that the groups were homogeneous (Table 2). None of the participants reported currently smoking, taking sick leave, submitting occupational injury claims, or transferring jobs due to LBP. However, some participants reported engaging in non-pharmacological treatments, such as massage and stretching, for LBP relief.

Table 2. Homogeneity Test of General Characteristics of Participants and Outcome Variables in the Two Groups (*N*=60)

Characteristics	Categories	n (%) or M±SD			χ^2 or Z or t	*p*
		Total (n=60)	Exp. (n=30)	Cont. (n=30)		
Sex	Male	1 (1.7)	1 (3.3)	0 (0.0)	-	>.999[†]
	Female	59 (98.3)	29 (96.7)	30 (100.0)		
Age (year)		28.5±3.08	27.8±3.05	29.3±2.96	–1.98	.053
BMI (kg/m^2)		21.0±2.94	21.5±3.21	20.6±2.61	1.27	.209
Marital status	Married	8 (13.3)	5 (16.7)	3 (10.0)		.706[†]
	Single	52 (86.7)	25 (83.3)	27 (90.0)		
Housework (hour)	Almost none	20 (33.3)	9 (30.0)	11 (36.7)	-	.934[†]
	<1	32 (53.3)	17 (56.7)	15 (50.0)		
	≥1	8 (13.3)	4 (13.3)	4 (13.3)		
Working department	Surgery	33 (55.0)	19 (63.3)	14 (46.7)	1.68	.194
	Internal medicine	27 (45.0)	11 (36.7)	16 (53.3)		
Nursing career (month)		69.9±37.67	61.3±39.51	78.5±34.24	–1.81	.076
LBP-related experiences[‡]	Hospital treatment					
	Yes	8 (13.3)	5 (16.7)	3 (10.0)	-	.706[†]
	No	52 (86.7)	25 (83.3)	27 (90.0)		
	OTC treatment					
	Yes	10 (16.7)	6 (20.0)	4 (13.3)	0.480	.488
	No	50 (83.3)	24 (80.0)	26 (86.7)		
	Non-pharmacological treatment					
	Yes	4 (6.7)	2 (6.7)	2 (6.7)	-	>.999[†]
	No	56 (93.3)	28 (93.3)	28 (93.3)		
Outcome variables	LBP	2.93±1.29	3.17±1.15	2.70±1.39	1.39[§]	.166
	LBP disability (%)	13.33±6.81	15.33±7.84	11.33±4.96	2.36	.022
	Lumbar flexibility (cm)	6.67±8.74	5.03±8.55	8.31±8.76	–1.47	.147
	Body mechanics performance	18.30±5.60	17.10±5.45	19.50±5.58	–1.69	.097

BMI=body mass index; Cont.=control group; Exp.=experimental group; LBP=low back pain; M=mean; OTC=over the counter; SD=standard deviation; [†]Fisher's exact test; [‡]Multiple responses; [§]Mann-Whitney U test.

2) LBP, LBP disability, lumbar flexibility, and body mechanics performance

The baseline homogeneity tests showed no significant differences between the experimental and control groups for LBP intensity, lumbar flexibility, or body mechanics performance. However, a significant difference was found between groups in baseline LBP-related disability scores ($t=2.36$, $p=.022$) (Table 2).

2. Hypothesis Testing

The effectiveness of the intervention was evaluated by comparing pre- and post-intervention outcomes in both the experimental and control groups.

1) Primary outcomes

The LBP score decreased in the experimental group from 3.17±1.15 at baseline to 1.60±1.43 post-intervention, whereas the control group showed a slight increase from 2.70±1.39 to 2.77±1.63. The mean difference was –1.57±1.33 for the experimental group and 0.07±1.17 for the control group, demonstrating a statistically significant difference between groups ($Z=4.65$, $p<.001$). Thus, hypothesis 1 was supported (Table 3).

LBP disability scores (%) in the experimental group decreased from 15.33±7.84 to 9.63±7.08, while the control group exhibited only a slight reduction from 11.33±4.96 to 10.89±5.85. After adjusting for baseline LBP disability scores using ANCOVA, the mean differences were –5.70±6.77 in the experimental group and –0.44±4.42 in the control group, with a statistically significant group difference ($F=7.04$, $p=.010$). Therefore, hypothesis 2 was supported (Table 3).

2) Secondary outcomes

Lumbar flexibility improved in the experimental group, increasing from 5.03±8.55 cm to 8.88±8.12 cm, whereas the control group experienced a decrease from 8.31±8.76 cm to 7.56±8.77 cm. The mean difference was 3.85±3.42 cm in the experimental group and –0.76±2.27 cm in the control group, with a statistically significant group difference ($t=6.15$, $p<.001$). Therefore, hypothesis 3 was supported (Table 3).

Body mechanics performance scores improved substantially in the experimental group, from 17.10±5.45 to 28.63±3.99, while the control group showed a smaller increase, from 19.50±5.58 to 21.00±5.57. The mean differences were 11.53±5.98 for the experimental group and 1.50±5.24 for the control group, showing a statistically significant difference between groups ($t=6.91$, $p<.001$). Thus, hypothesis 4 was supported (Table 3).

DISCUSSION

The intervention group showed significant reductions in LBP and LBP disability, as well as notable improvements in lumbar flexibility and body mechanics performance compared to the control group. The following discussion focuses on interpreting these findings.

Regarding the primary outcomes, the participants' average LBP score was approximately 2.9, categorizing their pain as mild (less than 4 points) according to Woo et al. [18]. This finding aligns closely with previous research involving ICU nurses who underwent lumbar stabilization training, which reported an average LBP score of 3.02 [10]. However, it was slightly lower than the average pain score of 3.6 reported in a study involving chronic LBP patients

Table 3. Changes in LBP, LBP Disability, Lumbar Flexibility, and Body Mechanics Performance between the Two Groups ($N=60$)

Variables	Groups	Pre-test	Post-test	Mean differences	Z or F or t	*p*
		M±SD				
LBP	Exp. (n=30)	3.17±1.15	1.60±1.43	–1.57±1.33	4.65[†]	<.001
	Cont. (n=30)	2.70±1.39	2.77±1.63	0.07±1.17		
LBP disability (%)	Exp. (n=30)	15.33±7.84	9.63±7.08	–5.70±6.77	7.04[‡]	0.01
	Cont. (n=30)	11.33±4.96	10.89±5.85	–0.44±4.42		
Lumbar flexibility (cm)	Exp. (n=30)	5.03±8.55	8.88±8.12	3.85±3.42	6.15	<.001
	Cont. (n=30)	8.31±8.76	7.56±8.77	–0.76±2.27		
Body mechanics performance	Exp. (n=30)	17.10±5.45	28.63±3.99	11.53±5.98	6.91	<.001
	Cont. (n=30)	19.50±5.58	21.00±5.57	1.50±5.24		

Cont.=control group; Exp.=experimental group; LBP=low back pain; M=mean; SD=standard deviation; [†]Mann-Whitney U test; [‡]Analysis of covariance.

[25]. Additionally, the average LBP disability score among participants in this study was 13.3%, corresponding to a "minimal disability" level based on Fairbank et al.'s classification [20]. This disability level resembles that reported in a previous study of intensive care nurses [10], who similarly exhibited minimal disability. Likewise, another study of chronic LBP patients reported an average KODI score of approximately 18%, also indicating minimal disability [25]. These findings suggest that nurses in their late 20s with approximately five years of clinical experience commonly experience chronic mild LBP (NRS score ~3), although associated functional disability typically remains minimal.

Following the 6-week intervention, participants' average LBP scores decreased from approximately 3 to 1, and their LBP-related disability scores declined from around 15% to 10%. These outcomes are consistent with a previous study [10] involving 35 ICU nurses who received body mechanics training combined with core stabilization exercises, which resulted in a 1.5-point reduction in LBP and a 6% decrease in disability. Similarly, another study [13] of 36 nurses with chronic LBP reported a 3.4-point pain reduction and significant improvement in disability, as assessed by the Roland-Morris Disability Questionnaire. These collective findings suggest that the ADIM effectively enhances core stability, thereby alleviating both pain and functional limitations. Nurses regularly engage in activities involving forward bending, pulling, lifting, and repositioning patients; thus, proper application of body mechanics is essential for managing LBP. Teaching and implementing correct patient-handling techniques based on body mechanics principles may have significantly contributed to reducing participants' pain levels.

Regarding the secondary outcomes, participants' lumbar flexibility increased from approximately 5 cm at baseline to 9 cm after the 6-week ADIM and body mechanics intervention, representing an improvement of approximately 4 cm. This outcome aligns with previous studies [9,26,27], which similarly reported significant lumbar flexibility improvements of 4–5 cm after core stabilization training. Improved lumbar flexibility observed in this study may be attributable to enhanced spinal stability, maintenance of proper posture, and effective application of body mechanics principles, all potentially contributing to reduced LBP. Chronic LBP is known to impair spinal flexibility and muscle strength, consequently limiting the range of motion (ROM) [28]. Thus, evaluating lumbar flexibility and ROM is critical for assessing intervention effectiveness. However, in this study, ROM was assessed exclusively in forward-bending positions, despite potential ROM limitations also existing during rotational and extension movements.

In addition, body mechanics performance scores improved markedly from approximately 17 to 29 out of a possible 35 points following the intervention, demonstrating substantial improvement in participants' application of body mechanics principles. This improvement surpasses findings from a previous study [10], in which body mechanics scores increased by approximately 7 points following a single educational session combined with 6 weeks of core stabilization exercises. The greater improvement observed in the current study suggests a particularly effective intervention, possibly due to continuous reinforcement of body mechanics principles through daily text message reminders that encouraged the integration of proper techniques into daily activities. Previous research on body mechanics education has highlighted the importance of repeated training sessions at 1-week [6] or 2-week intervals [29]. While acquiring knowledge is important, practical application of body mechanics in daily routines is critical. Continuous motivation and frequent exposure to body mechanics principles through various media can facilitate behavioral change, thus constituting a vital component of effective body mechanics interventions.

The participants had an average age of 28.5 years and an average clinical experience of 5.8 years. This profile is comparable to previous studies involving nurses with LBP [9,10], where participants were also predominantly in their late 20s. However, participants in this study had slightly more clinical experience than the approximately 3-year average reported in prior studies. This difference may relate to previous findings that LBP is prevalent among nurses in their 20s [30], whereas older nurses, who are typically more adapted to their roles and engage more frequently in managerial tasks, tend to report less LBP [31]. Nevertheless, previous research has yielded conflicting results regarding the association between years of clinical experience and LBP, with some studies suggesting that prolonged employment increases LBP risk [5], particularly among nurses with more than 10 years of experience [32]. Consequently, further research including nurses with broader age ranges and varying lengths of work experience is warranted.

With respect to participants' experiences with LBP, 70% reported no prior treatment, indicating a tendency among nurses to refrain from active LBP management. This finding aligns with a previous study by Jang and Park [10], which similarly reported that 74% of participants had received no prior treatment. It is also consistent with another study on musculoskeletal symptoms among nurses at small- and medium-sized hospitals [2], where 49% of nurses with LBP had not sought treatment. This reluctance to seek treatment may relate to nurses' struggles to engage in preventive health behaviors, such as regular medical checkups and physical activity, due to demanding working hours and irregular shifts [11]. Similarly, Ross et al. [12] noted that nurses often recognize the importance of health management but encounter practical difficulties in adopting such behaviors because of shift work, fatigue, and family obligations, leading to low adherence rates for health-promoting practices. Therefore, practical and proactive strategies beyond raising awareness are essential to effectively support nurses in managing their LBP.

