Aims and Scope
The Korean Journal of Women Health Nursing is a primary source of information for meeting the challenges of providing optimal healthcare for women. The journal aims to be a core resource for cutting-edge advancements and clinical applications of new nursing practice, therapeutic protocols for managing health problems in women, and innovative research on gender-based issues that impact treatment and nursing care.

Its scope includes the latest clinical and research papers on health issues that affect women throughout their lifespan. The emphasis is on clinical nursing practice and education on the social science components relevant to women's health issues. It also includes nursing care, education, and research methodology for ante-, intra-, and post-partum women, middle-aged and elderly women's health, socio-cultural issues, and therapies. Its regional focus is mainly Korea, but it also welcomes submissions from researchers all over the world.

About the Journal
The Korean Journal of Women Health Nursing (KJWHN) is a peer-reviewed official journal of the Korean Society of Women Health Nursing of the Republic of Korea (South Korea). It was launched in 1995 under its previous title, the Journal of Korean Women's Health Nursing Academic Society (Vol. 1, No. 1 in 1995 to Vol. 6, No. 1 in 2000; pISSN: 1225-9543), and the Journal of Korean Academy of Women's Health Nursing (Vol. 6, No. 2 in 2000 to Vol. 7, No. 2 in 2001, pISSN: 1225-9543).

Since June 2012 it has continued under the current title, the Korean Journal of Women Health Nursing Vol. 18, No. 2 in 2012 to present; pISSN: 2287-1640, eISSN: 2093-7695). The official abbreviated title is Korean J Women Health Nurs. It is published quarterly on the last day of every March, June, September, and December. Any supplementary or special issues may be published. The number of print copies per issue is 60. The copyright, including the right of online transmission, is owned by the Korean Society of Women Health Nursing. This journal is supported by a Korean Federation of Science and Technology Societies grant funded by the Korean government (Ministry of Science and ICT).

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Stepping stones for the future—2022 major developments, journal metrics, and appreciation for reviewers

Sue Kim
Mo-Im Kim Nursing Research Institute, College of Nursing, Yonsei University, Seoul, Korea

The Year of the Tiger was projected to bring forth resilience and strength in the face of challenges [1]. This certainly rings true for the *Korean Journal of Women Health Nursing* (KJWHN), as we sought to follow the prior year’s success in being indexed in Scopus. I wish to describe some noteworthy accomplishments of the journal in 2022 and share some messages for potential authors.

**Major developments in 2022**

On October 29, 2022, KJWHN received notice of its release to PubMed Central (PMC) live site three months after the interchange of the PMC Full-Participation Agreement on July 30, 2022 [2]. Therefore, it also became searchable in PubMed. While our September issue editorial projected that KJWHN would likely be the first non-English journal among Korean health-related journals to achieve PMC status, since its publication, the *Journal of the Korean Society of Radiology* (*Taehan Yongsang Uihakhoe Chi*) was cataloged as PubMed journal in the National Library of Medicine 14 days earlier than KJWHN. Meanwhile, KJWHN is the first non-English, non-MEDLINE nursing journal to be indexed in PMC and PubMed.

On December 5, 2022, we received official notice of being indexed in Emerging Sources Citation Index (ESCI), marking a significant milestone for KJWHN. We are delighted that published papers from 2020 (issue 1, volume 26) will be retroactively included in both PMC and Web of Science Core Collection databases in Korean and/or English. Out of more than 20 nursing journals in Korea, KJWHN is the second journal published in both Korean and English to achieve triple crown status in three databases, including PubMed, Web of Science Core Collection, and Scopus. The first one is the *Journal of Korean Academy of Nursing* (eISSN: 2093-758X).

Since being indexed in Scopus we have seen an increase in submissions: from 48 unsolicited manuscripts in 2021 to 63 in 2022. Now with triple crown status, I hope potential authors may consider KJWHN, especially those from a wider range of countries. High-quality studies that fit our aims and scope will be welcomed from authors over the world.

We have continued to publish English manuscripts at a steady rate, which will be meaningful for international readers to access our published content. Our collaborative work with Statistics Korea also continued in 2022, resulting in a statistics paper [3].
Journal metrics

Data on manuscripts submitted to KJWHN this year, as of December 8, 2022 (Table 1), appear to reflect the power of being indexed in an international database. With a higher influx of submissions, the number of non-accepted manuscripts has also increased. Meanwhile, the acceptance rate has stabilized; a great improvement from 78.9% in 2019 and 63.8% in 2021, coming down to 48.4% in 2022.

Future plans

Building on our hard work over the past few years since our initial MEDLINE application in 2020, KJWHN will be reapplying for MEDLINE inclusion shortly. We have made significant strides in meeting international guidelines. Preparing for Scopus, PMC, and ESCI indexing has helped us refine our policy and have a greater sensitivity toward communicating with readers. I wish to alert potential authors that we will strengthen our current policy on the following points.

Clinical trial registration

Authors are expected to state the clinical registration number for interventional studies at submission, for example, Clinical Research Information Service (CRIŚ, https://cris.nih.go.kr) and ClinicalTrials.gov. Prospective registration is recommended and if retrospective registration was done, authors should also provide a brief description of the reason. An exception is interventional studies on students and/or healthcare providers that focus on knowledge, attitude, etc., that do not directly impact patient health outcomes.

Data sharing

As noted in Table 1 of author guidelines (https://www.kjwhn.org/authors/authors.php), all interventional studies submitted after July 1, 2018 should include a statement on data sharing. Data sharing provides transparency and reproducibility of research so we strongly encourage authors to share deidentified data.

Furthermore, we have made efforts to overcome the weaknesses outlined in the review document notifying us of not being recommended for MEDLINE. The following describes our response to some major points:

Point 1. High acceptance rate: Although our acceptance rate when we initially applied for MEDLINE was relatively high (79% in 2019), this rate has stabilized over the years with probable booster effects since becoming indexed in an international database, as noted above. In 2022 we have reached less than 50% acceptance rate (Table 1) and will continue to seek to maintain this level. Rather than discouraging potential authors, we hope this will assure them that KJWHN is committed to publishing quality studies for research and practice.

Point 2. Most articles are from Korean authors and written in Korean: As stated in our aims and scope (https://kjwhn.org/about/index.php), our regional focus is mainly Korea, but we welcome submissions from all over the world. KJWHN still mainly receives submissions from domestic authors, but over the years, we have increased the proportion of English manuscripts to make these studies available to a wider audience. We welcome submissions from international authors, especially studies reporting on women’s health issues in Asia and/or using sex and gender-based analysis. And now, with triple crown indexing status, we expect to see more English manuscript submissions in the future. KJWHN is currently considering waivers and/or discounts of article processing charges for authors from developing countries, as a step to encourage more submissions from abroad.

Point 3. Significant prevalence of descriptive correlational studies with no theoretical framework for why variables were chosen: This has also been noted as a prevailing issue in other disciplines and journals [4,5]. KJWHN has been promoting specifying the theoretical framework through our annual workshops and communicating with authors during the review process to help them be

<table>
<thead>
<tr>
<th>Category</th>
<th>Data</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commissioned manuscripts (n)</td>
<td>8</td>
<td>4 Editorials, 4 Issues &amp; Perspectives</td>
</tr>
<tr>
<td>Unsolicited manuscripts (n)</td>
<td>63</td>
<td></td>
</tr>
<tr>
<td>Accepted manuscripts (n)</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Non-accepted manuscripts (n)</td>
<td>27</td>
<td>19 Rejected, 7 rejected before review (unsuitable), 1 withdrawn</td>
</tr>
<tr>
<td>Manuscripts reviewed and determined (n)</td>
<td>49</td>
<td>30 accepted, 19 rejected</td>
</tr>
<tr>
<td>Manuscripts under review or revision (n)</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Acceptance rate (%)</td>
<td>48.4</td>
<td>30/62 = 0.484</td>
</tr>
<tr>
<td>Average time from submission to acceptance (day)</td>
<td>56.4</td>
<td></td>
</tr>
</tbody>
</table>
more aware of the importance of stating their theoretical underpinnings [e.g., 6,7]. Potential authors are encouraged to include a description of their theoretical framework and may refer to practical suggestions in the literature [4,8]. As for more variety in study designs, many society members usually choose to submit experimental study papers to journals with high impact factors. KJWHN has been advertising more actively that manuscripts on interventional studies, integrative reviews/scoping reviews, and systematic reviews and/or meta-analyses are particularly welcome. Over the past 3 years, we have published eight systematic reviews, one integrative review, two randomized controlled trials, and three quasi-experimental studies. We will continue to actively advertise and seek high-quality manuscripts on various study designs. KJWHN is planning a special issue on “Digital era education for women’s health and wellbeing” for September 2023 (https://www.kjwhn.org/file/kjwhn_call_for_paper.pdf). We welcome submissions covering the design, development, evaluation, and use of digital solutions that support the health and wellbeing of women through education.

**Appreciation for 2022 reviewers**

KJWHN is indebted to our tireless reviewers, and our appreciation is extended to the following colleagues for their professional service this year:

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Chae, Hyun Ju (Joongbu University)
Cheon, Suk Hee (Sangji University)
Choi, Mi Young (National Evidence-based Healthcare Collaboration Agency)
Choi, So Young (Gyeongsang National University)
Chung, Chae Weon (Seoul National University)
Chung, Mi Young (SunMoon University)
Drake, Emily E. (University of Virginia)
Ha, Ju Young (Pusan National University)
Jeong, Geum Hee (Hallym University)
Jo, Myung Ju (The Catholic University of Korea)
Kang, Saemi (Gyeongsang National University)
Kang, Sookjung (Ewha Womans University)
Kim, Haewon (Seoul National University)
Kim, Hee Kyung (Kongju National University)
Kim, Hye Young (Keimyung University)
Kim, Hyun Kyung (Kongju National University)
Kim, Jeung-Im (Soonchunhyang University)
Kim, Joungyoun (University of Seoul)

We especially wish to acknowledge Professors Eun Ko (Sunchon National University), Geum Hee Jeong (Hallym University), and Mi Ha Sung (Inje University) as “Reviewer of the Year 2022” and Professors Sukhee Ahn (Chungnam National University) and Joungyoun Kim (University of Seoul) for their statistical expertise.

The editorial board will continue to strive for excellence so that KJWHN will be able to serve its purpose of improving women’s health in Korea and beyond.

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**Authors’ contributions**

All work was done by Kim S.
Conflict of interest
Sue Kim has been editor-in-chief of the Korean Journal of Women Health Nursing since January 2020. She was not involved in the review process of this editorial. Otherwise, there was no conflict of interest.

Funding
None.

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None.

References
Introduction

Since the first report, “Gendered Innovations: How Gender Analysis Contributes to Research,” published by the European Commission in 2013, many examples and case studies have demonstrated that the integration of sex and gender-based analysis (SGBA) into research can not only enhance research excellence but also add inclusive value for both men and women [1]. In the coronavirus disease 2019 (COVID-19) pandemic, the incorporation of SGBA into research has received new attention as extensive scientific evidence has indicated that biological sex matters in the immune system, which responds differently to vaccination in males and females. The publication of scientific evidence that does not properly reflect SGBA not only leads to unequal research results in men and women but can also have life-threatening results and cause investment losses.

In order to reach a higher level of excellence in biomedical and health research and development, reflecting on SGBA has been an international trend, and various research support policies have been established and applied in the European Union (EU), the United States (US), and Canada [2]. The US National Institute of Health (NIH) mandated “integrating sex as a biological variable in vertebrate animals and human studies” in 2016 and the EU recommended reflecting gender as a dimension in research during Horizon 2020 for 7 years (2014–2020) and carried out “Gender Flagged” projects [3]. Horizon Europe, which began in 2021 following Horizon 2020, further introduced a research and innovation policy in which the integration of the gender dimension into research and teaching is recommended in addition to the mandatory process-related requirements for a gender equality plan [4].

An SGBA policy of peer-reviewed journals is another factor in promoting gender-based research in health. More than 33 professional journals in the field of biomedical science and health research such as Nature, The Lancet, and Cell have introduced policies requiring or strongly recommending SGBA analysis when submitting manuscripts [5].

Current status of integrating sex and gender-based analysis into research

To find out how well SGBA has been integrated into research wherever applicable, a study [6] ana-
lyzed journals indexed in Web of Science from 2010 to 2021 in the field of biomedical and health science, using the following search terms: "sex factor" OR "sex characteristic" OR "sex difference" OR "gender factor" OR "gender characteristic" OR "gender difference" not "sex" partner" OR "sex" selection" OR "sex" behavior" OR "sex" behaviour" (data downloaded on August 2, 2022). Out of a total of 7,899,483 published papers, only 60,562 papers (0.77%) contained the keywords sex and gender. The field of neurosciences had the highest proportion of papers integrating SGBA, at 10,021 papers out of 476,180 papers (2.10%), followed by the fields of hormone-metabolic diseases at 3,810 papers out of 219,398 (1.74%) and cardiovascular diseases at 3,043 papers out of 247,731 (1.23%). However, although pharmaceutical studies triggered the integration of SGBA into research because of sex differences the adverse drug reactions, the proportion of papers integrating SGBA was only 0.57% (2,925 papers out of 514,882). Furthermore, in the field of immunology, in which SGBA should be actively integrated into research in the context of the COVID-19 pandemic [7,8], only 0.35% of research papers (1,027 papers out of 297,159) considered sex and gender differences. Given that research integrating SGBA in biomedicine and health is still very low, there is a risk that skewed data or knowledge from research may lead to further bias in medical artificial intelligence (AI). The health chatbot developed by Babylon Health is an example [9,10]. This chatbot participated in the United Kingdom's medical license exam, scoring higher than the average physician, and was advertised to be able to make diagnoses 40% faster than humans, but was accused of gender discrimination. When presented with a hypothetical 59-year-old man and woman with the exact same habits, including smoking and drinking, who complained of chest pain and nausea, the chatbot advised the man to go to the emergency room immediately, whereas the woman was instructed to consult a family doctor if the symptoms do not improve after a few days. This is because the chatbot judged that men were at risk for heart attack and women were at risk for depression or panic disorder, which could have been due to the use of biased scientific data accumulated from long-standing practices and prejudices that heart disease is a mainly male problem [11].

In the era of digital transformations, serious consideration should be given to whether bias is embedded in digital health technology because of skewed data or knowledge available. According to a study [11] on trends in gender-related AI in medical research, the number of publications has steadily increased over time from 2001 to 2020, with a steep increase between 2016 and 2020, accounting for 77.5% (2,410 of 3,110) of all included papers (Table 1). That study also showed that the percentages of gender-related articles in medical AI research doubled from 3% to 6.5% from 2001 to 2020 in a bibliometric analysis conducted by searching Web of Science.

Despite the rapid increase in research related to medical AI, few studies have actually integrated SGBA, potentially leading to the development of more gender-biased medical AIs. Therefore, more attention should be given to research integrating sex and gender.

### Awareness of sex and gender-based analysis in biomedical research in Korea and policy development

SGBA in research was formally introduced through a case study supported by the Korea Foundation for Women in Science, Engineering and Technology [12] and the Gender Summit 6 Asia-Pacific, which was held in Seoul in 2015 [13]. Subsequently, starting in 2016, the National Research Foundation supported a 5-year project reflecting sex and gender characteristics, through which various cases were accumulated and policy agendas were developed [14]. However, the awareness of SGBA in research in Korea is still low, as shown in Table 2. It is challenging that only 1% of principal investigators who participated in the investigation and analysis of national research and development (R&D) projects considered SGBA to be applicable to their projects [6].

Although funding policy is a major component of infrastructure for research and innovation to encourage the implementation of SGBA into the entire research process, institutions also play a pivotal role in developing research methodology to integrate SGBA and providing expertise to future generations [4]. As funding policy in Korea is based on the Master Plan of Science and Technology (S&T), the integration of SGBA has to be introduced into the Master Plan of S&T, which is established by the Ministry of Science and ICT. A consideration of mid- and long-term policy objectives and directions for S&T development every 5 years is required by the Framework Act on Science and Technology. The le-

### Table 1. Trends in gender-related research in medical artificial intelligence

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of papers</th>
<th>Proportion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001–2005</td>
<td>54</td>
<td>1.7</td>
</tr>
<tr>
<td>2006–2010</td>
<td>153</td>
<td>4.9</td>
</tr>
<tr>
<td>2011–2015</td>
<td>493</td>
<td>15.9</td>
</tr>
<tr>
<td>2016–2020</td>
<td>2,410</td>
<td>77.5</td>
</tr>
<tr>
<td>Total</td>
<td>3,110</td>
<td>100</td>
</tr>
</tbody>
</table>
The legal basis for the integration of SGBA into the full process of research and innovation is well established via the amendment of the Framework Act on Science and Technology, enacted on April 20, 2021 [15]. The amendment of the Framework Act introducing sex and gender consideration was made possible by the proposal submitted by the Honorary Congressman Seounglae Jo after a consensus was fully developed during the Gender Summit Global for SDGs hosted by the Korea Center of Gendered Innovations for Science and Technology Research (GISTeR), which was held in Seoul in 2020 [16]. This event emphasized the role of SGBA in the entire process of research and development as one of the main tools for inclusive innovations for sustainable development. Before the summit, a similar bill was submitted in 2018 but did not pass until the end of the 20th National Assembly in June 2020. Since 2016, GISTeR has held various activities including expert forums and roundtable discussions with the National Assembly to raise publicity.

The content of the amendment of the Framework Act on Science and Technology introducing SGBA is shown in Table 3, and its impacts are described below.

According to Article 7, 15-4, the Master Plan shall include the implementation of S&T to enhance social values in consideration of characteristics such as sex and gender and their intersectional factors. Based on Article 7, 15-4, in the Fifth Master Plan of S&T the paragraph "securing a policy base for the integration of SGBA into research" is reflected in Task 2 < Improvement of Research Environment to Increase Autonomy and Creativity > in Strategy 1 < Advancement of Science and Technology System for Qualitative Growth >. Based on these legal and institutional foundations, SGBA shall be reflected in the annual implementation plan starting in 2023 and there should be many research projects on integrating SGBA. However, despite this legal framework, in reality these efforts may be very limited because the implementation of SGBA is left to the researchers’ autonomy. This is in contrast to what experts in gendered innovations recommend as the most effective approach for SGBA (i.e., the mandatory implementation of SGBA by funding agencies).

Article 14 (3), ensuring the analysis of characteristics such as sex/gender in the Technology Assessment and Evaluation, could be regarded as the most advanced and innovative policy at a worldwide level. This policy stipulates that SGBA shall be applied in the whole process of technology innovation and create new value through new products and services for both men and women by considering sex and gender differences wherever applicable. Furthermore, the target of technology impact assessment is emerging technologies in the future, and sex and gender could be often overlooked or ignored because of a lack of understanding of the impact of sex and gender in humans. For example, the target of the 2022 technical impact assessment in Korea is synthetic biology [17], which is generally considered as having nothing to do with sex and gender by synthetic biologists, because their biomaterial has no sex. However, when synthetic bio-

---

**Table 2. Principal investigators’ responses on the applicability of SGBA among 2019 national R&D projects**

<table>
<thead>
<tr>
<th>Applicability of SGBA</th>
<th>Number of projects</th>
<th>Funding size</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Proportion (%)</td>
<td>Funding (million USD)</td>
</tr>
<tr>
<td>Not applicable</td>
<td>3,253</td>
<td>91.9</td>
<td>1,061</td>
</tr>
<tr>
<td>Applicable</td>
<td>37</td>
<td>1.0</td>
<td>6</td>
</tr>
<tr>
<td>No answer</td>
<td>250</td>
<td>7.1</td>
<td>57</td>
</tr>
<tr>
<td>Total</td>
<td>3,540</td>
<td>100</td>
<td>1,124</td>
</tr>
</tbody>
</table>

R&D, Research and development; SGBA: sex and gender-based analysis.

1 US dollar (USD)=1,299 Korean won.

**Table 3. Integration of sex and gender into the Framework Act on Science and Technology**

<table>
<thead>
<tr>
<th>Articles</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Article 7 (Master Plans for Science and Technology)</td>
<td>15-4 Implementation of science and technology to enhance social values in consideration of characteristics such as sex and gender</td>
</tr>
<tr>
<td>Article 14 (Technology Assessment and Evaluation)</td>
<td>(3) When conducting a technology impact assessment, the government should ensure that the analysis of characteristics such as sex/gender is reflected by taking into account the characteristics of the target technology.</td>
</tr>
<tr>
<td>Article 26-2 (Surveys and Analysis of Scientific and Technological Statistics and Indexes)</td>
<td>(3) When investigating and analyzing science and technology statistics and indicators, the government should reflect the characteristics of the analysis such as sex/gender by considering the characteristics of individual science and technology statistics and indicators.</td>
</tr>
</tbody>
</table>
material is used, it can affect the environment and elicit subsequent effects in both men and women. There is much scientific evidence \[18,19\] for sex differences in chemical toxicity and gender differences in the acceptability of new technology. Thus, the methodology of technology impact assessment for any targets integrating SGBA should be developed at the global level.

Finally, Article 26-2 deals with an inclusive approach to data management, analysis, and utilization to measure the development of SGBA implementation in research and innovation. Data management reducing gender bias would be a major challenge in developing health technology, as well as in research on the integration of medical technology with information and communication technology.

As described, the development of SGBA in biomedicine, health, medical AI, and emerging technologies may not be suitable to leave to the autonomy of researchers because the available scientific evidence indicates that research should integrate SGBA. Thus, the Act on the Performance Evaluation and Management of National Research and Development Project further fortified SGBA on June 29, 2021 \[20\] to promote SGBA research (Table 4).

Article 3 ⑦ ensures that evaluation and monitoring of the development of SGBA in research will take place at the national level, even though the actual implementation of SGBA is left to researchers’ autonomy or discretion.

### Concluding remarks

As reviewed above, the EU has been reflecting the gender dimension in research policies since 2013, and the US NIH puts research excellence at the forefront and has mandated the submission of research proposals with sex as a variable in research on vertebrate animals and humans since 2016. Moreover, the Government of Canada’s Health Portfolio uses ‘Sex-and Gender-Based Analysis Plus (SGBA Plus)’ to develop, implement, and evaluate not only the Health Portfolio’s research, but also surveillance, legislation, policies, regulations, programs, services, and other initiatives related to national health policies. The objective of this policy is to strengthen the integration and application of SGBA Plus in all Health Portfolio’s activities to advance equity, diversity, and inclusion \[21\]. Korea has also specified that SGBA should be reflected in R&D through an amendment of the Framework Act on Science and Technology from 2021 onwards.

Despite the introduction and dissemination of these relevant policies and acts to promote SGBA research, the integration of SGBA in actual research settings has been slow. An important message for individual researchers, funding agencies, and scholarly journals aiming to expand SGBA are to establish a research culture in which all researchers and science policy experts trust that gendered innovations are for “Better Science and Better Life” for both women and men, as well as for research excellence. Inclusive innovation could be accelerated by developing a sound methodology to practice SGBA by improving awareness that SGBA is meant to create better knowledge throughout the whole research process.

I hope that readers will be mindful of the recent global movements and the legislative trends within Korea aimed at promoting SGBA, and thus be encouraged to take part in gendered innovations.

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### Authors’ contributions

All work was done by Lee HS.

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Data availability

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References


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The experiences of depressed pregnant women participating in a cognitive behavioral therapy program via video communication: an exploratory qualitative study

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Purpose: This study explored the experiences of pregnant women with depressed mood participating in a group cognitive behavioral therapy (CBT) program using video communication, based on Beck’s cognitive theory.

Methods: The participants were six pregnant women out of 13 women who had participated in an 8-session group CBT program using video communication for women with depressed mood (Edinburgh Postnatal Depression score of ≥9). Data were collected from February 20 through March 25, 2021. In-depth individual interviews were conducted through a video conferencing platform at 1 month post-baseline. Thematic analysis was done.

Results: Three themes, 10 subthemes, and 38 concepts were derived from experiences of participating in the 4-week group CBT program (twice a week). The first theme, entitled “continuing realization” had subthemes of “a negative and instable self,” “a selfish judgment that excludes others,” and “a strong belief in self-control.” The second theme, entitled “attempt to change for restoration” had subthemes of “shift to rational thinking,” “freedom from suppressed beliefs,” “tolerance of other people,” and “courage for self-expression.” The third theme, entitled “departure for a positive life,” had subthemes of “emotional healing,” “faith in oneself,” and “reestablishing the criteria for happiness.”