This study had several limitations. First, the LBP assessment relied on self-reported data, which could introduce subjective bias. Similarly, exercise adherence and body mechanics performance were also self-reported, limiting the objectivity of the findings. Among the outcome variables, lumbar flexibility was objectively measured; however, this study only assessed flexibility using the forward-bending position. Second, the study design did not include randomization and blinding, potentially introducing threats to internal validity. Additionally, the study protocol was not registered in a clinical trial registry, a measure that could have enhanced transparency and reduced reporting bias.

Despite these limitations, the intervention combining ADIM and body mechanics training was found to be effective in reducing LBP, alleviating functional disability, improving lumbar flexibility, and enhancing body mechanics performance among nurses. This intervention integrated ADIM with body mechanics training, enabling nurses to independently manage their LBP in everyday practice. Unlike conventional single-session training approaches, this intervention reinforced key concepts through daily text message reminders and weekly self-assessments, promoting sustained engagement. Given its practical applicability, this intervention represents a feasible and effective strategy for nurses frequently at risk for LBP due to patient handling tasks and heavy equipment use in demanding clinical settings.

CONCLUSION

This study demonstrated the effectiveness of an intervention integrating ADIM and body mechanics principles in reducing LBP and LBP-related disability while simultaneously improving lumbar flexibility and body mechanics performance among nurses experiencing chronic LBP. These findings provide practical evidence supporting a simple yet efficient intervention strategy that can easily be incorporated into daily routines, enhancing its applicability in clinical settings to prevent and manage musculoskeletal disorders among nurses. Moreover, this intervention offers a feasible self-management approach that allows nurses to decrease work-related physical strain and increase physical resilience, thereby contributing to improved nursing care quality and advancement of evidence-based nursing practices.

Future research should include more objective evaluations of intervention effectiveness, such as measurements of lumbar ROM (including rotation and extension movements) and assessments of deep muscle activation using ultrasound. Additionally, studies utilizing digital platforms, such as mobile application-based programs, are recommended to support nurses in maintaining long-term adherence to interventions.

ORCID

Saeun Cheon, https://orcid.org/0009-0001-5039-4728
Seung-bin Park, https://orcid.org/0009-0000-3057-2905
Insoon Kang, https://orcid.org/0000-0002-3637-2549

CONFLICTS OF INTEREST

The authors declared no conflict of interest.

AUTHORSHIP

Study conception and/or design acquisition - SC and IK; data collection and analysis - SC and SBP; interpretation of the data - SC and IK; and drafting or critical revision of the manuscript for important intellectual content - SC and SBP.

FUNDING

None.

ACKNOWLEDGEMENT

This article is a condensed form of the first author's master's thesis from Pusan National University.

DATA AVAILABILITY STATEMENT

The data can be obtained from the corresponding authors.

REFERENCES

1. Tuna R, Eskin Bacaksiz F, Kahraman B. Compassion satisfaction, compassion fatigue, burnout, working environments, and musculoskeletal disorders among nurses. Perspect Psychiatr Care. 2022;58(4):2321-9. https://doi.org/10.1111/ppc.13063
2. Jung JS, Eun Y. Factors associated with musculoskeletal symptoms in small and medium sized hospital nurses. J Muscle Jt Health. 2017;24(3):159-170. https://doi.org/10.5953/JMJH.2017.24.3.159
3. Uhm HJ, Park HJ. Low back pain and its influencing factors among intensive care unit nurses: a cross-sectional study. J Health Info Stat. 2022;47(2):95-102. https://doi.org/10.21032/jhis.2022.47.2.95
4. Sorour AS, El-Maksoud MM. Relationship between musculoskeletal disorders, job demands, and burnout among emergency nurses. Adv Emerg Nurs J. 2012;34(3):272-82. https://doi.org/10.1097/TME.0b013e31826211e1
5. Alnaami I, Awadalla NJ, Alkhairy M, Alburidy S, Alqarni A, Algarni A, et al. Prevalence and factors associated with low back pain among health care workers in southwestern Saudi Arabia. BMC Musculoskelet Disord. 2019;20(1):56. https://doi.org/10.1186/s12891-019-2431-5
6. Moazzami Z, Dehdari T, Taghdisi MH, Soltanian A. Effect of an ergonomics-based educational intervention based on transtheoretical model in adopting correct body posture among operating room nurses. Glob J Health Sci. 2015;8(7):26-34. https://doi.org/10.5539/gjhs.v8n7p26
7. Qaseem A, Wilt TJ, McLean RM, Forciea MA; Clinical Guidelines Committee of the American College of Physicians, Denberg TD, et al. Noninvasive treatments for acute, subacute, and chronic low back pain: a clinical practice guideline from the American College of Physicians. Ann Intern Med. 2017;166(7):514-30. https://doi.org/10.7326/M16-2367
8. Abdelraouf OR, Abdel-Aziem AA. The relationship between core endurance and back dysfunction in collegiate male athletes with and without nonspecific low back pain. Int J Sports Phys Ther. 2016;11(3):337-44.
9. Kwon H, Jung H. Effect of strengthening program for nurses in relation to back pain, flexibility and muscle strength. J Korean Data Anal Soc. 2009;11(1):213-27.
10. Jang HM, Park HJ. Effects of a lumbar stabilization exercise program on low back pain, the Oswestry Disability Index, use of body mechanics, and lumbar strength among intensive care unit nurses. J Health Info Stat. 2022;47(3):209-16. https://doi.org/10.21032/jhis.2022.47.3.209
11. Kim MH, Lee JS. The health care experience of the clinical nurse in a university hospital. J Korea Acad Ind Coop Soc. 2016;17(1):209-18. http://doi.org/10.5762/KAIS.2016.17.1.209
12. Ross A, Bevans M, Brooks AT, Gibbons S, Wallen GR. Nurses and health-promoting behaviors: knowledge may not translate into self-care. AORN J. 2017;105(3):267-75. https://doi.org/10.1016/j.aorn.2016.12.018
13. Noormohammadpour P, Kordi M, Mansournia MA, Akbari-Fakhrabadi M, Kordi R. The role of a multi-step core stability exercise program in the treatment of nurses with chronic low back pain: a single-blinded randomized controlled trial. Asian Spine J. 2018;12(3):490-502. https://doi.org/10.4184/asj.2018.12.3.490
14. Roh JS, Park HY. The effect of balance core exercise on spinal variation, physical fitness and visual analogue scale of the middle-aged women with chronic back pain. Korean J Growth Dev. 2020;28(4):503-12. https://doi.org/10.34284/KJGD.2020.11.28.4.503
15. Puntumetakul R, Saiklang P, Tapanya W, Chatprem T, Kanpittaya J, Arayawichanon P, et al. The effects of core stabilization exercise with the abdominal drawing-in maneuver technique versus general strengthening exercise on lumbar segmental motion in patients with clinical lumbar instability: a randomized controlled trial with 12-month follow-up. Int J Environ Res Public Health. 2021;18(15):7811. https://doi.org/10.3390/ijerph18157811
16. Song HS, Jeong YS, Kim YH. The effect of abdominal drawing-in maneuver on chronic low back pain in office workers on lumbar dysfunction and balance ability. J Korean Acad Orthop Man Phys Ther. 2021;27(3):79-87. https://doi.org/10.23101/kaompt.2021.27.3.79

17. World Health Organization. WHO guideline for non-surgical management of chronic primary low back pain in adults in primary and community care settings. World Health Organization report. Geneva: World Health Organization; 2023 December.
18. Woo A, Lechner B, Fu T, Wong CS, Chiu N, Lam H, et al. Cut points for mild, moderate, and severe pain among cancer and non-cancer patients: a literature review. Ann Palliat Med. 2015;4(4):176-83. https://doi.org/10.3978/j.issn.2224-5820.2015.09.04
19. Jeon CH, Kim DJ, Kim DJ, Lee HM, Park HJ. Cross-cultural adaptation of the Korean version of the Oswestry Disability Index (ODI). J Korean Soc Spine Surg. 2005;12(2):146-52. https://doi.org/10.4184/jkss.2005.12.2.146
20. Fairbank JC, Couper J, Davies JB, O'Brien JP. The Oswestry low back pain disability questionnaire. Physiotherapy. 1980;66(8):271-3.
21. Roh JS, Jeong GY. The effects of aerobic exercise on body composition and fitness in the elderly men. Korean J Growth Dev. 2020;28(2):221-7. https://doi.org/10.34284/KJGD.2020.05.28.2.221
22. Lee HJ. Effects of the Tuina program on nurses with low back pain [dissertation]. Seoul: Hanyang University; 2002.
23. Hegewald J, Berge W, Heinrich P, Staudte R, Freiberg A, Scharfe J, et al. Do technical aids for patient handling prevent musculoskeletal complaints in health care workers?: a systematic review of intervention studies. Int J Environ Res Public Health. 2018;15(3):https://doi.org/10.3390/ijerph15030476
24. Kim SC, Kim SG, Kim CS. Effect of abdominal draw in maneuver in sitting position. J Rehabil Welfare Eng Assist Technol. 2017;11(3):207-14. https://doi.org/10.21288/resko.2017.11.3.207
25. Ahn JH, Kim HS, Kim HJ. Pain, disability, emotional status and educational needs between acute and chronic low back pain groups. J Korean Biol Nurs Sci. 2019;21(1):77-84. https://doi.org/10.7586/jkbns.2019.21.1.77
26. Chang IS, Kang HS. The effect of exercise for the prevention of low back pain on back pain, back strength, flexibility operating room nurses. J Korean Clin Nurs Res. 2004;10(1):125-33.
27. Lee K, Jung H. The effect of core program on back pain, back strength and flexibility to nurses. J Korean Data Anal Soc. 2007;9(4):1693-706.
28. Gill K, Krag MH, Johnson GB, Haugh LD, Pope MH. Repeatability of four clinical methods for assessment of lumbar spinal motion. Spine (Phila Pa 1976). 1988;13(1):50-3. https://doi.org/10.1097/00007632-198801000-00012
29. Abdollahi T, Pedram Razi S, Pahlevan D, Yekaninejad MS, Amaniyan S, Leibold Sieloff C, et al. Effect of an ergonomics educational program on musculoskeletal disorders in nursing staff working in the operating room: a quasi-randomized controlled clinical trial. Int J Environ Res Public Health. 2020;17(19):7333. https://doi.org/10.3390/ijerph17197333
30. Kim J, Lee JA, Choi SH, Hwang SS, Jung MH. Nurses and low back pain: a literature review. J Korean Soc Living Environ Syst. 2007;14(4):298-312.
31. Sung MH, Seo DH, Eum OB. Factors affecting low back pain in nurses in intensive care unit. J Korean Acad Fundam Nurs. 2010;17(3):343-50.
32. Sun W, Zhang H, Tang L, He Y, Tian S. The factors of non-specific chronic low back pain in nurses: a meta-analysis. J Back Musculoskelet Rehabil. 2021;34(3):343-53. https://doi.org/10.3233/BMR-200161

ORIGINAL ARTICLE

Korean J Adult Nurs Vol. 37 No. 2, 177-187, May 2025
eISSN: 2288-338X
https://doi.org/10.7475/kjan.2025.0325

KJAN
Korean Journal of
Adult Nursing

Mediating Effect of Shared Decision-Making on the Relationship between Patient Activation and Self-Management in Patients on Hemodialysis: A Cross-Sectional Study

Mi Yeon Kim[1], So Young Yun[2]

[1]*Nurse, Gwangju Korea Hospital, Gwangju, Korea*
[2]*Professor, Department of Nursing, Nambu University, Gwangju, Korea*

Received: March 25, 2025
Revised: April 23, 2025
Accepted: May 13, 2025

Corresponding author:
So Young Yun
Department of Nursing, Nambu University, 1 Nambudae-gil, Gwangsan-gu, Gwangju 62271, Korea.
Tel: +82-62-970-0223
Fax: +82-62-972-6200
E-mail: yunsy@nambu.ac.kr

Purpose: This descriptive correlational study aimed to evaluate the impact of patient activation on self-management and explore the mediating role of shared decision-making (SDM) among patients on hemodialysis. **Methods:** A cohort of 136 participants was recruited from hemodialysis units in Gwangju, South Korea, between August 9 and 22, 2024. Patient activation, self-management, and SDM were assessed using the Patient Activation Measure (PAM-13), the Hemodialysis Self-Management Instrument (HDMI-K), and the 9-item Shared Decision-Making Questionnaire (SDM-Q-9), respectively. Descriptive statistics, Pearson's correlation analysis, and mediation analysis using the PROCESS macro were conducted to analyze the data. **Results:** Patient activation, SDM, and self-management were positively correlated with one another. Mediation analysis showed that patient activation significantly predicted both SDM and self-management. SDM also significantly predicted self-management, confirming its partial mediating effect. The final model explained 54.5% of the variance in self-management. The indirect effect of patient activation on self-management through SDM was statistically significant (indirect effect = 0.05, 95% confidence interval [CI] = 0.02–0.10). The indirect effect of patient activation on self-management through SDM was statistically significant (indirect effect = 0.05, 95% CI = 0.02–0.10). **Conclusion:** Patient activation directly and indirectly enhances self-management through SDM, verifying the partial mediating role of SDM. Integrating SDM into nursing interventions is essential for effectively supporting self-management in patients undergoing hemodialysis.

Key Words: Hemodialysis; Self-management; Decision making, shared

INTRODUCTION

Chronic kidney disease (CKD) is characterized by persistent kidney dysfunction lasting over 3 months, resulting in a gradual decline in glomerular filtration rate and eventual loss of renal function. CKD can become life-threatening without renal replacement therapy [1]. Advances in medical technology and increased access to treatment have led to a continual rise in the incidence and prevalence of CKD. Consequently, the proportion of patients undergoing hemodialysis as renal replacement therapy has also increased [1].

Patients undergoing hemodialysis often experience a considerable disease burden, as the dialysis process itself contributes to cumulative physical and mental fatigue, thereby significantly impairing quality of life [1,2]. Treatment regimens typically necessitate hospital visits two to three times per week, with each session lasting approximately 4 hours, imposing substantial restrictions on daily activities. In addition to physical exhaustion, patients frequently encounter psychological and social challenges [1-3]. During the initial stages of hemodialysis, patients may experience shock following diagnosis, leading to denial or passive coping behaviors. Over time, adhering to dietary restrictions, fluid management, and medication regimens becomes challenging, making self-management increasingly difficult [3,4].

Self-management is defined as the process of maintaining health through health-promoting practices and effective illness management [5]. This comprehensive concept extends beyond mere adherence to treatment, encompassing lifestyle modifications necessitated by the disease and psychosocial adjustments [5,6]. Inadequate self-management can result in complications and disease progression, underscoring the importance of proactive self-care among patients undergoing hemodialysis [4]. Healthcare professionals play a pivotal role in strengthening patients' self-management capabilities through continuous monitoring and support.

Patient activation refers to a patient's possession of the necessary knowledge, skills, and confidence required to effectively manage their health [7]. It serves as an essential precursor to successful self-management practices [8]. Higher levels of patient activation correlate with increased patient engagement in health management and collaborative interactions with healthcare professionals in making treatment decisions [8,9]. Hibbard et al. [10] identified patient activation as a key factor in enhancing self-management efficacy, whereas Hussein et al. [9] observed that increased patient activation is associated with more proactive participation in self-care activities, particularly among patients on hemodialysis.

Shared decision-making (SDM) is a collaborative process wherein patients and healthcare providers exchange information and jointly determine the treatment plan [11]. This approach is pivotal for improving patient health outcomes and satisfaction with care [12]. SDM positively influences various treatment aspects in patients on hemodialysis, including dialysis modality selection and vascular access methods [13]. Higher SDM levels correlate with improved patient understanding of their treatment and increased adherence to therapeutic regimens [12,13].

SDM and patient activation are closely related; patients with higher activation levels are more likely to actively participate in the SDM process [14,15]. Vitger et al. [15] reported that SDM enhances patient activation, boosts confidence in communicating with healthcare providers, and promotes self-management. In hemodialysis, participation in SDM fosters a patient-centered care environment, improving dietary control, adherence to fluid restrictions, and proactive disease-management attitudes [16]. Additionally, higher SDM levels have been linked to improved clinical outcomes, including better blood pressure control, blood glucose management, and mental health status through enhanced self-management [15,17].

The relationship among patient activation, SDM, and self-management can be theoretically explained by the Middle-Range Theory of Self-Care of Chronic Illness proposed by Riegel et al. [5]. This theory emphasizes that self-care behaviors occur through decision-making processes. Within this framework, patient activation serves as a motivational foundation for engaging in self-care, while SDM functions as a facilitating mechanism, enabling patients to make informed judgments regarding changes in their health status. In this context, SDM can be interpreted as a mediating mechanism that translates patient activation into concrete self-management behaviors.

While previous studies have identified associations among patient activation, SDM, and self-management, most have primarily examined correlations. Given the theoretical connections among these variables, it is important to investigate whether SDM mediates the relationship between patient activation and self-management, particularly among patients undergoing hemodialysis. Mediation analysis is useful for determining whether SDM mediates the effect of patient activation on self-management and serves as a critical method for identifying effective nursing intervention strategies.

Accordingly, this study aimed to analyze the impact of patient activation on self-management and determine whether SDM serves as a mediator in this relationship, with the ultimate goal of informing practical nursing approaches to enhance self-management among patients undergoing hemodialysis.

METHODS

1. Study Design

A descriptive correlational design was employed to analyze the relationships among patient activation, self-management, and SDM in patients undergoing hemodialysis and to assess the mediating role of SDM. The manuscript was prepared in accordance with the STROBE statement for cross-sectional observational research.

2. Participants

Participants were recruited from the hemodialysis units of three general hospitals and one medical clinic located in Gwangju City. These institutions were chosen based on their high patient volumes, willingness to participate, and accessibility for data collection. Inclusion criteria comprised adult patients diagnosed with CKD undergoing regular hemodialysis two to three times weekly for at least 6 months, who understood the study's purpose and consented to participate. Exclusion criteria included patients diagnosed with cognitive impairments such as dementia or psychiatric disorders, those unable to communicate, and those unable to respond to written surveys.

The required sample size was determined using G-Power 3.1.9.7 [18], considering 10 predictor variables, a significance level of .05, a statistical power of .80, and an effect size of 0.15, classified as medium-to-large according to the literature [19]. This calculation indicated that a minimum of 118 participants was necessary. Accounting for a potential dropout rate of 20%, 142 participants were recruited. After excluding six participants for insincere responses, data from 136 participants were retained. Mediation analysis was performed using bootstrapping. According to Fritz and MacKinnon [20], a sample of this size is adequate to detect medium-sized indirect effects with 80% power, ensuring statistical validity for mediation analysis.

3. Study Instruments

1) Patient activation

Patient activation was assessed using the Korean version of the Patient Activation Measure (PAM-13) [21], originally developed by Hibbard et al. [7]. This instrument evaluates an individual's knowledge, skills, and confidence related to health management. Each item is rated on a 4-point Likert scale, with higher scores indicating greater patient activation. Scores classify patient activation into four levels: level 1 (≤47.0), indicating no recognition of the need for an active health management role; level 2 (47.1–55.1), denoting insufficient knowledge, skills, and confidence to act proactively; level 3 (55.2–67.0), reflecting initiation of active health-related behavior; and level 4 (≥67.1), representing sustained proactive self-management, even under stress. The original instrument reported a Cronbach's alpha of .87 [7], while a previous study by Ahn et al. [22] reported a reliability coefficient of .88. In this study, Cronbach's alpha was .92.

2) Self-management

Self-management behaviors were measured using the Hemodialysis Self-Management Instrument-Korean version (HDMI-K), adapted from the original Hemodialysis Self-Management Instrument (HDMI) developed by Song and Lin [23] and translated into Korean by Cha and Kang [24]. The HDMI-K consists of 20 items across four sub-domains: problem-solving and communication, fluid and weight management, diet and dialysis management, and self-advocacy and emotional management. Responses were recorded using a 4-point Likert scale, with higher scores indicating better self-management practices. The original instrument showed a Cronbach's alpha of .87 [21], while Cha and Kang [24] reported .89. The alpha coefficient in the present study was .92.

3) Shared decision-making

The extent of SDM was evaluated using the 9-item Shared Decision-Making Questionnaire (SDM-Q-9) developed by Kriston et al. [25]. This tool assesses the degree to which patients perceive involvement in healthcare providers' decision-making processes. Each item is rated on a 5-point Likert scale, with higher scores indicating greater SDM levels. The original instrument demonstrated a Cronbach's alpha of .93 [25]. A previous study by Shin [19] using the Korean version reported reliability at 0.96; in this study, Cronbach's alpha was .94.

4. Data Collection

Data collection occurred from August 9 to 22, 2024. The researcher visited three general hospitals and one internal medicine clinic in Gwangju to explain the study's purpose and procedures to hospital directors, nephrology staff, and participants. These institutions were selected among those operating hemodialysis units based on patient volume, willingness to participate, and accessibility for data collection. Recruitment notices prepared by the research team were posted on bulletin boards at participating facilities, with hospital administrators' permission. In some cases, hospital staff assisted in posting notices within dialysis units. Eligible patients on hemodialysis who voluntarily expressed interest through recruitment notices received detailed study information from research assistants. After providing written informed consent, participants completed the surveys independently, with research assistants offering clarification without influencing responses. Surveys were administered following participants' outpatient dialysis sessions, after a 15-minute rest period post-dialysis, as recommended by nephrologists.

To ensure confidentiality, completed questionnaires were sealed in envelopes. A total of 142 questionnaires were distributed and collected. After excluding six insincere responses, 136 were included in the final analysis.

5. Ethical Considerations

This study was approved by the Institutional Review Board of Nambu University (approval No. 1041478-2024-HR-006). Participants were informed about the study's purpose, procedures, potential discomfort, confidentiality measures, and their right to withdraw at any time without penalty. Surveys were processed anonymously, without identifying information, and data were stored in password-protected files accessible only to the principal investigator and research staff. Collected data will be retained for 3 years, after which physical documents will be shredded, and electronic files permanently deleted. Participants were offered a small token of appreciation for their involvement.