Conclusion: Pregnant women with depressed mood expressed that continuing realizations and attempts to change supported their transition toward a positive direction of healing. Thus, they were able to change their distorted thinking into rational thinking through CBT using video communication. These findings support the use of group CBT using video communication with pregnant women who have depressed mood.

Keywords: Cognitive behavioral therapy; Depression; Pregnancy; Qualitative research

주요어: 인지행동치료; 우울; 임신; 질적연구
Introduction

임신 중 우울증은 임신 여성의 약 7%가 경험하는 빈번한 건강문제로[1]. 절망감, 불안, 슬픔, 좌절감, 불면 혹은 수면 과다, 과식 혹은 식욕 상실, 집중력 및 기억력 저하, 과민 또는 안절부절 등의 증상을 동반한다[2]. 이 가운데 수면 및 식욕 문제, 에너지 수준 저하와 같은 일부 증상들은 임신 증상과 유사하기 때문에 임부가 우울 증상임을 자각하지 못할 수도 있다[1].


우울증은 그 정도의 심각성에 따라 정신요법이나 항우울제와 같은 전문치료 이외에도 심리요법이 고려된다[1]. 인지행동치료(cognitive behavioral therapy, CBT)는 우울증 치료에 효과적인 방법으로 널리 알려져 있으며, 임신과 출산을 포함한 주산기 우울증 치료에도 널리 사용되고 있다[3]. CBT는 개인의 사고가 자신의 감정과 행동에 영향을 미치고, 행동은 감정과 사고에 영향을 미친다는 기초이다[6]. 우울증 치료에 있어서 인지이론 적용의 목적은 부정적 사고와 행동을 바꾸고, 인지적 재구조화함으로써 부정적인 생각과 행동을 줄이는 데에 있다[7].


One of the key objectives of this study is to investigate the impact of the cognitive behavioral therapy (CBT) program on pregnant women with depression, as well as to understand the experiences of those who have participated in the program. The study aims to provide foundational data for future interventions and policy recommendations.
Methods

Ethics statement: This study was approved by the Institutional Review Board of Kyungnam University (No. IRB-1040460-A-2020-039). Informed consent was obtained from the participants.

연구 설계
본 연구는 우울한 임신 여성의 화상 CBT 프로그램 참여 경험을 이해하고 탐색하기 위한 질적연구이며, COREQ (Consolidated Criteria for Reporting Qualitative Research) 가이드라인에 따라 기술하였다 [19].

연구 대상
본 연구에서는 연구 참여자 선정을 위해 목적적 표집을 실시하였다. 8회기의 화상 CBT 프로그램 [19]에 참여했던 임신 18주–28주 사이의 일부 중, 본 질적연구의 목적을 이해하고 연구 참여에 자발적으로 동의한 자를 대상자로 선정하였다. 화상 CBT 프로그램의 참여자는 창원시 온라인 임신·육아 커뮤니티인 '맘카페' 회원으로, 에든버러 산후우울 척도 (Edinburgh Postnatal Depression Scale) 점수가 9점 이상이었다. 에든버러 산후우울 척도의 기준을 9점으로 선정한 이유는 보건복지부에서 이를 우울상담이 필요한 수준이라고 제시하고 있기 때문이다 [20].

자료 수집 방법
본 연구에서 화상 CBT 프로그램은 창원시 온라인 임신·육아 커뮤니티인 맘카페에 안내하였고, 프로그램 진행 기간은 2020년 10월부터 2021년 2월까지였다 [19]. 총 3,441인에 팀을 이루어 1회 당 80분 (CBT 그룹 활동 50분, 과제 나눔 30분), 주 2회, 총 8회기를 진행하였다. 회차별 순서는 지난 회기 이후의 생활에 대해 참여자들과 공유하고, 매 회기의 주된 내용 학습, 활동 후 느낌 나누기, 과제 안내 순서로 진행하였다. 1회기는 '인지행동 산후우울 예방 프로그램 소개'를 통해 인지행동의 기본 개념과 참여자들을 소개하고, 2회기인 '긍정의 나 부정의 나'는 일상생활에서 일어나는 자신의 생각과 감정을 확인한다. 3회기 '스트레스 확인하기 1'은 자신의 평소 스트레스 정도를 확인하고, 4회기 '스트레스 확인하기 2'는 임신과 관련된 자신의 스트레스 내용을 확인한다. 5회기 '스트레스 대처하기'는 자신의 핵심 신념과 평소 자신의 스트레스 조절 효과를 확인하고, 6회기 '내 삶의 이야기'는 자신의 일상에서 나타나는 정서적 사고, 핵심 신념, 인지적 오류, 감정 확인을 통해 자신의 삶의 질과 관계적으로 바라본다. 7회기 '값들에 대한 변화'는 감동 상황에서 자신이 사용하는 문제 해결 방식의 변화를 통해 효과성을 확인하고, 8회기 '변화하는 나의 삶 이야기'는 임신 사건에 대한 가치를 재정의하는 과정을 통해 자신의 새로운 미래를 계획해 보도록 하였다.

중 8회의 화상 CBT 프로그램 참여를 통해 우울, 자동적 사고 및 역기능적 태도의 점수가 유의하게 감소한 것을 확인할 수 있었는데 [18], 본 연구는 화상 CBT 프로그램 종료 1개월 시점에서 프로그램에 참여했던 13명에게 유선으로 연구의 목적, 방법 등을 설명하고, 참여의사를 받은 6명에게 동의서를 받은 뒤 자료 수집을 위한 심층 면담을 실시하였다. 진행 연구를 [12, 16]에서는 자료 수집 기간이 프로그램 진행 전후에서 종료 후 12개월 이내였으나, 본 연구에서는 출산 이후 심층면담에 집중하기 어려울 것을 감안하여 CBT 프로그램 종료 후 1개월에 면담을 실시하였다.

본 질적연구의 자료 수집은 2021년 2월 20일에서 3월 25일까지 진행되었다. 면담을 시작하기 전 면담 내용의 녹음에 대해 허락을 받았으며, COVID-19 위기 상황에서 대면이 어려워 참여자가 원하는 시간에 맞추어 화상으로 심층면담을 진행하였다. 면담 횟수는 1인당 1~2회였고, 면담 시간은 1시간 15분에서 2시간 30분이 소요되었다. 면담 후에는 소장의 사례비(25,000원)를 지급하였다.

면담은 연구표준화된 질문 형식으로 진행하였다. 주요 면담 질문으로는 "화상회의 CBT 프로그램 참여 동안 어떤 경험을 하였습니까?", "프로그램 참여 후 무엇이 달라진 것 같습니다가?", "프로그램 참여 후 생활 상에서 어떻게 변화를 경험하셨습니까?" 등이었다. 면담 시 참여자의 언어적, 비언어적 표현 등을 주의 깊게 관찰하고 메모하였다. 각 면담이 끝난 후에는 연구자와 연구보조원이 녹음을 파일에서 참여자의 표현 그대로 필사하였다. 연구 참여자의 민감 정보를 녹음 파일과 필사본은 참여자의 정보를 코드화하여 저장하여 익명성이 보장되는 것과 모든 자료는 연구 종료 후 폐기될 것임을 설명하였다.

자료 분석
자료 분석은 질적분석을 위한 기본방법으로 정성적자료 분석에 유용한 주제분석 (thematic analysis) [21] 단계를 사용하였다. 1단계는 자료에 친숙해지는 단계로 필사된 면담 내용을 전체적으로 반복해서 읽으면서 의미 있는 부분에 밑줄을 그었다. 2단계는 초기 코드를 생성하는 단계로 친숙화 작업 후 자료에서 의미가 있는 공통된 특성을 코드화하였고, 각 코드와 관련된 자료를 모았다. 3단계는 주제 찾기 단계로, 도출된 개념이 전체 자료와 부합되는지 확인하고, 주제도를 통해 각 주제가 어떻게 개념화되어 서로 관련성을 검토하였다. 4단계는 주제를 정의하고 명명하는 단계로, 전반적인 내용과 연관성을 두고 주제와 관련된 자료를 모았다. 5단계는 주제 찾기 단계로 코드를 더불어 하고, 개념과 관련된 모든 자료를 수집하였다. 6단계는 주제 확인 단계로 도출된 개념이 전체 자료와 부합되는지 확인하고, 주제도를 통해 각 주제가 어떻게 개념화되어 서로 관련된지 검토하였다. 5단계는 주제를 정의하고 명명하는 단계로, 전반적인 내용과 연관성을 두고 주제와 관련된 자료를 모았다. 6단계는 보고서를 작성하는 단계로, 연구결론이나 문헌과의 관련성을 검토하고 각 주제와의 관련성을 기술하였다.

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연구의 엄격성 확보 및 연구자 준비

연구의 엄격성 확보
본 연구에서 연구의 엄격성을 확보하기 위해 Lincoln과 Guba[22]가 제시한 평가기준인 신빙성, 전이성, 의존가능성, 확증가능성의 측면에서 연구의 신뢰도와 타당성을 높이고자 하였다. 연구자들은 신빙성을 확보하기 위해 연구 참여자에게 연구의 분석과 결과물에 대해 정확성을 확인할 것을 요청하여 왜곡된 내용이 없는지, 표현과 기술이 정확한지를 검토하였다. 전이성은 독자들에게 참여자의 면담 내용을 가능한 풍부하고 생생하게 기술하고자 하였고 프로그램, 전형적인 사례, 연구 대상자에 대해 묘사하였다. 의존가능성은 연구자 간에 일관된 결과가 도출되도록 수차례의 검토와 논의 과정을 거쳤으며, 확증가능성은 질적연구의 경험이 풍부한 교수 2인에게 분석자료와 연구결과에 대해 검토받았다.

연구자 준비
본 연구에서 제 1저자는 질적연구 특강나 워크숍 등에 참여하여 질적연구 설계, 질적내용 분석, 현상학, 근거이론 등 질적연구방법론을 구준히 익혔다. 현상학적 연구 방법론을 이용한 질적연구를 학회지에 여러 번 게재한 경험이 있으며, 태어Desktop폰과 우울에 관한 연구를 10년간 수행해 왔고, 교신저자는 정신간호학 교수이며, 정신건강복지센터에서 조현병의 관리 및 분양과 심리소통자로 활동하면서 경험한 경험의 일부를 배경으로 휴대자는 정신간호학 교수이며, 이에 대한 경험이 풍부한 학회지에 여러 번 게재한 경험이 있으며, 본 연구에 참여한 대학원 과정에서 질적연구방법론을 수학하였다. 본 연구에 참여한 대학원 과정에서 질적연구방법론을 수학하였다. 본 연구에서 화상 CBT 프로그램[19]에 참여했던 우울한 임신 여성들의 경험을 탐색적으로 분석한 결과, 38개의 개념과 10개의 하위주제, 3개의 주제가 도출되었다(Table 2).

Table 1. General characteristics of participants

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Participant No.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Age (year)</td>
<td>36</td>
</tr>
<tr>
<td>Job</td>
<td>Yes</td>
</tr>
<tr>
<td>Number of pregnancy</td>
<td>2</td>
</tr>
<tr>
<td>Gestational age (week)</td>
<td>28</td>
</tr>
<tr>
<td>Complications of pregnancy</td>
<td>No</td>
</tr>
<tr>
<td>Planned pregnancy</td>
<td>Yes</td>
</tr>
<tr>
<td>Family history of depression</td>
<td>No</td>
</tr>
<tr>
<td>EPDS score Before CBT</td>
<td>20</td>
</tr>
<tr>
<td>After CBT</td>
<td>5</td>
</tr>
</tbody>
</table>

CBT: cognitive behavioral therapy; EPDS: Edinburgh Postnatal Depression Scale.

화상 CBT 프로그램 참여 경험
주제1. 알아차림의 연속

참여자들은 자기성찰의 차간을 통해 자신의 부정적 감정과 사고를 득바로 알게 되었고, 이러한 것으로 인해 일상생활이 무기력하고 우울함을 개발하게 되었다. 내가 전에 열등감과 자신만 임신의 희생양이 된 것 같은 억울함에 휩싸여 스스로 외롭고 비참하게 만들었던 순간들을 반성하게 되었다. 이러한 감정과 사고는 자신의 삶에 부정적 영향을 미치기 때문에, 벗어나고 맞서야 함을 인식하게 되었다.

· 부정적이고 불안정한 자아

여성들은 과거에도 부정적인 감정과 생각을 인식하고 했지만 임신과 함께 자신이 더 부정적으로 변화되거나 있음을 인식하게 되었다. 임신, 출산, 양육에 대한 걱정은 불안, 우울, 분노 등의 부정적 경험으로 감정이 쌓여있고 임상에서 흔히 관찰된다. 누구나 대신해 줄 수 없는 임신의 신체적 고통과 자녀 양육에 대한 막중한 부담감에 압도되어 감정의 불안정이 시작되었다고 화상했다. 타인과 비교하

Results

본 연구의 참여자는 총 6명이었으며, 평균 연령은 34.3세(범위, 30~37세)였다. 현재 근무 중인 경우가 2명, 직업이 없는 경우가 3명, 휴직 상태인 경우가 1명이었다. 임신 횟수는 평균 1.67회였으며, 제태연령은 평균 22주였고, 최소 18주에서 최대 28주었다. 임신 합병증이 있는 경우가 1명이었고, 가족 중 우울 진단을 받은 경우가 1명이었다. 우울 점수는 CBT 참여 이전의 경우 30점 만점에 평균 14.33점이었으며, CBT 종료 후에는 평균 5.5점이었다(Table 1).

본 연구에서 화상 CBT 프로그램[19]에 참여했던 우울한 임신 여성들의 경험을 탐색적으로 분석한 결과, 38개의 개념과 10개의 하위주제, 3개의 주제가 도출되었다(Table 2).

Table 2. Themes and sub-themes identified from the CBT participants

<table>
<thead>
<tr>
<th>Theme</th>
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<td>알기에차림의 연속</td>
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Cognitive Behavioral Therapy (CBT)
여 자신을 비하하고, 예상치 못한 부정적인 사건이 발생하면 일방적으로 자신에게 책임을 전가하는 습관이 있음을 알게 되었다.

입덧 때문에 아무것도 못하고 먹는 것도 힘들었어요. 내 몸은 이런데 아기를 케어하기 힘들고 남편하고 다투게 되면 감정적으로 휘둘리게 되었어요. 나만 왜 이렇게 고통스러울까? 우울한 생각이 들었어요. (참여자 1)

임신 후 몸이 너무 힘드니까 단단하지 못한 엄마라는 생각을 했어요. 엄마가 되어가는 내 모습이 약하고, 엄마로써 자격이 없다고 생각했어요. (참여자 3)

자궁에 피고임이 심해 누워서 생활을 했어요. 애기 상태가 나빠질 수 있다고 하나도 콧물 관리를 잘못해서 일일이 발생하고, 다 내용물 같았어요. 그 때 겨울이었는데 세탁기가 안 열리서 세탁기가 안 열리서요 생각했어요. (참여자 6)

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<th>Table 2. Experience of cognitive changes in cognitive behavioral therapy using video communication for depressed pregnant women</th>
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<tr>
<td><strong>Theme</strong></td>
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<td>Departure for a positive life</td>
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상대방을 배제한 이기적인 판단

참여자들은 상대방과의 관계에서 자신의 입장에서만 고집하여 응
바른 판단을 하지 못하는 자신을 발견하게 되었다. 자신의 입장만
완고하고 고수하며 상대방의 입장과는 다르게 자신을 회생하거나 상
대방을 왜곡하게 만들었다. 자신이 늘 피해자이며, 상대방은 이기
적인 판단을 바탕으로 사고방식에 문제가 있음을 발견하고, 상대방의 입
장에서 생각하고 배려하는 것이 필요하다고 인식하게 되었다.

참여자들은 상대방의 입장을 배제하고 자신의 입장을만 고집하므
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들 것 같아요. (참여자 1)
처음 아빠가 되다 보니 게 제 몸 상태나 될 해주어야 하는지 모르고, 애기가 생긴 것에 대한 기쁨은 있지만 평소대로 대해주기 얼마요. (참여자 2)
임용 준비를 그만 하라는 부모님을 만나고 싶었는데 끝까지 밀어붙이셨어요. 엄마가 나를 얼마나 안타깝게하는지 생각을 안 해봐요. 나는 사랑을 많이 받고 있는데... (참여자 3)
· 자기 표현의 용기
참여자들은 상대방의 입장을 들어보고, 서로의 요구를 확인하면서 합일점이 찾아지는 경험을 하였다. 과거에는 상황을 회피하면서 상대방을 원망하기 일쑤였지만 이제는 먼저 다가가 대화를 시도할 수 있게 되었다. 자신의 감정이나 요구를 솔직하게 표현하거나 필요한 사항을 요청할 때 상대방으로부터 공감과 위로를 얻었으며, 서로 도움을 주고 받게 되었다.
명절에 시댁에 가면 너무 힘들 것 같은데, 인사는 가야할 것 같고... 남편에게 저의 생각을 이야기해서 서로 입장을 애기하고 적당히 이야기를 해서 가야할 것 같아요. (참여자 2)
 자기괴리 기간에 설이 끼어 있으니까 설을 보내야할 것 같아요. (참여자 3)
저도 남편을 가족의 범주에 넣고 나니 함께 할 수 있게 되었어요. (참여자 4)
도덕적 관심
참여자들은 갈등 상황을 회피하고 제대로 대처하지 못했던 과거와 달리 극복해낼 수 있다는 자신감을 가지게 되었다. 더 이상 자신을 과소평가하지 않고 어떤 일이든 해낼 수 있는 능력이 있다고 다시 평가하게 되었다. 앞으로도 계속해서 긍정적인 생각을 선택하고, 과거에 집착하지 않으며, 자신을 향후 할 수 있을 것이라는 자기 믿음이 생겨났다.
아기가 커서 유치원 가면 엄마들끼리 친해야 아기들도 친하다고 하는데 나 때문에 왜랑 달라서 걱정하는 거에... (참여자 3)
저도 남편을 가족의 범주에 넣고 나니 함께 할 수 있게 되었어요. (참여자 4)
가족의 기준 재정립
참여자들은 자신의 행복과 갈등의 해소를 자기 밖에서 찾으던 반면 자신은, 자신의 행복과 갈등을 자기 밖에서 찾으든 반면 적 감정이 누그려졌다.
게 수고했네. 적당히 하자라고 말하고 싶어요. (참여자 2)

행복은 절대적이 아니라 내 마음속의 상대적인 가치인 거 같아요. 내 안에 있는 최선의 행복을 느끼는 것. 내 기준에 맞춘 것이 행복이라고 생각해요. (참여자 4)

Discussion

본 연구에서 우울한 임신 여성의 화상회의 CBT 참여 후 인지변화 경험의 의미와 구조를 탐색한 결과, 도출된 주제로는 알아차림의 연속, 회복을 위한 변화, 긍정적 삶으로의 도약으로 나타났다.

환자들이 질병에 대한 통제력이 높아지고 대처에 대한 자기효능감이 높아졌다는 결과와도 비슷하였다. 도박중독 환자들도 자신의 가치에 집중하며 자신을 위한 행복의 기간을 찾아가게 되었다. CBT에 참여한 강박장애 환자들도 자신의 역할과 책임에 대한 가치를 인식하게 되었다고 하였다[16]. 마음챙김 기반 CBT에 참여했던 도박중독 환자의 경우 자신이 중요하게 생각하는 것에 우선 순위를 두고 자신의 역할과 책임에 대한 가치를 인식하게 되었다고 하였다[17]. 이와 같이 집단 화상회의 CBT 프로그램은 임신 여성의 우울 감소뿐만 아니라 자기 인식과 자신감의 향상을 통하여 더 나은 삶으로의 희망과 기쁨을 가지게 하였다.

결론적으로 화상 CBT 프로그램을 통해 기존의 대면 CBT[15,16]에서와 같이 감정, 사고, 행동에서의 긍정적 변화, 왜곡된 사고와 행동의 통제, 부정적 감정의 감소, 문제 해결 능력 향상, 관계 회복, 자신감 향상 등의 변화를 확인할 수 있었다. 특히 주목할 점은 인지적 변화의 측면에서 왜곡된 사고를 효과적으로 바탕한 결과를 위한 합리적인 사고로 변화할 수 있었으며, 이러한 변화는 치료자의 개입에 의한 것이라는 점이다. 따라서 집단 화상회의 CBT 프로그램이 COVID-19와 같은 비대면 환경에서 치료자와의 접촉을 유지하는 임신 여성의 우울관리에 새로운 접근방법임을 시사한다. 환자들은 자신의 중요하게 생각한 것들에 우선순위를 두고 자신의 역할과 책임에 대한 가치를 인식하게 되었다[17]. 이와 같이 집단 화상회의 CBT 프로그램은 임신 여성의 우울 감소뿐만 아니라 자기 인식과 자신감의 향상을 통하여 더 나은 삶으로의 희망과 기쁨을 가지게 하였다.

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Conceptualization: Lee E, Kim M; Sources: Kim M; Investigation: Lee E; Formal analysis: Lee E, Park Y; Writing–original draft: Lee E; Writing–review & editing: All authors.

Conflict of interest

The authors declared no conflict of interest.

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Data availability

The data that support the findings of this study are available on request from the corresponding author.

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References


Do family values and reproductive health knowledge influence reproductive health-promoting behaviors in married women? A cross-sectional survey

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Purpose: Based on the World Health Organization framework on reproductive health, this descriptive correlational study investigated the factors affecting reproductive health-promoting behaviors of married women, with a focus on family values and reproductive health knowledge.

Methods: A cross-sectional survey was conducted on 170 married women between the ages of 25 and 49 years living in Daegu, Korea. The general and reproductive health characteristics, family values, and reproductive health knowledge of married women were identified, as well as factors affecting reproductive health-promoting behaviors. A questionnaire survey was administrated to investigate the impact of various factors on reproductive health-promoting behaviors.

Results: Positive correlations were shown for family values ($r=.78$, $p<.001$) and reproductive health knowledge ($r=.55$, $p<.001$). Family values ($β=.35$, $p<.001$) and reproductive health knowledge ($β=.24$, $p<.001$) were identified as factors influencing reproductive health-promoting behaviors. According to the regression model, the explanatory power of factors affecting reproductive health-promoting behaviors among married women was 51.2%.

Conclusion: A history of reproductive diseases, family values, and reproductive health knowledge were identified as factors influencing reproductive health-promoting behaviors. These results will provide basic data for the development of a reproductive health-promoting program, including a positive approach to reproductive health among married women, and will serve as a basis for further research on intervention strategies.

Keywords: Health promotion; Knowledge; Reproductive health; Values

주요어: 건강증진; 지식; 생식건강; 가치
Introduction

The concept of reproductive health-promoting behaviors refers to positive behaviors for reproductive health, such as stable sexual behavior, reproductive health management, prevention of sexually transmitted infections, family planning, pregnancy, and childbirth. This study identifies factors affecting reproductive health-promoting behaviors in married women, including past experiences of reproductive disease, family values, and reproductive health knowledge. These results will be useful in nursing interventions as a positive approach to reproductive health in married women.

Implications for practice, education, and/or policy

Programs promoting reproductive health-promoting behaviors should include past experiences of reproductive disease, family values, and reproductive health knowledge.

세계보건기구(World Health Organization)와 국제연합(International) 총회에서는 생식건강의 의료 분야 연구 및 정책 개발과 생식건강 서비스의 보편적 접근을 보장하기 위한 구체적 목표를 설정하였다. 국내 국민건강증진종합계획에서는 인구 정책의 맥락으로 저출산 현상에 대한 가족과 생식건강에 대해 사회적인 관심이 증가하였으며, 본 연구자는 생식건강의 통합적 관점에서의 연구 필요성을 고려하여 기혼여성을 대상으로 가족가치관, 생식건강지식이 생식건강증진행위에 미치는 영향을 파악하고자 한다. 생식건강증진행위에 미치는 영향을 파악하기 위한 상관성 조사 연구설계이다.