6. Data Analysis

The collected data were analyzed using SPSS Win version 29.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics, including frequencies, percentages, means, and standard deviations, were calculated to describe participants' general characteristics. Independent t-tests and one-way analysis of variance were performed to examine differences in patient activation, self-management, and SDM across demographic variables, with Scheffé's test conducted for post-hoc analyses. Pearson's correlation coefficients were computed to assess relationships among patient activation, self-management, and SDM. The mediating effect of SDM on the relationship between patient activation and self-management was evaluated using Hayes' PROCESS macro (model 4). Hayes developed the PROCESS macro [26], a statistical tool used in SPSS and SAS for mediation, moderation, and conditional process model analyses, employing bootstrapping methods to determine the significance of indirect effects.

RESULTS

1. General Characteristics

The study included 136 participants with a mean age of 59.14±13.37 years. Men comprised 64.7% (n=88) of the sample, and women accounted for 35.3% (n=48). Regarding educational attainment, 72.8% (n=99) had completed high school or university-level education. The most common comorbidities among participants were hypertension (69.9%) and diabetes (48.5%). The average duration of hemodialysis treatment was 61.15±57.32 months. Additionally, 73.5% (n=100) had received dialysis self-management education, and 83.1% (n=113) had participated in decisions regarding their dialysis modality (Table 1).

2. Differences in Patient Activation, SDM, and Self-Management Based on Participant Characteristics

The analysis revealed significant differences in patient activation, self-management, and SDM scores based on education level, presence of comorbid conditions, experience with self-management education, and involvement in dialysis modality decision-making (Table 1).

1) Patient activation

Patient activation scores differed significantly by education level ($F=4.23$, $p=.017$). Participants with less than a high school education reported significantly lower activation scores compared to those with high school to college education. Additionally, higher activation scores were observed among participants with hypertension ($t=-2.47$, $p=.015$), those who had received self-management education ($t=3.51$, $p=.001$), and those who participated in dialysis modality decision-making ($t=3.58$, $p<.001$).

https://doi.org/10.7475/kjan.2025.0325

Table 1. General Characteristics of Participants and Differences in Patient Activation, Shared Decision-Making, and Self-Management According to General Characteristics (*N*=136)

Characteristics	Categories		n (%) or M±SD	Patient activation		Self-management		Shared decision-making	
				M±SD	t or F (*p*)	M±SD	t or F (*p*)	M±SD	t or F (*p*)
Age (year)			59.14±13.37						
Sex	Men		88 (64.7)	61.92±16.00	0.79 (.430)	58.16±9.86	0.85 (.399)	76.26±15.51	2.54 (.013)
	Women		48 (35.3)	59.61±16.77		56.65±10.17		67.08±22.27	
Education[†]	Less than high school[a]		31 (22.8)	54.15±18.26	4.23 (.017)	52.52±11.35	6.10 (.003)	62.44±23.73	7.23 (.001)
	High school to college[b]		99 (72.8)	63.49±15.30	a<b[†]	59.34±9.14	a<b[†]	75.91±16.04	a<c[†]
	Graduate school[c]		6 (4.4)	57.68±10.76		55.67±6.50		80.00±5.79	
Cohabitation Status	Alone		35 (25.7)	60.06±18.19	−0.44 (.662)	56.86±10.96	-0.53 (.598)	71.05±18.03	−0.73 (.469)
	With family		101 (74.3)	61.49±15.61		57.89±9.63		73.71±18.88	
Comorbidities	Diabetes	Yes	66 (48.5)	58.72±17.26	1.67 (.097)	55.02±10.46	3.06 (.003)	73.81±19.71	0.51 (.614)
		No	70 (51.5)	63.35±15.03		60.09±8.85		72.19±17.53	
	Hypertension	Yes	95 (69.9)	63.32±15.50	−2.47 (.015)	58.48±8.91	−1.54 (.126)	74.74±16.53	−1.64 (.103)
		No	41 (30.1)	55.96±16.97		55.63±11.93		69.05±22.51	
	Coronary disease	Yes	25 (18.4)	60.48±14.63	0.21 (.834)	57.60±9.17	0.01 (.989)	75.64±18.74	−0.78 (.438)
		No	111 (81.6)	61.24±16.66		57.63±10.17		72.43±18.64	
Dialysis duration (month)			61.15±57.32						
Self-management education experience		Yes	100 (73.5)	63.92±15.51	3.51 (.001)	59.06±9.07	2.88 (.005)	76.60±16.66	3.57 (.001)
		No	36 (26.5)	53.26±15.91		53.64±11.29		63.09±20.40	
Participated in dialysis modality selection		Yes	113 (83.1)	63.26±15.88	3.58 (<.001)	59.03±8.97	3.19 (.004)	76.87±15.17	4.63 (<.001)
		No	23 (16.9)	50.49±13.95		50.74±11.80		54.11±22.55	

M=mean; SD=standard deviation; [†]Scheffé.

2) Self-management

Self-management scores also significantly differed by education level (F=6.10, *p*=.003). Participants with less than a high school education reported significantly lower scores compared to those with high school to college education. Higher self-management scores were also observed among participants without diabetes (t=3.06, *p*=.003), those who had received self-management education (t=2.88, *p*=.005), and those involved in dialysis modality decision-making (t=3.19, *p*=.004).

3) Shared decision-making

SDM scores were significantly higher among male participants than among female participants (t=2.54, *p*=.013). Additionally, SDM scores varied significantly according to education level (F=7.23, *p*=.001), with participants having graduate-level education reporting significantly higher SDM scores compared to those with less than a high school education. Higher SDM scores were also significantly associated with having received self-management education (t=3.57, *p*=.001) and participating in dialysis modality decision-making (t=4.63, *p*<.001).

No significant differences were found based on age, the presence of cohabiting family members, the duration of hemodialysis, or other comorbidities such as coronary artery disease, malignancy, or autoimmune diseases.

3. Patient Activation, Self-Management, and SDM

Participants' average scores for patient activation, self-management, and SDM were 61.10±16.25, 57.63±9.96, and 73.02±18.63, respectively. Patient activation levels were distributed as follows: level 1 included 25 participants (18.4%), level 2 included 25 participants (18.4%), level 3 included 39 participants (28.7%), and level 4 included 47 participants (34.5%) (Table 2).

4. Correlations among Patient Activation, SDM, and Self-Management

Patient activation was significantly positively correlated with self-management (r=0.67, *p*<.001) and SDM (r=0.47,

$p < .001$). Additionally, self-management showed a significant positive correlation with SDM ($r = 0.52$, $p < .001$) (Table 3).

5. Mediation Analysis of Patient Activation, SDM, and Self-Management

Key assumptions were assessed to ensure the validity of the regression analysis. The Durbin-Watson statistic was 2.170, smaller than the critical value of 2.235 ($d_u < d < 4-d_u$), indicating no autocorrelation and thus confirming the independence of observations. Multicollinearity was evaluated using the variance inflation factor (1.317), which remained below the threshold of 10, demonstrating the absence of multicollinearity. Homoscedasticity was verified through the Breusch-Pagan test ($p = .267$), confirming constant variance of residuals. These findings demonstrated that the regression model satisfied fundamental assumptions, supporting its appropriateness for the analysis.

The mediating effect of SDM on the relationship between patient activation and self-management was analyzed using Hayes' PROCESS macro model 4 [26]. The analysis controlled for variables that exhibited significant differences in self-management scores: education level, diabetes presence, self-management education experience, and involvement in dialysis modality decision-making. Patient activation was significantly associated with both SDM ($\beta = .33$, $p < .001$) and self-management ($\beta = .52$, $p < .001$). Furthermore, SDM exhibited a significant positive impact on self-management ($\beta = .25$, $p = .001$). The overall model explained 54.5% of the variance in self-management ($R^2 = .545$) (Table 4). Bootstrapping analysis with 5,000 resamples indicated a statistically significant indirect effect of patient activation on self-management through SDM (indirect effect = 0.05, 95% confidence interval = 0.02–0.10), confirming that SDM partially mediated the relationship between patient activation and self-management (Table 5).

DISCUSSION

This study examined the mediating effect of SDM on the relationship between patient activation and self-management in patients undergoing hemodialysis. The analysis confirmed that SDM partially mediated this relationship, indicating that patient activation contributes directly and indirectly to self-management through SDM. These findings highlight that, while higher patient activation promotes self-management behaviors, the effectiveness and sustainability of these behaviors are enhanced when patients actively engage in SDM by communicating and collaborating with healthcare professionals. By empirically demonstrating the mediating role of SDM, this study provides critical insights into its underlying mechanism and underscores the importance of integrating SDM strategies into nursing interventions for patients undergoing hemodialysis.

In this study, the average activation level among patients undergoing hemodialysis corresponded to level 3, repre-

Table 2. Patient Activation, Shared Decision-Making, and Self-Management among Participants (*N* = 136)

	n (%) or M ± SD	Min	Max	Range
Patient activation	61.10 ± 16.25	26	100	1–100
Level 1 (≤ 47.0)	25 (18.4)			
Level 2 (47.1–55.1)	25 (18.4)			
Level 3 (55.2–67.0)	39 (28.7)			
Level 4 (≥ 67.1)	47 (34.5)			
Self-management	57.63 ± 9.96	26	78	20–80
Shared decision-making	73.02 ± 18.63	0.0	100	0–100

M = mean; SD = standard deviation.

Table 3. Correlations between Patient Activation, Self-Management and Shared Decision-Making (*N* = 136)

	r (*p*)		
	Patient activation	Self-management	Shared decision-making
Patient activation	1		
Self-management	.67 (< .001)	1	
Shared decision-making	.47 (< .001)	.52 (< .001)	1

https://doi.org/10.7475/kjan.2025.0325

Table 4. Mediation Analysis of Patient Activation, Self-Management, and Shared Decision-Making (*N* = 136)

Variables	Shared decision-making					Self-management				
	B	SE	β	t	*p*	B	SE	β	t	*p*
Patient activation	0.38	0.09	.33	4.33	< .001	0.32	0.04	.52	7.36	< .001
Shared decision-making						0.13	0.04	.25	3.33	.001
F (*p*)	12.96 (< .001)					21.90 (< .001)				
R^2	.376					.545				

β = standardized estimate; SE = standard error.

Table 5. Significance Test of the Mediation Effect (*N* = 136)

	Effect	BootSE	95% CI	
			BootLLCI	BootULCI
Total effect	0.37	0.04	0.28	0.45
Direct effect	0.32	0.04	0.23	0.40
Indirect effect	0.05	0.02	0.02	0.01

Bootstrap samples = 5,000.
BootSE = bootstrapped standard error; BootLLCI = bootstrapped lower limit of the confidence interval; BootULCI = bootstrapped upper limit of the confidence interval; CI = confidence interval.

senting the initiation of active health-related behaviors, similar to scores previously reported for patients with chronic diseases [10,19]. However, there was considerable variation in activation levels among patients. Consequently, tailored interventions accounting for individual patient characteristics are necessary, and strategies such as employing digital tools [15,27] and peer support [28] may effectively enhance patient activation. Additionally, while participants scored highly in the "problem-solving and communication" domain of self-management, their scores were lower in the "self-advocacy and emotional regulation" domain. This indicates that patients on hemodialysis are accustomed to managing their condition through interactions with healthcare professionals but may remain vulnerable when managing emotional burdens. Therefore, self-management education incorporating self-advocacy and emotion regulation is essential, along with providing support to help patients maintain emotional stability and strengthen self-advocacy skills [29].