연구 대상 및 표집 방법
본 연구 대상자는 25세 이상 49세 미만의 기혼여성으로 본 연구의 목적과 취지를 이해하고 자료 수집에 동의한 대상자만 참여하였다. 제외 기준은 현재 생식기 질병을 진단받고 치료 중인 자, 성병 및 질환을 진단받고 치료 중인 자로 선정하였다. 현재 생식기 질병을 진단받고 치료 중인 자는 건강상태를 지각하고 건강회복을 위한 긍정적 행위를 실천[18]하므로 연구 결과에 영향을 줄 수 있다고 판단하여 제외하였다. 연구 수행에 필요한 표본 크기는 Lee[19]의 선행 연구를 바탕으로 G*Power 3.1.9.2 프로그램을 이용하고, 다중회귀분석에서 임의 추정 예측변수 15개, 효과크기 .15, 유의수준 .05, 검정력 80으로 총 139명으로 산출하였으나, 탈락률 20%를 고려하여 177명을 모집하였다. 설문지 중 응답이 불완전하거나 불성실한 2부를 제외한 170부를 최종 자료 분석에 활용하였다.

연구 도구
본 연구에서 사용된 주요 변수를 측정하기 위한 구조화된 도구는 이메일을 통하여 개발자에게 도구 사용에 대한 승인을 받았다. 생식건강증진행위(reproductive health-promoting behaviors) 생식건강증진행위는 Jo 등[12]이 대학생을 대상으로 개발하고 Lee와 Lee[14]가 기혼여성에게 사용하기 위하여 수정, 보완한 도구를 사용하였다. 생식건강증진행위 측정도구는 안전 성행위 4 문항, 생식건강증진행위 8 문항, 생식건강증진행위 8 문항, 생식기 위생 관리 3 문항 등 총 18 문항으로 구성되어 있다. 각 문항은 5점 Likert 척도로 ‘전혀 그렇지 않다’ 1점, ‘매우 그렇다’ 5점으로 점수를 구하며(가능점수 범위, 18–90점) 점수가 높음수록 생식건강증진행위 수행도가 높음을 의미한다. 개발 당시 도구의 신뢰도는 Cronbach’s α=.88, Lee와 Lee[14]의 연구에서 신뢰도는 Cronbach’s α=.76–.90이었으며 본 연구에서는 Cronbach’s α=.81이었다.

가족가치관(family values)
가족가치관은 Seo[20]가 선행논문을 재구성하여 수정, 보완한 측정도구를 사용하였다. 자녀가치와 보부모가치로 구분되며, 자녀가치는 자녀의 필요성 및 중요성에 관한 3 문항, 보부모가치는 부모가 되고, 부모로서 자녀를 양육하는 것에 대한 중요성에 관한 4 문항으로 총 7 문항으로 구성되어 있다. 점수 Likert 척도로 ‘전혀 그렇지 않다’ 1점에서 ‘매우 그렇다’ 7점까지의 범위를 갖는다(가능점수 범위, 7–49).

Methods

Ethics statement: This study was approved by the Institutional Review Board of Keimyung University (No. 40525-202203-HR-005-02). Obtaining written informed consent was exempted because the survey was completely anonymous and considering the online survey design.
대상자 특성

선행 연구를 바탕으로, 연령, 종교, 교육수준, 직업, 소득수준의 일반적 특성과 결혼 기간, 자녀 유무, 생식건강 상태, 피임 방법, 과거 생식기 질병 경험, 생식건강 교육 여부, 생식건강 교육 필요성의 생식건강 관련 특성을 총 12문항으로 구성하였다.

자료 수집

자료 수집은 2022년 5월 18일부터 2022년 7월 2일까지 진행되었다. 대구광역시 소재지 초등학교 1곳, 의료기관 2곳, 직장인 전용 익명 소셜 네트워크 서비스에서 담당자가 전문가 조사에 동의한 대상자 중 통신을 통한 응답이 높은 피험자를 대상으로 하였다. 그리고 본 연구의 필요성 및 목적으로 이해하고 대상자 기준에 부합하는 자는 온라인 설문을 위하여 QR 코드를 이용한 선풍적 자료 수집 및 이용의 항목에 동의한 대상자의 절반만을 대상으로 하였다. 설문서 작성을 위한 설문지 작성에는 각 15문항 정도의 시간이 소요되었으며, 설문 종료 후 연구 보상이 제공되었다. 자료 분석 방법

수집된 자료는 IBM SPSS ver. 22.0 (IBM Corp., Armonk, NY, USA) 통계 프로그램을 이용하여 분석하였으며 구체적인 방법은 다음과 같다.

1) 대상자의 일반적 및 생식건강 특성은 실수와 백분율, 평균과 표준편차로 분석하였다.

2) 대상자의 가족가치관, 생식건강지식, 생식건강증진행위는 평균, 표준편차로 분석하였다.

3) 대상자의 일반적 및 생식건강 특성에 따른 생식건강증진행위 차이는 independent t-test를 이용하여 Pearson correlation으로 분석하였다.

4) 가족가치관, 생식건강지식, 생식건강증진행위의 상관관계를 파악하기 위하여 Scheffe test를 이용하였다.

5) 대상자의 생식건강증진행위에 미치는 영향 요인을 파악하기 위하여 위계적 회귀분석(hierarchical analysis)으로 검증하였다.

Results

대상자의 일반적 및 생식건강 관련 특성

대상자의 연령은 25세 이상 49세 미만(평균 32.28 ± 0.31세), 종교는 '무교'가 77.6%, 교육수준은 4년제 대학 졸업이 72.4%. 월 수입평균은 251.09 ± 0.88만원으로 나타났다. 생식건강 특성에서 결혼 기간은 1~2년 사이가 32.9%. 자녀는 '있음'이 71.8%. 현재 생식건강 상태는 전문가 정의에 의하여 '보통'이 59.4%. 피임 방법은 콘돔이 54.1%, 과거 생식기 질병 경험은 월경 장애가 40.0%, 생식건강 교육 경험은 '많음'이 59.2%. 생식건강 교육 필요성은 '예'가 87.6%이다(Table 1).

대상자의 생식건강증진행위, 가족가치관 및 생식건강지식

생식건강증진행위는 평균 평점 5점 만점에 3.18점으로, 하부 요인 중 안전 성행위가 3.32점으로 가장 높았고, 생식건강 관리가 3.09점, 생식기 위생관리가 3.09점으로 가장 낮았다. 대상자의 가족가치관은 평균 평점 7점 만점에 4.40점, 생식건강지식은 평균 평점 34점 만점에 27.98점으로 나타났다. 세부 항목으로는 가족가치관은 평균 4.45점, 자녀가치는 평균 4.36점이었다(Table 2).

대상자의 일반적 및 생식건강 관련 특성에 따른 생식건강증진행위 차이

대상자의 일반적 및 생식건강 특성에 따른 생식건강증진행위의 차이는 다음과 같다. 생식건강증진행위는 대상자 교육수준은 대학 졸업이 1.32, p = .011. 결혼 기간은 1년 이상, 2년 이하가 3.65점, 3년 이상, 4년 이하가 평균 3.40점으로, 결혼 기간 1년 이상 2년 이하에서 생식건강증진행위가 높게 나타났다(F = 0.33, p = .011). 피임 방법은 콘돔이 3.56점, 월경 추적이 3.44 점으로, 콘돔이 가장 높게 나타났다(F = 1.01, p = .021). 과거 생식기 질병 경험에서 생식기 질병은 평균 3.67점, 월경 장애가 3.49점으로 생식기 질병 질병 및 증상에 따른 생식건강증진행위 차이가 가장 높게 나타났다(F = 0.58, p = .018) (Table 1).
Table 1. Differences in RHPB according to the characteristics of the participants (N=170)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Categories</th>
<th>n (%)</th>
<th>Categories (mean ± SD)</th>
<th>RHPB (mean ± SD)</th>
<th>t or F</th>
<th>p</th>
<th>Scheffé</th>
</tr>
</thead>
<tbody>
<tr>
<td>General characteristics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (year)</td>
<td>&lt; 30</td>
<td>29 (17.1)</td>
<td>32.28 ± 0.31</td>
<td>3.53 ± 0.20</td>
<td>0.36</td>
<td>.522</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30–34</td>
<td>75 (44.1)</td>
<td>3.48 ± 0.25</td>
<td>3.52 ± 0.11</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>35–39</td>
<td>36 (21.2)</td>
<td>3.11 ± 0.11</td>
<td>3.02 ± 0.41</td>
<td></td>
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<tr>
<td></td>
<td>40–44</td>
<td>22 (12.9)</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td>≥ 45</td>
<td>8 (4.7)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Religion</td>
<td>Yes</td>
<td>132 (77.6)</td>
<td>3.52 ± 0.18</td>
<td>0.23</td>
<td>.318</td>
<td></td>
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<tr>
<td></td>
<td>No</td>
<td>38 (22.4)</td>
<td>3.55 ± 0.31</td>
<td></td>
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<tr>
<td>Level of education</td>
<td>≤ High school</td>
<td>2 (1.1)</td>
<td>3.27 ± 0.22</td>
<td>1.32</td>
<td>.011</td>
<td>a &lt; c</td>
<td></td>
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<tr>
<td></td>
<td>Junior college</td>
<td>27 (15.9)</td>
<td>3.30 ± 0.17</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>University</td>
<td>123 (72.4)</td>
<td>3.51 ± 0.38</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>≥ Graduate School</td>
<td>18 (10.6)</td>
<td>3.32 ± 0.41</td>
<td></td>
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<tr>
<td>Job</td>
<td>Yes</td>
<td>158 (92.9)</td>
<td>3.70 ± 0.11</td>
<td>2.65</td>
<td>.111</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>12 (7.1)</td>
<td>3.18 ± 0.28</td>
<td></td>
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<tr>
<td>Income per month (× 10^4 KRW)</td>
<td>&lt; 150</td>
<td>11 (6.5)</td>
<td>251.09 ± 0.58</td>
<td>3.24 ± 0.16</td>
<td>1.34</td>
<td>.410</td>
<td></td>
</tr>
<tr>
<td></td>
<td>150–299</td>
<td>108 (63.5)</td>
<td>3.60 ± 0.21</td>
<td></td>
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<tr>
<td></td>
<td>300–449</td>
<td>35 (20.6)</td>
<td>3.32 ± 0.18</td>
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<tr>
<td></td>
<td>≥ 450</td>
<td>16 (9.4)</td>
<td>3.35 ± 0.11</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Reproductive health characteristics</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duration of marriage (year)</td>
<td>&lt; 1</td>
<td>24 (14.1)</td>
<td>2.62 ± 0.92</td>
<td>3.50 ± 0.15</td>
<td>0.33</td>
<td>.111</td>
<td>b &gt; c</td>
</tr>
<tr>
<td></td>
<td>1–2</td>
<td>56 (32.9)</td>
<td>3.65 ± 0.18</td>
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<tr>
<td></td>
<td>3–4</td>
<td>51 (30.0)</td>
<td>3.40 ± 0.11</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>≥ 5</td>
<td>39 (22.9)</td>
<td>3.49 ± 0.28</td>
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<tr>
<td>Children</td>
<td>Yes</td>
<td>122 (71.8)</td>
<td>3.56 ± 0.23</td>
<td>3.74</td>
<td>.333</td>
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<tr>
<td></td>
<td>No</td>
<td>48 (28.2)</td>
<td>3.39 ± 0.11</td>
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<tr>
<td>Reproductive health status</td>
<td>Best</td>
<td>13 (7.6)</td>
<td>3.43 ± 0.44</td>
<td>1.41</td>
<td>.288</td>
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<tr>
<td></td>
<td>Good</td>
<td>34 (20.0)</td>
<td>3.49 ± 0.20</td>
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<tr>
<td></td>
<td>General</td>
<td>101 (59.4)</td>
<td>3.51 ± 0.88</td>
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<tr>
<td></td>
<td>Bad</td>
<td>17 (10.0)</td>
<td>3.65 ± 0.08</td>
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</tr>
<tr>
<td></td>
<td>Worst</td>
<td>5 (2.9)</td>
<td>3.44 ± 0.22</td>
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<tr>
<td>Contraceptive method</td>
<td>Condom</td>
<td>92 (54.1)</td>
<td>3.56 ± 0.18</td>
<td>1.01</td>
<td>.021</td>
<td>a &gt; d</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Oral</td>
<td>26 (15.3)</td>
<td>3.48 ± 0.25</td>
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<tr>
<td></td>
<td>Contraceptive pill</td>
<td>19 (11.2)</td>
<td>3.48 ± 0.22</td>
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<td></td>
<td>Coitus interruptus</td>
<td>17 (10.0)</td>
<td>3.44 ± 0.16</td>
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<tr>
<td></td>
<td>Natural family planning</td>
<td>4 (2.3)</td>
<td>3.49 ± 0.30</td>
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<td></td>
<td>Intrauterine device</td>
<td>12 (7.1)</td>
<td>3.40 ± 0.34</td>
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<tr>
<td>Experience of reproductive diseases</td>
<td>Menstrual disorder</td>
<td>68 (40.0)</td>
<td>3.49 ± 0.32</td>
<td>0.55</td>
<td>.018</td>
<td>a &lt; b</td>
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<td>Genital infection</td>
<td>47 (27.6)</td>
<td>3.67 ± 0.17</td>
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<tr>
<td></td>
<td>Benign tumor</td>
<td>55 (32.4)</td>
<td>3.58 ± 0.18</td>
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<tr>
<td>Ever received RH education</td>
<td>Yes</td>
<td>67 (39.4)</td>
<td>3.47 ± 0.34</td>
<td>2.72</td>
<td>.147</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>103 (59.2)</td>
<td>3.53 ± 0.55</td>
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<tr>
<td>Perceived necessity of RH education</td>
<td>Yes</td>
<td>149 (87.6)</td>
<td>3.62 ± 0.52</td>
<td>2.55</td>
<td>.393</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>21 (12.4)</td>
<td>3.48 ± 0.21</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