This study found educational level to be significantly associated with patient activation, SDM, and self-management. This finding is consistent with previous research [9,30] and suggests that higher educational attainment is linked to improved ability to understand and utilize health information, along with increased active participation in decision-making processes. Conversely, patients with lower educational attainment may have reduced health literacy and a more passive approach to self-management and decision-making, necessitating tailored health education strategies. Developing educational content using visual materials and digital tools and providing individualized health education through healthcare professionals are recommended strategies [28,31].

Patient activation, SDM, and self-management were significantly correlated in this study, validating the theoretical and statistical assumptions required for mediation analysis. Although these correlations indicate meaningful associations, they do not fully explain how patient activation translates into improved self-management. Therefore, this study further explored the mediating role of SDM in this relationship, confirming that SDM significantly mediates the relationship between patient activation and self-management in patients undergoing hemodialysis. This finding suggests that SDM functions not merely as a method of treatment participation but as a core mechanism supporting the internalization and sustained practice of self-management behaviors.

First, higher patient activation levels were associated with greater engagement in SDM, indicating that patients who exhibit greater interest and responsibility for their health tend to actively participate in decision-making processes with healthcare professionals. These results align with previous studies [14,15] and emphasize that patient activation is not confined to knowledge or attitudes but also encompasses psychological readiness leading to behavioral changes [7]. Highly activated patients proactively seek treatment-related information, ask questions, and suggest options, thereby becoming active partners in the decision-making process.

In addition, patient activation demonstrated a significant direct effect on self-management. This finding indicates that patient activation independently enhances self-management behaviors, beyond its impact through SDM. Patients with higher activation levels are more likely to engage in proactive health behaviors, exhibit greater self-awareness, and assume responsibility for managing their condition. These results are consistent with previous studies identifying patient activation as a significant predictor of self-management [8,10,19].

The finding that SDM significantly impacts self-management behaviors indicates that through information sharing and collaborative discussions, patients can fully understand and accept their health status and treatment options, facilitating the integration of self-management into daily life. Previous studies also report that active patient involvement through SDM improves self-efficacy and strengthens self-management behaviors [32]. This finding aligns with prior research emphasizing the role of SDM, particularly for chronic conditions requiring long-term, complex self-management [12,13,16,19].

The indirect effect of patient activation on self-management through SDM was statistically significant, supporting SDM's role as a critical mediating pathway enhancing patient engagement in health management. This finding suggests that willingness alone to manage health does not sufficiently translate into actual self-management behaviors. Rather, patients must first fully understand their health conditions and treatment options and then make informed decisions based on their values through the SDM process. This result aligns with prior research involving patients with hypertension, demonstrating the mediating role of SDM in the relationship between patient activation and self-management [19].

Although previous literature has primarily highlighted SDM's effects on patients' cognitive understanding and emotional satisfaction [12], the present study extends this perspective by empirically demonstrating SDM as a mediating variable within a structural pathway leading to behavioral change, specifically self-management. In other words, for highly activated patients undergoing hemodialysis, receiving disease-specific information and empowerment through SDM enhances self-efficacy. This increased self-efficacy subsequently fosters the confidence and motivation needed to implement self-management behaviors [16]. Such psychological reinforcement can translate into actual improvements in self-management capacity, which is especially crucial for patients undergoing hemodialysis, where highly structured and sustained self-management is essential.

These findings suggest that SDM serves not merely as a means of information exchange or formal patient participation, but also as a mechanism that stimulates patients' intrinsic motivation and facilitates their execution of self-management behaviors. Accordingly, in nursing practice, SDM should be recognized not simply as a communication technique but as a strategic approach to enhancing patients' self-management capabilities. This perspective is particularly relevant for patients undergoing hemodialysis, who must routinely perform complex self-care tasks—such as dietary and fluid restriction, medication adherence, and regular health monitoring—alongside attending treatment sessions two to three times weekly. In such contexts, the importance of effectively implementing SDM becomes even more pronounced.

Nurses, as healthcare professionals most closely interacting with patients during the hemodialysis process, are uniquely positioned to implement SDM in clinical practice. Previous study [33] has emphasized nurses' critical role as both information providers and mediators who incorporate patient preferences into clinical decision-making. Iida et al. [16] further recommended that nurses fully engage in the SDM process by setting shared goals with patients, providing tailored information, and conducting ongoing evaluations and consultations. Although Marriott-Statham et al. [34] noted practical challenges to effectively implementing SDM in clinical nursing settings, the roles of information provider, mediator, and facilitator align inherently with nurses' professional responsibilities in chronic illness care. When nurses actively involve patients in care planning and incorporate their preferences, SDM becomes a feasible and meaningful practice in real-world clinical environments.

To enhance self-management among patients with chronic illnesses, nurses can apply several key SDM strategies. These include providing individualized information, collaboratively setting care goals, and integrating patients' values into care decisions. Additionally, by offering continuous feedback, coordinating multidisciplinary care, and fostering emotional support and self-efficacy, nurses can strengthen patients' motivation and active engagement in their health management. Given their essential roles as information providers, facilitators, and care coordinators, nurses are ideally positioned to integrate SDM into their practice, thereby promoting sustained patient self-management.

For SDM-based nursing interventions to be effectively implemented, it is crucial first to provide competency-based training for healthcare providers [35] to enhance their relevant capabilities. Moreover, the development and implementation of standardized decision-making guidelines and practical decision aids tailored for clinical use are required. Institutional-level strategies must also be established to ensure the consistent and sustained application of SDM in clinical practice. Such strategies may include allocating sufficient consultation time, implementing supportive decision-making systems, and developing policy-linked institutional frameworks to facilitate SDM across healthcare environments.

This study has several limitations. First, its cross-sectional design precludes causal inference regarding the relationships among patient activation, SDM, and self-management. Future longitudinal or experimental studies are needed to clarify the directionality of these associations. Second, data were collected using self-reported questionnaires, which may introduce response or recall bias, potentially affecting the accuracy of the findings. Third, participants were recruited from a limited number of dialysis centers, potentially restricting the generalizability of the findings to other settings or patient populations. Therefore, caution is advised when applying these results to broader clinical contexts. Despite these limitations, this study provides meaningful evidence regarding the role of SDM in hemodialysis care and suggests practical approaches for enhancing patient-centered interventions.

CONCLUSION

This study confirmed that SDM serves as a significant mediator in the relationship between patient activation and self-management. Consequently, it is essential to systematically incorporate SDM elements into patient education and self-management intervention programs by establishing appropriate educational and support systems for healthcare professionals. Future research should focus on developing effective nurse-patient SDM interventions and identifying specific strategies suitable for clinical application.

ORCID

Mi Yeon Kim, https://orcid.org/0009-0001-5439-9956
So Young Yun, https://orcid.org/0000-0003-2562-4592

CONFLICTS OF INTEREST

The authors declared no conflict of interest.

AUTHORSHIP

Study conception and/or design acquisition - SYY; analysis - MYK and SYY; interpretation of the data - MYK and SYY; and drafting or critical revision of the manuscript for important intellectual content - MYK and SYY.

FUNDING

None.

ACKNOWLEDGEMENT

This article is a condensed form of the first author’s master’s thesis from Nambu University.

DATA AVAILABILITY STATEMENT

The data can be obtained from the corresponding authors.

REFERENCES

1. Bello AK, Okpechi IG, Levin A, Ye F, Saad S, Zaidi D, et al. ISN Global kidney health atlas [Internet]. Brussels: International Society of Nephrology; 2023 [cited 2025 March 13]. Available from: https://www.theisn.org/wp-content/uploads/media/ISN%20Atlas_2023%20Digital_REV_2023_10_03.pdf
2. Rikos N, Kassotaki A, Frantzeskaki C, Fragiadaki M, Mpalaskas A, Vasilopoulos G, et al. Investigation of perception of quality of life and psychological burden of patients undergoing hemodialysis: quality of life of hemodialysis patients. Nurs Rep. 2023;13(3):1331-41. https://doi.org/10.3390/nursrep13030112
3. Kim YJ, Kwon SH. The experience of life reconstruction in hemodialysis patients with chronic renal failure. J Digit Converg. 2017;15(9):321-33. https://doi.org/10.14400/JDC.2017.15.9.321
4. Ma LC, Liu YM, Lin YC, Liao CT, Hung KC, Chen R, et al. Factors influencing self-management behaviors among hemodialysis patients. J Pers Med. 2022;12(11):1816. https://doi.org/10.3390/jpm12111816
5. Riegel B, Jaarsma T, Stromberg A. A middle-range theory of self-care of chronic illness. ANS Adv Nurs Sci. 2012;35(3):194-204. https://doi.org/10.1097/ANS.0b013e318261b1ba

6. Cha J. Structural equation modeling of self-management in patients with hemodialysis. J Korean Acad Nurs. 2017;47(1):14-24. https://doi.org/10.4040/jkan.2017.47.1.14
7. Hibbard JH, Stockard J, Mahoney ER, Tusler M. Development of the patient activation measure (PAM): conceptualizing and measuring activation in patients and consumers. Health Serv Res. 2004;39(4 Pt 1):1005-26. https://doi.org/10.1111/j.1475-6773.2004.00269.x
8. Lightfoot CJ, Nair D, Bennett PN, Smith AC, Griffin AD, Warren M, et al. Patient activation: the cornerstone of effective self-management in chronic kidney disease? Kidney Dial. 2022;2(1):91-105. https://doi.org/10.3390/kidneydial2010012
9. Hussein WF, Bennett PN, Abra G, Watson E, Schiller B. Integrating patient activation into dialysis care. Am J Kidney Dis. 2022;79(1):105-12. https://doi.org/10.1053/j.ajkd.2021.07.015
10. Hibbard JH, Mahoney ER, Stock R, Tusler M. Do increases in patient activation result in improved self-management behaviors? Health Serv Res. 2007;42(4):1443-63. https://doi.org/10.1111/j.1475-6773.2006.00669.x
11. Charles C, Gafni A, Whelan T. Shared decision-making in the medical encounter: what does it mean? (or it takes at least two to tango). Soc Sci Med. 1997;44(5):681-92. https://doi.org/10.1016/s0277-9536(96)00221-3
12. Shay LA, Lafata JE. Where is the evidence?: a systematic review of shared decision making and patient outcomes. Med Decis Making. 2015;35(1):114-31. https://doi.org/10.1177/0272989X14551638
13. Murea M, Grey CR, Lok CE. Shared decision-making in hemodialysis vascular access practice. Kidney Int. 2021;100(4):799-808. https://doi.org/10.1016/j.kint.2021.05.041
14. Poon BY, Shortell SM, Rodriguez HP. Patient activation as a pathway to shared decision-making for adults with diabetes or cardiovascular disease. J Gen Intern Med. 2020;35(3):732-42. https://doi.org/10.1007/s11606-019-05351-6
15. Vitger T, Hjorthoj C, Austin SF, Petersen L, Tonder ES, Nordentoft M, et al. A smartphone app to promote patient activation and support shared decision-making in people with a diagnosis of schizophrenia in outpatient treatment settings (momentum trial): randomized controlled assessor-blinded trial. J Med Internet Res. 2022;24(10):e40292. https://doi.org/10.2196/40292
16. Iida M, Kaneko S, Ando Y. Relationship between shared decision making (SDM) and self-management behavior of hemodialysis patients in the selection of renal replacement therapy when introducing hemodialysis. J Jpn Acad Nurs Sci. 2022;42:456-67. https://doi.org/10.5630/jans.42.456
17. Elias S, Chen Y, Liu X, Slone S, Turkson-Ocran RA, Ogungbe B, et al. Shared decision-making in cardiovascular risk factor management: a systematic review and meta-analysis. JAMA Netw Open. 2024;7(3):e243779. https://doi.org/10.1001/jamanetworkopen.2024.3779
18. Faul F, Erdfelder E, Buchner A, Lang AG. G*Power 3.1.9.7 [Internet]. Düsseldorf: Heinrich Heine University; 2020 [cited 2025 March 13]. Available from: https://www.psychologie.hhu.de/arbeitsgruppen/allgemeine-psychologie-und-arbeitspsychologie/gpower
19. Shin R. The mediating effect of shared decision-making on the relationship between self-management and patient activation in hypertension patients with comorbidities [master's thesis]. Seoul: Seoul National University; 2024.
20. Fritz MS, MacKinnon DP. Required sample size to detect the mediated effect. Psychol Sci. 2007;18(3):233-9. https://doi.org/10.1111/j.1467-9280.2007.01882.x
21. Insignia Health. Patient activation measure (PAM) [Internet]. Portland, OR: Insignia Health; 2014 [cited 2024 May 15]. Available from: https://www.insigniahealth.com/pam/
22. Ahn YH, Yi CH, Ham OK, Kim BJ. Psychometric properties of the Korean version of the "patient activation measure 13" (PAM13-K) in patients with osteoarthritis. Eval Health Prof. 2015;38(2):255-64. https://doi.org/10.1177/0163278714540915
23. Song YC, Lin CC. The development and testing of a new hemodialysis self-management instrument (HD-SMI). J Nurs Healthc Res. 2009;51(9):51-9.
24. Cha J, Kang J. Validation and reliability of the Korean version of the hemodialysis self-management instrument (HDSMI-K). J Health Info Stat. 2017;42(2):153-61. https://doi.org/10.21032/jhis.2017.42.2.153
25. Kriston L, Scholl I, Holzel L, Simon D, Loh A, Harter M. The 9-item shared decision making questionnaire (SDM-Q-9): development and psychometric properties in a primary care sample. Patient Educ Couns. 2010;80(1):94-9. https://doi.org/10.1016/j.pec.2009.09.034
26. Hayes AF. An index and test of linear moderated mediation. Multivariate Behav Res. 2015;50(1):1-22. https://

doi.org/10.1080/00273171.2014.962683

27. Abdelraheem O, Salama M, Chun S. Impact of digital interventions and online health communities in patient activation: systematic review and meta-analysis. Int J Med Inform. 2024;188:105481. https://doi.org/10.1016/j.ijmedinf.2024.105481
28. Cook JA, Jonikas JA, Burke-Miller JK, Hamilton M, Powell IG, Tucker SJ, et al. Whole health action management: a randomized controlled trial of a peer-led health promotion intervention. Psychiatr Serv. 2020;71(10):1039-46. https://doi.org/10.1176/appi.ps.202000012
29. Kim B, Kim H, Lee J. A concept analysis of stress in hemodialysis patients. Korean J Adult Nurs. 2021;33(6):601-15. https://doi.org/10.7475/kjan.2021.33.6.601
30. Ghodsian S, Ghafourifard M, Ghahramanian A. Comparison of shared decision making in patients undergoing hemodialysis and peritoneal dialysis for choosing a dialysis modality. BMC Nephrol. 2021;22(1):67. https://doi.org/10.1186/s12882-021-02269-2
31. Kim HS, Sung JH. The influence of digital informatization level, self-efficacy, and social support on digital health literacy in the elderly with cancer. Asian Oncol Nurs. 2022;22(4):255-63. http://doi.org/10.5388/aon.2022.22.4.255
32. Wieringa TH, Rodriguez-Gutierrez R, Spencer-Bonilla G, de Wit M, Ponce OJ, Sanchez-Herrera MF, et al. Decision aids that facilitate elements of shared decision making in chronic illnesses: a systematic review. Syst Rev. 2019;8(1):121. https://doi.org/10.1186/s13643-019-1034-4
33. Park M, Kim J, Jung J, Thao DT. The role of nurses in shared decision-making about caring for older adults with chronic disease: a qualitative descriptive study. J Korean Gerontol Nurs. 2023;25(3):309-19. https://doi.org/10.17079/jkgn.2023.00087
34. Marriott-Statham K, Dickson CAW, Hardiman M. Sharing decision-making between the older person and the nurse: a scoping review. Int J Older People Nurs. 2023;18(1):e12507. https://doi.org/10.1111/opn.12507
35. Meijers B, Wellekens K, Montomoli M, Altabas K, Geter J, McCarthy K, et al. Healthcare professional education in shared decision making in the context of chronic kidney disease: a scoping review. BMC Nephrol. 2023;24(1):195. https://doi.org/10.1186/s12882-023-03229-8

RETRACTION

Korean J Adult Nurs Vol. 37 No. 2, 188, May 2025
eISSN: 2288-338X
https://doi.org/10.7475/kjan.2012.24.4.358.r1

KJAN
Korean Journal of
Adult Nursing

Retraction notice: Korean and United States: Comparison of Costs of Nursing Interventions

Sung-Jung Hong[1], **Eunjoo Lee**[2]

[1]*Full-time Lecturer, Department of Nursing, Sunlin College, Pohang, Korea*
[2]*Professor, College of Nursing, Kyungpook National University, Daegu, Korea*

Retraction to: Korean J Adult Nurs 2012;24(4):358-369.

The article titled “Korean and United States: Comparison of Costs of Nursing Interventions” has been retracted by the Korean Journal of Adult Nursing due to concerns regarding inappropriate authorship.

Instructions for Authors

Korean Journal of Adult Nursing
Enacted in June 1994, most recently revised in May 2025 and, applied from Vol. 37, No. 2 (May 2025).

KJAN
Korean Journal of
Adult Nursing

Table of Contents

I. AIMS AND SCOPE

The *Korean Journal of Adult Nursing* (KJAN) is the official peer-reviewed research journal of the Korean Society of Adult Nursing (KSAN). KJAN is devoted to the dissemination of groundbreaking research on theory, practice, and education in the field of adult nursing. Research on other subject areas or issues that contribute to adult nursing is published at the discretion of the Editorial Board. The goal of KJAN is to contribute to health maintenance, health promotion, and disease prevention and management in adults by publishing research. KJAN is published four times per year at the end of February, May, August, and November.

II. RESEARCH & PUBLICATION ETHICS

1. Research Ethics

For policies on research and publication ethics that are not stated in these instructions, the Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals by the International Committee of Medical Journal Editors (ICMJE) or the Committee on Publication Ethics (COPE) guidance (https://publicationethics.org/guidance) can be applied. Further, all processes of handling research and publication misconduct shall follow the applicable COPE flowchart.

Statements of human and animal rights: Clinical research should be done in accordance with the Ethical Principles for Medical Research Involving Human Subjects, outlined in the Declaration of Helsinki (https://www.wma.net/policies-post/wma-declaration-of-helsinki-ethical-principles-for-medical-research-involving-human-subjects/). Any study involving human subjects or human data must be reviewed and approved by a responsible institutional review board (IRB). Research involving meta-analyses, systematic reviews, and literature reviews does not require IRB review. For secondary data analyses, IRB review and approval for an exempt study may be required based on the decision of the Editorial Board. When necessary, the Editorial Board may request any documentation regarding ethical issues of the manuscript such as written consent or the approval of the study by the IRB. Furthermore, for studies involving human subjects, the authors must explicitly state in the paper that the research received IRB approval and was conducted in accordance with the relevant standards.

Statement of informed consent: Copies of written informed consent and IRB approval for clinical research should be kept. If necessary, the editor or reviewers may request copies of these documents to resolve questions about IRB approval and study conduct.

Originality and duplicate publication: Duplicate publication or duplicate submission is prohibited in accordance with the ICMJE recommendations (https://www.icmje.org/recommendations/browse/publishing-and-editorial-issues/overlapping-publications.html). Manuscripts that have been published or are being submitted to other journal(s) should not be submitted to KJAN. Manuscripts that have been published or are currently under consideration for publication in KJAN must not be submitted to another journal. The corresponding author must obtain approval from the Editors-in-Chief of both related journals if the author wants to reprint a published manuscript in another language.

If manuscripts have been submitted or are currently under consideration for publication in KJAN, the Editorial Board will determine the nature and degree of duplicate publication or duplicate submission for the manuscript. If a manuscript has been published in KJAN, the KSAN ethics committee will determine the nature and degree of duplication.

2. Authorship

KJAN follows the recommendations for authorship set out by the ICMJE Authorship guidelines (http://www.icmje.org/icmje-recommendations.pdf). Authorship is attributed only to individuals who have directly participated and made significant contributions to the creation of the manuscript. Authorship should be based upon all four of the following criteria: 1) substantial contribution to the concept or design of the work, or the acquisition or analysis and interpretation of data; 2) drafting the work or revising it critically for important intellectual content; 3) final approval of the version submitted for publication; 4) accountability for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All other contributors not listed as authors should be mentioned in the acknowledgements section.

If a manuscript is based on a master's thesis or doctoral dissertation, the author must disclose that the manuscript is the product of his/her thesis or a dissertation for an academic degree. The first author must be the recipient of the academic degree from the work presented in the manuscript.

Any changes in authorship (addition, deletion or change in order of authorship) must be approved by the Editorial Board prior to the manuscript's acceptance for publication. To request such a change, the Editor must receive the following from the corresponding author: (a) the reason(s) for the change in the author list; and (b) written confirmation (e-mail, letter) from all authors that they agree with any addition, removal, or rearrangement.

3. Conflicts of Interest

The corresponding author will be responsible for informing the editor regarding potential conflicts of interest for all listed authors that might influence their interpretation of data. Examples of potential conflicts of interest include employment, consultancies, stock ownership, honoraria, paid expert testimony, patent applications/registrations, and grants or other funding. If there is no conflict of interest, this should also be explicitly stated as "The author(s) declared no conflict of interest."

4. Registration of a Clinical Trial

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). All clinical trials (as defined by the ICMJE) must be registered in a publicly accessible trial registry. For all other types of studies, including systematic reviews, prospective registration is strongly encouraged. If a study has been registered, please cite the registration number in both the abstract and body of the paper. The journal accepts registration in any of the primary registries that participate in the World Health Organization International Clinical Trials Portal (http://www.who.int/ictrp/en/), National Institutes of Health ClinicalTrials.gov (http://www.clinicaltrials.gov/), International Standard Randomized Controlled Trial Number Registry (https://www.isrctn.com/), or the Clinical Research Information Service, Korea Disease Control and Prevention Agency (KDCA) (https://cris.nih.go.kr/cris/index/index.do).

5. Research Data Sharing and Transparency

This journal encourages and enables authors to share data that supports the research publication, where appropriate, and to interlink the data with other published articles. Research data refers to the results of observations or experiments that validate the research findings. To facilitate reproducibility and data reuse, this journal encourages authors to share their software, codes, models, algorithms, protocols, methods, and other useful materials related to the project. Data generated through the participation of subjects and the public should be put to maximum use by the research community and, whenever possible, translated to deliver patient benefits. Data sharing benefits numerous research-related activities: reproducing analyses, testing secondary hypotheses, developing and evaluating novel statistical methods, teaching, aiding the design of future trials and meta-analyses, and helping to prevent error, fraud, and selective reporting. To promote more transparent and reproducible research, we ask authors to submit a Data Availability Statement in the manuscript to help readers understand how they can access the data, code, and other resources that support the research findings.