RHPB: Reproductive health-promoting behavior; KRW, Korean won; RH: reproductive health.
대상자의 생식건강증진행위, 가족가치관 및 생식건강지식 상관관계

대상자의 가족가치관과 생식건강지식은 상관 관계가 유의하지 않았으나, 생식건강증진행위와 가족가치관 \( r = .78, p < .001 \) 생식건강지식 \( r = .55, p < .001 \)은 정적 상관관계로 통계적으로 유의한 결과가 나타났다. 즉, 대상자의 가족가치관과 생식건강지식이 높을수록 대상자의 생식건강증진행위 수행도가 높은 것으로 나타났다(Table 3).

대상자의 생식건강증진행위에 미치는 영향요인

대상자의 일반적 및 생식건강 특성이 생식건강행위에 영향을 주므로 1단계에 넣고, 주요변수인 가족가치관과 생식건강지식의 중요성을 확인하고자 2단계에 넣어 위계적 다중회귀분석을 실시한 결과는 다음과 같다(Table 4).

본 연구에서 회귀모형에 대하여 첫째, 잔차의 산포도를 이용하여 종속변수와 독립변수 간의 선형관계와 등분산성을 확인하였다. 둘째, 잔차의 독립성을 확인하기 위하여 Durbin-Watson 지수를 확인한 결과 1.744로 2에 가까워, 자기 상관이 없어 오차항 간 서로 독립적이었다. 셋째, 정규성 검정을 위하여 Shapiro-Wilk test를 통하 여 확인한 결과 변수 모두 유의확률 0.05보다 높아 정규분포를 따르는 것을 확인하였다. 넷째, 독립변수 간의 상관관계를 확인하기 위하여 다중공선성은 분산팽창지수(variance inflation factor)를 통하여 확인한 결과, 모두 10 미만으로 다중공선성의 문제는 없는 것으로 확인하였다.

본서 결과 1단계에서는 일반적 및 생식건강 특성 중 생식건강증진행위에 차이가 있었던 변수인 교육수준, 결혼 기간, 피임 방법, 과거 생식기 질병 경험을 투입하였다. 그리고 유의한 차이가 있었던 변수들의 가장 큰 값을 기준으로 교육수준에서 대학교, 결혼 기간 1-2년, 피임 방법 중 콘돔, 과거 생식기 질병 경험에서 월경 장애를 다미변수 처리하여 투입하였을 때, 회귀모형은 유의하였으며 \( F = 18.48, p < .001 \) 설명력은 21.5%로 나타났다. 2단계에서는 가족가치관, 생식건강지식을 투입했을 때 회귀모형은 유의하였으나 \( F = 41.07, p < .001 \), 설명력 51.2%로 나타났다. 1단계에 비해서 29.7%가 유의하게 증가하였다. 따라서 가족가치관 \( \beta = .35, p < .001 \), 생식건강지식 \( \beta = .24, p < .001 \), 과거 생식기 질병 경험 중 생식기 감염 \( \beta = .09, p < .001 \)이 생식건강증진행위에 유의한 영향을 미치는 것으로 나타났다.

**Table 2. RHPB, family values, and reproductive health knowledge (N=170)**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Possible range</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>RHPB</td>
<td>1–5</td>
<td>2.26</td>
<td>5.00</td>
<td>3.18 ± 0.18</td>
</tr>
<tr>
<td>Safe sex behavior</td>
<td>1–5</td>
<td>2.67</td>
<td>5.00</td>
<td>3.32 ± 0.17</td>
</tr>
<tr>
<td>Sexual responsibility</td>
<td>1–5</td>
<td>2.00</td>
<td>5.00</td>
<td>3.10 ± 0.35</td>
</tr>
<tr>
<td>Genital health management</td>
<td>1–5</td>
<td>2.00</td>
<td>5.00</td>
<td>3.09 ± 0.23</td>
</tr>
<tr>
<td>STI prevention</td>
<td>1–5</td>
<td>2.65</td>
<td>5.00</td>
<td>3.31 ± 0.21</td>
</tr>
<tr>
<td>Genital hygiene management</td>
<td>1–5</td>
<td>2.00</td>
<td>5.00</td>
<td>3.09 ± 0.25</td>
</tr>
<tr>
<td>Family values</td>
<td>1–7</td>
<td>1.37</td>
<td>7.00</td>
<td>4.40 ± 0.57</td>
</tr>
<tr>
<td>Value of being a child</td>
<td>1–7</td>
<td>1.00</td>
<td>7.00</td>
<td>4.36 ± 1.02</td>
</tr>
<tr>
<td>Value of being a parent</td>
<td>1–7</td>
<td>1.75</td>
<td>7.00</td>
<td>4.45 ± 1.01</td>
</tr>
<tr>
<td>Reproductive health knowledge</td>
<td>0–34</td>
<td>18.00</td>
<td>34.00</td>
<td>27.98 ± 0.25</td>
</tr>
<tr>
<td>Structure and function of reproductive system</td>
<td>0–6</td>
<td>1.18</td>
<td>6.00</td>
<td>4.44 ± 0.52</td>
</tr>
<tr>
<td>Pregnancy and childbirth</td>
<td>0–11</td>
<td>1.00</td>
<td>11.00</td>
<td>10.13 ± 0.18</td>
</tr>
<tr>
<td>Contraception and STI</td>
<td>0–12</td>
<td>1.00</td>
<td>12.00</td>
<td>8.55 ± 0.09</td>
</tr>
<tr>
<td>Cancer of the reproductive system</td>
<td>0–5</td>
<td>1.32</td>
<td>5.00</td>
<td>3.88 ± 0.71</td>
</tr>
</tbody>
</table>

RHPB: Reproductive health-promoting behaviors; STI: sexually transmitted infection.

**Table 3. Relationships among RHPB, family values, and reproductive health knowledge (N=170)**

<table>
<thead>
<tr>
<th>Variable</th>
<th>( r (g) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>RHPB</td>
<td>1</td>
</tr>
<tr>
<td>Family values</td>
<td>.78 (&lt;.001)</td>
</tr>
<tr>
<td>Reproductive health knowledge</td>
<td>.55 (&lt;.001)</td>
</tr>
<tr>
<td>RH Knowledge</td>
<td>.41 (.018)</td>
</tr>
</tbody>
</table>

RHPB: Reproductive health-promoting behaviors.

**Discussion**

본 연구는 기혼여성을 대상으로 가족가치관, 생식건강지식을 확인하고 생식건강증진행위에 미치는 영향요인을 파악함으로써, 기혼 여성들의 생식건강 및 생식건강증진행위를 돕는 간호 중재 프로그램 개발을 위한 기초자료를 제공하고자 시도되었다. 본 연구의 결과를 중심으로 논의하면 다음과 같다.
본 연구 대상자의 생식건강증진행위는 5점 만점에 평균 3.18점으로 비교적 낮은 수준으로 나타났다. 동일한 측정도구를 사용한 Lee와 Lee [14]의 생식건강증진행위 연구에서는 난임 여성 평균 3.98점과 비교하여 낮은 점수를 보였다. 이는 난임을 진단받고 생식건강증진을 위하여 적극적이고 긍정적인 실천행위로 이행 중이므로 비교하기 어려운 부분이 있었다. 그리고 기혼여성들은 임신과 출산 후 영양, 가사노동 및 경제활동 병행으로 개인의 생식건강증진에 관심을 가지고 실천하는 것이 어려운 환경이므로 기혼여성들에게 맞는 차별화된 중재방법이 필요하다. 이는 Rahman 등 [22]의 기혼여성의 생식건강증진행위를 중재 개발 시 미디어를 통한 교육방법을 적극 활용하여 기혼여성의 시간과 공간적인 제약을 줄이고 정보 습득률을 높일 수 있도록 하여야 한다.


Table 4. Factors affecting reproductive health-promoting behavior (N=170)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>β</td>
</tr>
<tr>
<td>Level of education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ High school</td>
<td>-0.20</td>
<td>-0.27</td>
</tr>
<tr>
<td>Junior college</td>
<td>-0.05</td>
<td>-0.23</td>
</tr>
<tr>
<td>≥ Graduate School</td>
<td>-1.04</td>
<td>-0.21</td>
</tr>
<tr>
<td>Duration of marriage (years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 1</td>
<td>0.65</td>
<td>.41</td>
</tr>
<tr>
<td>3-4</td>
<td>0.08</td>
<td>.18</td>
</tr>
<tr>
<td>≥ 5</td>
<td>0.38</td>
<td>.25</td>
</tr>
<tr>
<td>Contraceptive method</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oral contraceptive pill</td>
<td>0.19</td>
<td>.58</td>
</tr>
<tr>
<td>Coitus interruptus</td>
<td>0.44</td>
<td>.09</td>
</tr>
<tr>
<td>Menstrual cycle</td>
<td>0.67</td>
<td>.14</td>
</tr>
<tr>
<td>Intrauterine device</td>
<td>1.98</td>
<td>.23</td>
</tr>
<tr>
<td>Experience of reproductive diseases</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Genital infection</td>
<td>0.93</td>
<td>.13</td>
</tr>
<tr>
<td>Benign tumor</td>
<td>0.64</td>
<td>.12</td>
</tr>
<tr>
<td>Family value</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.86</td>
<td>.35</td>
<td>0.87</td>
</tr>
<tr>
<td>Reproductive health knowledge</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R²</td>
<td>1.12</td>
<td>.24</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>0.101</td>
<td>.415</td>
</tr>
<tr>
<td>F (β)</td>
<td>18.48 (&lt;.001)</td>
<td>41.07 (&lt;.001)</td>
</tr>
</tbody>
</table>

Reference groups were level of education (university), duration of marriage (1-2 years), contraception method (condom), and experience of reproductive diseases (menstrual disorder).
고 여성들의 생식건강을 위한 간호중재를 개발해야 한다.