The following are examples of data-sharing statements:

- Example 1: The data can be obtained from the corresponding authors.
- Example 2: The data can be obtained from the Supplementary Material.
- Example 3: (In the case of healthcare big data) The data can be obtained from __ (the name of the)_repository source.
- Example 4: No new data were created or analyzed during this study. Data sharing is not applicable to this article.

6. Artificial Intelligence (AI)–Assisted Technologies

At submission, authors are required to disclose whether they used AI-assisted technologies (such as Large Language Models [LLMs], chatbots, or image creators) in their work. Authors should describe how they used AI-assisted technologies in both the cover letter and the appropriate section of the manuscript. For example, if AI was used for writing assistance, this should be described in the Acknowledgments section. If AI was used for data collection, analysis, or figure generation, the authors should describe this use in the Methods section. Chatbots (such as ChatGPT) should not be listed as authors because they cannot be held responsible for the accuracy, integrity, and originality of the work, and these responsibilities are required for authorship. Therefore, authors are responsible for any submitted material that included the use of AI-assisted technologies. Authors should carefully review and edit AI-generated results because AI can generate authoritative-sounding output that can be incorrect, incomplete, or biased. Authors must ensure there is appropriate attribution of all quoted material, including full citations, and should not list AI and AI-assisted technologies as an author or co-author, nor cite AI as an author.

7. Process for Managing Publication Malpractice

If 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 COPE guidance (https://publicationethics.org/guidance).

If a published manuscript is suspected of an ethics violation, the KSAN ethics committee, which includes the Editor-in-Chief of KJAN, will be convened. The procedure will be conducted in the following order: a preliminary investigation, a second investigation, and decision, in accordance with the prescribed regulations. If a published manuscript is determined to involve an ethics violation, members found to have violated this regulation and the general ethical principles of research will be subject to the following consequences, and other relevant matters shall be determined by the KSAN ethics committee.

1) The published manuscript will be retracted, and a public statement will be made regarding the reason for retraction.
2) Submission privileges to KJAN will be suspended for three years.
3) The retraction of the manuscript will be announced on KJAN's official website and in the printed journal.

III. GUIDELINES FOR MANUSCRIPT PREPARATION

1. Types of Manuscripts

KJAN publishes original articles, review articles, invited articles, and editorials.

1) *Original Articles* include full papers reporting original research. These are reports of empirical findings from high-quality basic and clinical research studies within the scope and focus of KJAN.
2) *Review Articles* include critical presentations of topics relevant to nursing theory, practice, and education regarding adult nursing. Unsolicited reviews will be considered for publication if topical, of high quality, and subject to peer review. The body of a review article should be a comprehensive, scholarly evidence-based review of the literature, accompanied by a critical analysis and reasonable conclusions.
3) *Invited Articles* provide concise reviews of a subject of importance to nursing researchers written by an invited expert in nursing science.
4) *Editorials* are commissioned by editors, and may include comments on manuscripts included, recent research trends in the field of adult nursing, and opinions on relevant topics.

2. General Guidelines

1) **Language and style:** Manuscripts should be written in English. The paper size setting should be A4, and the file should be compatible with Microsoft Word. The formatting requirements are as follows: the texts should be double-spaced and in Times New Roman 12-point font size with margins of top 30 mm, bottom 25 mm, left 25 mm, and right 25 mm. Page numbers are placed at the bottom of each page.

2) **Manuscript length:** The manuscript has different limits depending on the type of article submitted. (1) An original article should be no more than 6,000 words; (2) A review article should not exceed 8,000 words; and (3) An editorial should be no longer than 2,500 words. This word count includes only the main body of the text (i.e., not abstract, references, tables, or figures).

3) **Abbreviations:** Do not use abbreviations in the title or abstract and limit their use in the text. Expand all abbreviations at first mention in the text. Avoid using abbreviations in the article title. For standard abbreviated words and units, refer to the NLM (National Library of Medicine) Style Guide for Authors, Editors, and Publishers, 2nd Edition (2007) (http://www.nlm.nih.gov/citingmedicine).

4) **Description of participants:** Authors should ensure correct use of the terms sex (when reporting biological factors) and gender (identity, psychosocial or cultural factors), and, unless inappropriate, report the sex or gender of study participants, the sex of animals or cells, and describe the methods used to determine sex or gender. If the study was done involving an exclusive population, for example in only one sex, authors should justify why, except in obvious cases (e.g., prostate cancer). Authors should define how they determined race or ethnicity and justify their relevance.

5) **Permissions:** Authors should obtain permission from the copyright owners to use measurements or instruments for their studies. Permission to reproduce previously published material must also be obtained in writing from the copyright holder (usually the publisher) and acknowledged in the manuscript.

6) **Describing machinery or technical equipment:** Generic names should be used. When proprietary brands are used in research, include the name of the brand and the manufacturer, city (state), and nation in parentheses after the first mention of the generic name in the Methods section. Brand names are identified by symbols such as TM and ®, and should only be used when necessary.

7) **References and citation style:** References and citations follow the National Library of Medicine (NLM) Style. The submitting authors are responsible for ensuring adherence to NLM guidelines.

3. Research Reporting Guidelines

Authors are encouraged to adhere to relevant reporting guidelines when describing their study. Reporting guidelines endorsed by the journal are listed below, from the EQUATOR network (https://www.equator-network.org/).

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)

4. Manuscript Components

The composition of manuscripts shall be in the following order: title page, abstract and keywords, main text, references, tables and figures, and appendices. Each section begins on a new page. The main body of the manuscript (including the references, figures, tables, acknowledgements, and any funding information) should not include any identifying information, such as the authors' names or affiliations, to ensure a blind review.

1) Title page

The following should be included on the title page: (1) the title of the article; (2) the running title; (3) author information (ORCID number is required for all authors); (4) permission for measurements/instruments used in the study; (5) IRB approval institution and number; (6) disclosure; and (7) reporting guidelines checklist relevant to the research design used.

2) 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 Conclusion. The abstract should be accompanied by a list of three to five keywords for indexing purposes. Medical Subject Headings (MeSH) keywords (http://www.nlm.nih.gov/ mesh/meshhome.html) should be used, with careful selection of keywords that precisely reflect the focus of the study.

3) Main text

The text should be composed in the following order: Introduction, Methods, Results, Discussion, Conclusion, and References.

Introduction: Clearly state the need for this study and the main question or hypothesis of the study. Summarize the literature review or background in the area of the study.

Methods: Describe the study design, setting and samples, measurements/instruments, data collection/procedure, ethical considerations, and data analysis. If a study presents qualitative research, the instrument can be omitted. When discussing research methods, it is important to provide specific and detailed information to enable reproducibility. In the section on ethical considerations, the author should state that the study protocol was approved by the institutional review board (IRB No. ##-##-###). Please provide the initials of institutional names at the time of submission for peer review.

Results: Describe the main results in a concise paragraph. This section should be the most descriptive.

Discussion: The discussion should be based only on the reported results. It is strongly recommended that authors discuss how the study findings relate to advances in nursing practice, nursing knowledge development, and nursing implications.

Conclusion: State the conclusions and recommendations for further study. Do not summarize the study results.

4) References

In-text Citation: Citations of references in the text should follow Citing Medicine: The NLM Style Guide for Authors Editors, and Publishers 2nd edition (http://www.nlm.nih.gov/citingmedicine). References should be numbered serially in the order of appearance in the text, with numbers in brackets [ ] (e.g., social support [1], fatigue [2,3], depression [4-6]). If a reference is cited more than once, use the original reference number (e.g., social support [1,2], fatigue [2-5], depression [1,4-6]).

Reference list: References should be listed on a separate page at the end of the paper in the order of citation. The number of references should be 35 or less for an original article except for a manuscript on model construction, which is allowed to include up to 50 references. Citations of master's and doctoral dissertations should be minimized, with a maximum of three citations.

5) Tables and Figures

There should be no more than five tables and figures in total. Tables and figures should be self-contained and complement, but not duplicate, information contained in the text. Each table and figure should be placed on a separate page. All lines are to be single. Vertical lines are not acceptable. The title of a table should be placed on top. Within the title, the first letters of important words should be capitalized (e.g., Table 1. Clinical Characteristics of the Sample). The title of the figure should be placed below the figure with the first letter capitalized (e.g., Figure 1. Path diagram of the model.). Tables and Figures should be numbered consecutively in Arabic numerals. All abbreviations used in tables should be explained in footnotes. List abbreviations in alphabetical order; do not include the word "and" before the last abbreviation (e.g., BP = blood pressure; ED = emergency department). Footnote symbols including asterisks and other symbols should be placed after abbreviations in the table. Table footnotes should be indicated with superscript symbols in sequence: †, ‡, §, ‖, ¶, #, *, ††

If the point value of a number can exceed 1, write "0" before the decimal point (e.g., $t=0.26$, $F=0.98$, $R^2=.61$), otherwise do not write "0" before the decimal point (e.g., $p<.001$). The p value (as an indicator of statistical significance) should be written without a footnote and should be rounded to three decimal places (e.g., $p=.003$). If "*p*" is .000, then indicate that *p* is less than 0.001 (e.g., $p<.001$). Percentages (%) should be rounded off to one decimal place (e.g., 24.7%); test statistics, such as t, F, x^2, and r, should be rounded off to two decimal places (e.g., $t=0.26$, $F=0.98$, $R^2=.61$).

6) Appendices

Authors should submit an appendix containing the final developed instrument in instrument development studies and a list of reviewed articles in a systematic review or meta-analysis.

5. Reference Format

1) Journals

(1) For six or fewer authors, list all authors:

1. Han S, Min J, Kim DK, Kong ID, Kim N. The understanding and application of telomere length as an emerging biomarker in adult nursing research: a review. Korean J Adult Nurs. 2023;35(1):1-12. https://doi.org/10.7475/kjan.2023.35.1.1

(2) For more than six authors, list the first six followed by et al.

1. Lee S, Kim MK, Hong EY, Lee JJ, Kim HJ, Kim HS, et al. Structural equation modeling on spiritual nursing care of clinical nurses based on the theory of planned behavior. Korean J Adult Nurs. 2022;34(1):27-38. https://doi.org/10.7475/kjan.2022.34.1.27

(3) Forthcoming journal articles

1. van Corven CT, Bielderman A, Wijnen M, Leontjevas R, Lucassen PL, Graff MJ, et al. Defining empowerment for older people living with dementia from multiple perspectives: a qualitative study. Int J Nurs Stud. Forthcoming 2020 Nov 10. https://doi.org/10.1016/j.ijnurstu.2020.103823

2) Periodicals or magazines

1. Rutan C. Creating healthy habits in children. Parish Nurse Newsletter. 2012 May 15:5-6.

3) Newspaper articles

1. Cho CU. Stem cell windpipe gives Korean toddler new life. The Korea Herald. 2013 May 1; Sect. 01.

4) Books

(1) Reference to an entire book

1. Hughes JH. Military veteran psychological health and social care: contemporary issues. 1st ed. London: Taylor & Francis; 2017.
2. Kim SJ. Nursing theory. Seoul: Soomoonsa; 1985.

(2) Chapter in an edited book

1. Miller CW. Applied cardiovascular physiology. In: Wingfield WE, Raffe MR, editors. The veterinary ICU book. Jackson, WY: Teton NewMedia; 2002. p. 1-14.

(3) An edited book

1. Munslow A, Rosenstone RA, editors. Experiments in rethinking history. New York, NY: Routledge; 2004.

(4) Unknown authors or editors

1. Merriam-Webster's collegiate dictionary. 10th ed. Springfield, MA: Merriam-Webster; 1995.

(5) Book with translator(s)

1. McEwen M, Wills EM. Theoretical basis for nursing. 4th ed. Koh CK, translator. Philadelphia, PA: Wolters Kluwer; 2019. p. 20-5.

(6) An encyclopedia or dictionary

1. Sadie S, editor. The New Grove dictionary of music and musicians. 6th ed. London: Macmillan; 1980.
2. Fitzpatrick JJ, Wallace M, editors. Encyclopedia of nursing research. 3rd ed. New York, NY: Springer Publishing Company; 2012.

5) Scientific and technical reports

1. Hong S, Sung M, Choi J, Kim J, Kim S. Family policies implications in the context of an increase in one-person households. Korean Women's Devel-

opment Institute Report. Seoul: Korean Women's Development Institute; 2017 July. Report No.: 1105012716.

6) Unpublished dissertations and theses: Not recommended. Maximally three dissertations and theses in total are al- lowed if necessary.
  (1) Dissertations
   1. Zhao JJ. Design of a 3D virtual learning environment for acquisition of cultural competence in nursing education: experience of nursing and other health care students, instructors, and instructional designers [dissertation]. Vancouver: University of British Columbia; 2019. p. 100-5.
  (2) Theses
   1. Huh MS. Effect of Danjeon breathing on stress urinary incontinence and quality of life in middle aged wom- en [master's thesis]. Busan: Dongeui University; 2005.

7) Conference proceedings
  (1) Unpublished proceedings
   1. Lankntree C, Briere J. Early data on the trauma symp- tom checklist for children (TSCC). Paper presented at: The meeting of the American Professional Society on the Abuse of Children; 1991 January 25; San Diego, CA.
  (2) Posters
   1. Cho YJ, Han YR. The relationship between the professional self concept, work stresses and their triage competency in emergency nurses. Poster session pre- sented at: Korean Society of Nursing Science; 2020 October 23; Seoul.

8) Web
   1. Ministry of the Interior and Safety. Safety experience center [Internet]. Sejong: Ministry of the Interior and Safety; 2022 [cited 2023 January 12]. Available from: https://www.mois.go.kr/frt/sub/a06/b10/safe- tyExperience/screen.do

IV. SUBMISSION AND PEER REVIEW

1. Submission

Manuscripts should be submitted electronically via this journal's submission system (https://submit.kjan.or.kr/). The first and corresponding authors should be members of KSAN, with the exception of non-Korean authors. Under certain circumstances, non-members can submit manuscripts following approval by the Editorial Board. All correspondence, including notification of the editor's decision and requests for revisions, will be processed via this system. Authors should complete the Submission Checklist and sign the Copyright Transfer Agreement form and submit via the submission system. For any questions regarding the use of the online system, please contact the KJAN publication director via phone, fax, or e-mail.

2. Peer Review

This journal follows a double-blind peer review process. Each submission will initially be assessed by the editors to determine suitability for publication in this journal. If a submission is deemed suitable, it will typically be sent to a minimum of three reviewers for an independent expert assessment of the scientific quality. The decision as to whether an article is accepted or rejected will be taken by our editors.

1) **Preview:** The editorial committee initially assesses each submission. The primary goal is to quickly determine which papers should not be sent for peer review and which ones should. To prevent delays for authors who may wish to submit their work elsewhere, papers that do not meet basic standards or are unlikely to be published, even with a favorable peer review—such as those with insufficient novel contributions or unclear relevance to the field—may be rejected at this stage.

2) **Peer-review process:** 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. If the author deems a reviewer's opinion to be unacceptable or thinks that a reviewer has misinterpreted the data, a reasonable explanation should be provided. 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 14 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 14 days. The Editorial Board may consider further review upon the author's request. 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 KJAN 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.

3) **Appeals of decisions:** Any appeals against the editorial decision must be made within 2 weeks of the date of the decision letter. Authors who wish to appeal against a decision should contact the Editor-in-Chief, explaining in detail the reasons for the appeal. All appeals will be discussed with at least one other associate editor. If consensus cannot be reached thereby, an appeal will be discussed at a full editorial meeting. The process of handling complaints and appeals follows the COPE guidance (https://publicationethics.org/guidance). KJAN does not consider second appeals.

V. FINAL PREPARATION FOR PUBLICATION

1. Final Version

After the paper has been accepted for publication, the author(s) should submit the final version of the manuscript. The names and affiliations of the authors should be double-checked, and if the originally submitted image files were of poor resolution, higher-resolution image files should be submitted at this time. Symbols (e.g., circles, triangles, squares), letters (e.g., words, abbreviations), and numbers should be large enough to be legible on reduction to the journal's column widths. All symbols must be defined in the figure caption. If references, tables, or figures are moved, added, or deleted during the revision process, renumber them to reflect such changes so that all tables, references, and figures are cited in numeric order.

2. Manuscript Corrections

Before publication, the manuscript editor will correct the manuscript so that it meets the standard publication format. The author(s) must respond within 48 hours when the manuscript editor contacts the corresponding author for revisions. If the response is delayed, the manuscript's publication may be postponed to the next issue.

3. Proofs and Reprints

The author(s) will receive the final version of the manuscript as a PDF file. Upon receipt, the author(s) must notify the editorial office of any errors found in the file within 48 hours. Any errors found after this time are the responsibility of the author(s) and will have to be corrected as an erratum.

4. Correction

To correct errors in published articles, the corresponding author should contact the journal's editorial office with a detailed description of the proposed correction. Corrections that seriously affect the interpretation or conclusions of the article will be reviewed by the editors. Corrections will be published as an author correction or a publisher correction in a later issue of the journal.

Minor errors will be corrected directly in the online version of the article. An indication of the correction, along with the date it was made, will be added to the article information in both the HTML and PDF versions. A separate correction note will not be published.

VI. ARTICLE PROCESSING CHARGE

When a manuscript is accepted for publication, an article processing charge (APC) of 600 USD (KRW 600,000) per article is charged to the corresponding author.

VII. COPYRIGHT, OPEN ACCESS POLICY

1. Copyright

All manuscripts published in KJAN are protected by copyright. The copyright and transfer rights of the digital content of the published paper and journal are owned by the

KSAN. Copyright Transfer Agreement form should be submitted online at submission. All authors should print their names and sign the copyright transfer agreement.

2. Open Access Policy

KJAN is an open-access journal. Articles are distributed under the terms of the Creative Commons Attribution-Non Commercial-No Derivatives 4.0 (CC BY-NC-ND 4.0) license, which permits copying and distributing the material in any medium or format in unadapted form only, for non-commercial purposes only, and only so long as attribution is given to the KJAN.

VIII. OTHER EDITORIAL POLICY

1. Archiving Policy

All manuscripts published in KJAN are freely available through open access to read and download from any electronic link, including those found on the KJAN website (http://www.kjan.or.kr/) immediately and permanently after publication.

History:

Enacted Jun, 1994
Revised Dec, 1999
Revised Dec, 2002
Revised Dec, 2003
Revised Dec, 2006
Revised Dec, 2007
Revised Jun, 2008
Revised Dec, 2008
Revised Feb, 2009
Revised Jun, 2009
Revised Apr, 2010
Revised Aug, 2010
Revised Jun, 2012
Revised Jul, 2014
Revised Aug, 2016
Revised Feb, 2018
Revised Aug, 2018
Revised Dec, 2018
Revised Jun, 2020
Revised Mar, 2023
Revised Aug, 2023
Revised May, 2025

Submission Checklist

KJAN
Korean Journal of
Adult Nursing

Before submitting the manuscript, please review the following items and mark the applicable content with a "✓" (checkmark).

1. General Considerations

☐ The manuscript should be written according to the research and publication ethics of KJAN.
☐ The first and corresponding authors should be members of the KSAN (*Foreign researchers may submit to KJAN, even though they are not KSAN members).
☐ Copyright transfer agreement signed by all authors and relevant EQUATOR reporting guidelines checklist should be submitted by submission system.
☐ Institutional review board (IRB) approval institution and number:

2. Title page

☐ Please follow the title page template available online.

3. Manuscript preparation

3.1. General guidelines

☐ A4 paper size, 12-point font Times New Roman in MS Word file.
☐ Line space: double spacing / Margins of 30 mm on the top and 25 mm on the bottom, left, and right.
☐ Page numbers at the bottom of each page.
☐ Subheadings of abstract, text, references, and tables and figures.
☐ Original article should be no more than 6,000 words; a review article should not exceed 8,000 words; and an editorial should be no longer than 2,500 words.

3.2. Abstract and Keywords

☐ 250 words or fewer in the abstract.
☐ Subheadings of Purpose, Methods, Results, and Conclusion.
☐ Three to five keywords from MeSH terms.

3.3. Main Text

☐ The main text consists of introduction, methods, results, discussion, conclusion, and references.

3.4. References

☐ The number of references should be 35 or fewer (50 or fewer for model construction).
☐ References follow NLM style.
☐ All references are written with DOIs.
☐ All citations in the paper should have a complete and accurate corresponding reference in the reference list.
☐ Present recent (within 5 years) articles to the extent possible.

3.5. Tables and Figures

❒ The total number of tables and figures should be 5 or fewer.
❒ All abbreviations should be described below the tables or figures.
❒ When numbers are used, the units of the numbers should also be given.
❒ All table and figure numbers should be mentioned in the text.
❒ Tables and figures are presented on separate pages after the references, with one table and figure per page.

Manuscripts submitted to KJAN will be returned if they do not conform to the submission guidelines of KJAN. The authors of this article understand and confirm the above instructions.

Name of corresponding author: ____________ Date: ______/______/______ (Signature)

Copyright Transfer Agreement

KJAN
Korean Journal of
Adult Nursing

1. Transfer of Copyright

Copyright of this manuscript shall be transferred to the Korean Society of Adult Nursing [KSAN] if it is published in the Korean Journal of Adult Nursing [KJAN]. The author possesses all the rights except for the copyright, including the right to use all or a part of this manuscript for applying for patent or writing a future thesis. The author may use the material of this manuscript in another manuscript after obtaining a written approval. All the authors of this manuscript have made practical and intelligent contributions to this manuscript, and share public responsibility for the contents of this manuscript. In addition, this manuscript has not been published by or submitted to another academic journal so far, and is not planned to be contributed to any another academic journal as of now.

2. Disclosure of Conflict of interest

The author(s) of this manuscript clearly state all the interests related to this manuscript including financial interests (benefit of research fund, employment, possession of stocks, lecturer's fees or consultancy fees, material support, etc.) and personal interests (concurrent position, conflict of interest, conflict in intellectual property rights, etc.).

Manuscript entitled: ____

Date:

Author's Name ______________________ Signature ______________________

Author's Name ______________________ Signature ______________________

Author's Name ______________________ Signature ______________________

Author's Name ______________________ Signature ______________________

Author's Name ______________________ Signature ______________________

Author's Name ______________________ Signature ______________________

Author's Name ______________________ Signature ______________________

Author's Name ______________________ Signature ______________________

Author's Name ______________________ Signature ______________________

Author's Name ______________________ Signature ______________________

(USE A CONTINUATION SHEET IF NECESSARY FOR ADDITIONAL SIGNATURE)