본 연구에서는 기혼여성의 생식건강증진행위에 미치는 영향 요인을 확인하기에 앞서, 생식건강증진행위, 가족가치관 및 생식건강지식 간의 정적 상관관계를 확인하였다. 이는 기존 여성들의 생식건강증진행위의 결과, 출산, 자녀, 양육 등의 사회적 영향을 받는 주관적 인식인 가족가치관과 생식건강 관리와 개인의 임신 및 출산, 가족계획에 우려의 여론을 갖는 주요 생식 건강지식이 미치는 관계를 알 수 있다. 그리고 위계적 회귀분석을 시행한 결과, 가족가치관, 생식건강지식, 과거 생식기 질병 경험 중 생식기 감염이 영향요인으로 확인되었다. 가족가치관의 인식과 가족가치관의 자녀관의 자녀 필요성, 부모에 대한 가치가 정적일수록 출산 의향이 높아진다고 하였다. 이는 기혼여성의 생식건강증진행위에 결혼, 출산, 자녀, 양육 등의 사회적 영향을 받고 가족가치관과 생식건강관리에 올바른 의사결정을 할 수 있도록 돕는 생식건강지식이 의미 있는 관계임을 알 수 있다. 그리고 위계적 회귀분석을 시행한 결과, 가족가치관, 생식건강지식, 과거 생식기 질병 경험 중 생식기 감염이 영향요인으로 확인되었다. 가족가치관의 인식과 가족가치관의 자녀관의 자녀 필요성, 부모에 대한 가치가 정적일수록 출산 의향이 높아진다고 하였다. 이는 기혼여성의 생식건강증진행위에 결혼, 출산, 자녀, 양육 등의 사회적 영향을 받고 가족가치관과 생식건강관리에 올바른 의사결정을 할 수 있도록 돕는 생식건강지식이 의미 있는 관계임을 알 수 있다. 그리고 위계적 회귀분석을 시행한 결과, 가족가치관, 생식건강지식, 과거 생식기 질병 경험 중 생식기 감염이 영향요인으로 확인되었다. 가족가치관의 인식과 가족가치관의 자녀관의 자녀 필요성, 부모에 대한 가치가 정적일수록 출산 의향이 높아진다고 하였다. 이는 기혼여성의 생식건강증진행위에 결혼, 출산, 자녀, 양육 등의 사회적 영향을 받고 가족가치관과 생식건강관리에 올바른 의사결정을 할 수 있도록 돕는 생식건강지식이 의미 있는 관계임을 알 수 있다. 그리고 위계적 회귀분석을 시행한 결과, 가족가치관, 생식건강지식, 과거 생식기 질병 경험 중 생식기 감염이 영향요인으로 확인되었다. 가족가치관의 인식과 가족가치관의 자녀관의 자녀 필요성, 부모에 대한 가치가 정적일수록 출산 의향이 높아진다고 하였다. 이는 기혼여성의 생식건강증진행위에 결혼, 출산, 자녀, 양육 등의 사회적 영향을 받고 가족가치관과 생식건강관리에 올바른 의사결정을 할 수 있도록 돕는 생식건강지식이 의미 있는 관계임을 알 수 있다. 그리고 위계적 회귀분석을 시행한 결과, 가족가치관, 생식건강지식, 과거 생식기 질병 경험 중 생식기 감염이 영향요인으로 확인되었다. 가족가치관의 인식과 가족가치관의 자녀관의 자녀 필요성, 부모에 대한 가치가 정적일수록 출산 의향이 높아진다고 하였다. 이는 기혼여성의 생식건강증진행위에 결혼, 출산, 자녀, 양육 등의 사회적 영향을 받고 가족가치관과 생식건강관리에 올바른 의사결정을 할 수 있도록 돕는 생식건강지식이 의미 있는 관계임을 알 수 있다. 그리고 위계적 회귀분석을 시행한 결과, 가족가치관, 생식건강지식, 과거 생식기 질병 경험 중 생식기 감염이 영향요인으로 확인되었다. 가족가치관의 인식과 가족가치관의 자녀관의 자녀 필요성, 부모에 대한 가치가 정적일수록 출산 의향이 높아진다고 하였다. 이는 기혼여성의 생식건강증진행위에 결혼, 출산, 자녀, 양육 등의 사회적 영향을 받고 가족가치관과 생식건강관리에 올바른 의사결정을 할 수 있도록 돕는 생식건강지식이 의미 있는 관계임을 알 수 있다. 그리고 위계적 회귀분석을 시행한 결과, 가족가치관, 생식건강지식, 과거 생식기 질병 경험 중 생식기 감염이 영향요인으로 확인되었다. 가족가치관의 인식과 가족가치관의 자녀관의 자녀 필요성, 부모에 대한 가치가 정적일수록 출산 의향이 높아진다고 하았다. 이는 기혼여성의 생식건강증진행위에 결혼, 출산, 자녀, 양육 등의 사회적 영향을 받고 가족가치관과 생식건강관리에 올바른 의사결정을 할 수 있도록 돕는 생식건강지식이 의미 있는 관계임을 알 수 있다.

본 연구는 대상자 수집 과정에서 직장 여성의 비율이 높고, 월평균 수입을 구체적으로 확인하지 못한 한계점이 있었다. 그러나 가혼여성을 대상으로 가족가치관과 생식건강지식이 생식건강증진행위에 미치는 영향을 확인함으로써 생식건강증진행위가 성행위에 대한 책임감, 생식건강 관리, 임신 및 출산과 관련한 가족 계획을 내포하여 가혼여성의 안녕에 본질적으로 중요하다[29]는 것을 규명하였다.

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**Conflict of interest**

The authors declared no conflict of interest.

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**Data availability**

The data that support the findings of this study are available on request from the corresponding author.

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The impact of peripheral neuropathy symptoms, self-care ability, and disturbances to daily life on quality of life among gynecological cancer patients undergoing chemotherapy: a cross-sectional survey

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Purpose: This study investigated the effects of peripheral neuropathy symptoms, self-care ability, and disturbances to daily life on quality of life (QoL) among gynecological cancer patients undergoing chemotherapy.

Methods: The participants included 144 patients with gynecological cancer undergoing anticancer chemotherapy at a tertiary hospital in Seoul, South Korea, from December 1, 2021 to January 28, 2022. Convenience sampling was used to recruit patients who had received 4 or more cycles of chemotherapy using a paclitaxel-platinum regimen, and a self-reported questionnaire was used to collect data. Descriptive statistics, the t-test, analysis of variance, Scheffé test, Pearson correlation coefficients, and multiple regression analysis were performed.

Results: Most of the participants had ovarian cancer (70.1%) or endometrial cancer (14.6%), and the most common number of treatment cycles was 6 to 10 (29.2%). The mean QoL (60.83±19.89) was greater than the midpoint. The regression model analyzing the patients’ QoL was statistically significant (F=15.38, p<.001) with an explanatory power of 56.7%. Self-care ability (β=.39, p<.001), disturbances to daily life (β=−.38, p<.001), the duration of peripheral neuropathy symptoms (β=2.14, p=.034), and regular exercise (β=−2.12, p=.036) were found to significantly affect QoL.

Conclusion: Efforts to improve the self-care ability of gynecological cancer patients who have experienced peripheral neuropathy after receiving chemotherapy and mitigate disturbances to their daily life can improve their QoL. Healthcare professionals should identify peripheral neuropathy symptoms and examine the effects of the symptoms on patients’ daily lives. Improving the self-care ability of patients and alleviating their limitations in daily life may improve QoL.

Keywords: Activities of daily living; Genital neoplasms, female; Peripheral nervous system diseases; Quality of life; Self care

Introduction

Due to advances in medical technology, physicians are increasingly able to diagnose and treat cancer early and properly, and the survival rate of cancer patients is subsequently increasing, with an estimated global number of cancer survivors of 19.3 million people as of 2020 [1]. If South Korean citizens survive until their life expectancy, the probability of developing cancer is 37.4%,
Summary statement

• What is already known about this topic?
Patients who undergo chemotherapy experience peripheral neuropathy and a poor quality of life (QoL). Few studies, however, have identified the link between self-care ability, peripheral neuropathy, and QoL, especially in gynecological cancer patients.

• What this paper adds
Data from gynecological cancer patients undergoing chemotherapy showed that self-care ability, disturbances to daily life, the number of types of chemotherapy, the duration of peripheral neuropathy symptoms, and regular exercise affected patients’ QoL.

• Implications for practice, education, and/or policy
In order to improve the QoL of gynecological cancer patients, periodic patient education and assessments should be undertaken for the early identification of peripheral neuropathy. In addition, programs to improve self-care ability and alleviate patients’ daily limitations may help improve their QoL.

and an estimated 2 million cancer patients in Korea have at least one of 24 cancer types as of 2018. Between 2014 and 2018, the 5-year survival rate of gynecological cancer was 65.2% for ovarian cancer, 88.6% for endometrial cancer, and 80.5% for cervical cancer, which indicates that a substantial number of patients survive cancer [2]. Cancer survivors experience problems related to complications. In particular, many patients who undergo chemotherapy suffer from side effects such as nausea, vomiting, alopecia, peripheral neuropathy, and infection [3] and experience chronic side effects, fatigue, and deteriorated quality of life (QoL) after treatment [4]. In addition to the physical side effects caused by the treatment process, patients experience changes in their roles in their families, psychological problems such as anxiety and depression about cancer recurrence, and limitations to social activities, which have negative impacts on QoL [5]. Moreover, general characteristics including age, income quartile, and subjective health status and disease-related characteristics such as limitations to activities, depression, fatigue, pain, anxiety, resilience, and support were also found to affect the QoL of cancer patients [6-9].

In particular, the factors that affect the QoL of gynecological cancer patients include lower limb lymphedema, depression, sleep disorders, recurrence, peripheral neuropathy, distress, changes in subjective health status, and physical changes [9-12]. The use of neurotoxic anticancer drugs to treat gynecological cancer patients is a major factor that causes peripheral neuropathy [13], the symptoms of which can last a long time even after chemotherapy ends, leading to disturbances to patients’ activities of daily living [14]. Since the recurrence rate of ovarian cancer is 70%, most patients with the disease undergo chemotherapy multiple times, which worsens peripheral neuropathy symptoms [15]. Repeated chemotherapy negatively affects the physical and social functions of gynecological cancer patients [16], and psychological problems such as anxiety and depression caused by physical changes including edema and alopecia negatively affect their QoL [17].

Although lymphedema experienced by gynecological cancer patients also causes difficulties related to activities of daily living [9], persistent peripheral neuropathy symptoms lead to both functional and sensory impairment, which further limits patients’ activities of daily living [14]. Simple activities such as walking and dressing may be restricted due to decreased muscle strength and loss of balance [18], and as the symptoms of neuropathy worsen, QoL and functional independence are also impaired. As gynecological cancer patients continue to undergo chemotherapy, their symptoms of peripheral neuropathy worsen and various physical functions become impaired, affecting QoL due to disturbances to activities of daily living. However, a high self-care ability correlates to the proper management of various symptoms experienced by patients in the treatment process, leading to improved QoL [19]. In a study of female cancer patients, a higher self-care ability also correlated to a higher QoL [20], and in an international study, a higher self-care ability was found to lead to proper symptom management and improved QoL [21]. Self-care ability is a major factor that can help cancer patients return to normal life after receiving treatment, raise their functional independence, and improve their QoL.

Few studies, however, have analyzed the effect of self-care ability on QoL among gynecological cancer patients. While previous studies analyzing the QoL of gynecological patients have mainly investigated psychological factors [10-12], further efforts should be undertaken to analyze and understand the effect of physical...
restrictions on QoL so that patients can better return to normal life after treatment and improve their QoL.

Prior studies showing that the disease-related characteristics and restricted activities of gynecological patients are factors that affect QoL and the theoretical basis that improved self-care ability can raise QoL were considered in this study. Therefore, we attempted to identify the relationship between peripheral neuropathy symptoms, disturbances to daily life, self-care ability, and QoL among gynecological cancer patients and provide basic data for the development of intervention programs to improve the QoL of gynecological cancer patients.

The purpose of this study was to identify the impact of peripheral neuropathy symptoms, self-care ability, and disturbances to daily life on the QoL of gynecological cancer patients undergoing chemotherapy. The specific purposes were as follows:

1. Analyze the peripheral neuropathy symptoms, self-care ability, disturbances to daily life, and QoL of gynecological cancer patients
2. Identify differences in the QoL of gynecological cancer patients according to their general characteristics and disease-related characteristics
3. Identify the relationships between peripheral neuropathy symptoms, self-care ability, disturbances to daily life, and QoL in gynecological cancer patients
4. Identify the factors that influence the QoL of gynecological cancer patients

Methods

Study design
This is a correlational study investigating the relationship between peripheral neuropathy symptoms, self-care ability, disturbances to daily life, and QoL of gynecological cancer patients undergoing chemotherapy. This study was written according to the STROBE reporting guidelines (https://www.strobe-statement.org).

Participants
This study analyzed data on gynecological cancer patients undergoing chemotherapy at Asan Medical Center in Seoul, South Korea. The inclusion criteria were (1) adults aged 19 years or above, (2) diagnosed with gynecological cancer (ovarian, endometrial, cervical, vaginal, or vulvar cancer), and (3) participants who received four or more concurrent cycles of paclitaxel and platinum-based drugs, based on a study that showed peripheral neuropathy frequently occurs after four or more doses of paclitaxel and platinum-based drugs. The exclusion criteria were (1) participants who experienced peripheral neuropathy before undergoing chemotherapy and (2) participants for whom the exact reasons for peripheral neuropathy were unknown due to spinal and brain metastases.

The sample size for this study was calculated using G*Power 3.1.9. Based on a prior study [18], the minimum sample size needed for multiple regression analysis with a significance level of .05, power of .95, median effect size of .15, and four independent variables (peripheral neuropathy symptoms, the duration of peripheral neuropathy symptoms, self-care ability, and disturbances to daily life) was 129 participants. Questionnaires were distributed to 144 participants, considering a possible 10% drop-out rate. Questionnaires were collected immediately after distribution and the collection rate was 100%, and 144 questionnaires were used for the analysis.

Instruments
Permission was obtained from the developer and adapter before using any of the instruments included in this study.

Quality of life
QoL was evaluated using the Korean version of the Functional Assessment Cancer Therapy-General developed by Cella et al. [22] for measuring the QoL of cancer patients. The tool evaluates a total of 27 items, including seven items on physical state, seven items on social/family status, six items on emotional state, and seven items on functional state, and all regular items are scored on a scale ranging from 0 (strongly disagree) to 4 (strongly agree), while reverse items are scored on a scale ranging from 0 (strongly agree) to 4 points (strongly disagree). A higher score corresponds to a higher QoL, with possible scores ranging from 0 to 108. The reliability of the instrument as indicated by Cronbach’s α was .89 in the original study [22], .86 in a developmental study using the Korean version [23], and .84 in this study.

Peripheral neuropathy symptoms
Peripheral neuropathy symptoms were evaluated using an instrument developed by Tofthagen [24] and translated and verified by Hwang and Park [25]. Nine items on the occurrence of peripheral neuropathy symptoms, six items on the scope of occurrence, and
nine items on the intensity of the symptoms were used in this study. For the intensity of the symptoms, nine items are evaluated on a 10-point scale (0 points, no symptoms; 10 points, very severe). A higher score corresponds to more severe symptoms, and possible scores range from 0 to 90 points. The reliability of the instrument as indicated by Cronbach’s α was .94 in the original study [24], .92 in a translated study [25], and .91 in this study.

Self-care ability
Self-care ability was evaluated using an instrument developed by Geden and Taylor [26] and revised and translated into Korean by Jung [27]. It contains 32 items and uses a 6-point Likert scale (1 point, strongly disagree; 6 points, strongly agree). A higher score corresponds to a higher self-care ability, and possible scores range from 32 to 192 points. The reliability of the instrument as indicated by Cronbach’s α was .96 in the original study [26], .92 in a translated study [27], and .98 in this study.

Disturbances to daily life
Disturbances to daily life were evaluated using an instrument developed by Toft Hansen et al. [24] and translated into Korean and verified by Hwang and Park [25]. Fourteen items that measured disturbances to daily life were used in this study and scored based on a scale ranging from 0 points (no effect at all) to 10 points (strong effect). A higher score corresponded to a higher degree of disturbances to daily life, and possible scores ranged from 0 to 140 points. The reliability of the instrument as indicated by Cronbach’s α was .94 in the original study [24], .92 in a translated study [25], and .94 in this study.

General characteristics and disease-related characteristics
General characteristics included six items on age, marital status, education level, economic status, living with family, and regular exercise, and disease-related characteristics, which included type of cancer, the first instance of chemotherapy-induced peripheral neuropathy (CIPN), and the duration of CIPN (3 items), were investigated using a structured questionnaire. In addition, three further items were investigated using electronic medical records and included the number of types of chemotherapy the patient had undergone, the number of chemotherapy treatments received, and the cumulative amount of anticancer agents administered.

Data collection
Data were collected using the convenience sampling method to identify patients undergoing chemotherapy in the gynecological ward and outpatient injection room of the hospital from December 1, 2021 to January 28, 2022. The researchers explained the purpose and procedures of the study and ensured the confidentiality of the data to the participants in person, after which their consent to participate in the study was obtained. Data were collected using questionnaires that were completed by the participants themselves. If it was difficult for patients to complete the questionnaire, the researchers read the questions aloud to the participants and recorded their answers. The questionnaires took approximately 20 minutes to complete, and the participants were provided with a small gift (KN95 masks) upon completion. After the questionnaires were completed, disease-related items were collected from electronic medical records.

Data analysis
Data were analyzed using IBM SPSS ver. 28.0 (IBM Corp., Armonk, NY, USA) at a statistical significance level of p < .05 for the following:

- General characteristics, disease-related characteristics, peripheral neuropathy symptoms, self-care ability, disturbances to daily life, and the QoL of the participants were analyzed based on real numbers, percentages, means, and standard deviations.
- Differences in the QoL of the participants according to general characteristics and disease-related characteristics were analyzed using the independent t-test and one-way analysis of variance, and post-hoc was conducted using the Scheffé test.
- The correlations between peripheral neuropathy symptoms, self-care ability, and disturbances to daily life were analyzed using Pearson correlation coefficients.
- The factors that affected QoL were identified by conducting multilinear regression analysis using the simultaneous input method.
- To identify the factors that impact the QoL of gynecological patients, multiple regression analysis was conducted by loading the three variables (CIPN symptoms, self-care ability, and disturbances to daily life) that showed significant differences in their correlations with QoL; also seven variables (age, level of education, monthly family income, regular exercise, experience with CIPN symptoms, the number of types of chemotherapy, and the number of treatments of chemotherapy) that showed statistically significant differences related to QoL, and multiple regression analysis was conducted using the simultaneous input method.
- The Durbin-Watson test value, which was calculated to test the assumption of the regression analysis, was 2.054, indicating no correlation between the independent variables. When multi-
collinearity was tested, the tolerance limit was .25–.83, which was larger than .1, and the variance inflation factor was 1.23–3.98, which did not exceed 10. These results indicated no problem related to multicollinearity.

Results

Differences in quality of life according to participants’ general characteristics and disease-related characteristics

The participants’ mean age was 56.38 ± 8.59 years, and the highest number of participants was aged 50 to 59 years (n = 59, 41.0%). A total of 123 participants (85.4%) were married, 81 (56.3%) were high school graduates, and 50 (34.7%) had a mean monthly income of 1 million Korean won (KRW; 1 million KRW is approximately 760 USD) to less than 3 million KRW. A total of 131 participants (91.0%) lived with their families, and 79 (54.9%) exercised regularly.

For disease-related characteristics, the highest percentage of participants had ovarian cancer at 70.1% (n = 101), while 21 (14.6%) had endometrial cancer, 20 (13.9%) had cervical cancer, and 2 (1.4%) had another form of gynecological cancer (vaginal cancer or vulvar cancer). The highest proportion of participants answered that they first experienced CIPN after 1 to 3 chemotherapy treatments (n = 99, 68.8%). A total of 57 participants (39.6%) had fewer than 6 months of experience with CIPN, while 40 (27.8%) had over 2 years of experience with CIPN. The mean number of different types of chemotherapy administered was 1.97 ± 1.31; most of the participants were administered 1 type of chemotherapy (n = 73, 50.7%). The mean number of chemotherapy treatments was 13.81 ± 11.91, and the highest number of participants received treatment 6 to 10 times at 42 (29.2%). The mean cumulative amount of paclitaxel administered was 1,734.35 ± 1,184.03 mg/m², and 44 participants had a cumulative capacity of 1,000 to 1,499 mg/m², making up the largest proportion of participants at 30.6%.

QoL showed significant differences according to age (F = 12.64, p < .001), education level (F = 6.15, p = .003), monthly family income (F = 6.60, p = .002), regular exercise (t = 3.99, p < .001), duration of CIPN experience (F = 6.65, p = .002), the number of types of chemotherapy (F = 6.10, p = .003), and the cumulative number of chemotherapy treatments (F = 5.07, p = .008). Post-verification using the Scheffé test showed that the QoL was lower for participants aged 60 years and above compared to those below 60 years of age among the participants with a monthly family income of less than 1 million KRW compared to those with a monthly income of 3 million KRW or more. QoL was lower for those with over 24 months of experience with CIPN, those who were administered 3 or more types of chemotherapy, and those who received 11 or more chemotherapy treatments (Table 1).

Degrees of quality of life, peripheral neuropathy symptoms, self-care ability, and disturbances to daily life of the participants

The mean score for QoL was low at 60.83 ± 19.89, with the functional state (14.82 ± 5.98) showing the lowest mean score. The mean score for CIPN symptoms among the participants was 42.53 ± 19.73, with the highest score for sensory symptoms (30.93 ± 13.93), followed by motor symptoms (11.60 ± 7.37). The mean score for self-care ability was 144.33 ± 28.79, and physical activities showed a relatively lower score compared to the other items. The mean score for disturbances to daily life was 56.24 ± 34.09, with the highest mean score recorded for general activities (44.58 ± 25.27) followed by manual dexterity (11.66 ± 10.50) (Table 2).

Correlations among main variables

Although CIPN among the participants had a moderate positive correlation with disturbances to daily life (r = .64, p < .001), it had a mild negative correlation with QoL (r = -.41, p < .001). While self-care ability had a mild negative correlation with disturbances to daily life (r = -.41, p < .001), it had a moderate positive correlation with QoL (r = .62, p < .001). Disturbances to daily life had a moderate negative correlation with QoL (r = -.62, p < .001) (Table 3).

Factors affecting quality of life among participants

The QoL regression model of gynecological cancer patients undergoing chemotherapy was statistically significant (F = 15.38, p < .001), and the explanatory power related to QoL in this model was 56.7%.

Four factors (self-care ability, intensity of disturbances to daily life, duration of CIPN symptoms, and regular exercise) were found to influence QoL. The factor with the greatest influence was self-care ability (β = .39, p < .001), followed by the intensity of disturbances to daily life (β = -.38, p < .001), the duration of CIPN symptoms (β = .14, p = 0.34), and regular exercise (β = -.13, p = 0.36). In other words, a lower QoL corresponded to a higher intensity of disturbances to daily life, a duration of CIPN symptoms of less than 6 months compared to 6 to 24 months, a lack of regular exercise, and a low self-care ability (Table 4). The number of different types of chemotherapy, monthly family income, intensity of CIPN symptoms, number of chemotherapy treatments, education level, and age did not have a significant impact.
Table 1. Differences in quality of life according to participants’ characteristics (N=144)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Categories</th>
<th>Mean ± SD or n (%)</th>
<th>Quality of life</th>
<th>Mean ± SD</th>
<th>t or F (p)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>General</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>characteristics</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>General characteristics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (year)</td>
<td>Range, 32–76</td>
<td>56.38 ± 8.59</td>
<td>Quality of life</td>
<td>Mean ± SD</td>
<td>t or F (p)</td>
</tr>
<tr>
<td></td>
<td>&lt;50&lt;sup&gt;a&lt;/sup&gt;</td>
<td>30 (20.8)</td>
<td>68.57 ± 16.52</td>
<td>12.64</td>
<td>&lt; .001</td>
</tr>
<tr>
<td></td>
<td>50–59&lt;sup&gt;b&lt;/sup&gt;</td>
<td>59 (41.0)</td>
<td>65.98 ± 19.27</td>
<td>a, b &gt; c&lt;sup&gt;i&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>≥ 60&lt;sup&gt;c&lt;/sup&gt;</td>
<td>55 (38.2)</td>
<td>51.07 ± 18.52</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td>Single</td>
<td>13 (9.0)</td>
<td>63.38 ± 18.85</td>
<td>0.19</td>
<td>.829</td>
</tr>
<tr>
<td></td>
<td>Married</td>
<td>123 (85.4)</td>
<td>60.74 ± 20.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>8 (5.6)</td>
<td>58.00 ± 21.26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education level</td>
<td>≤ Middle school&lt;sup&gt;a&lt;/sup&gt;</td>
<td>16 (11.1)</td>
<td>50.31 ± 20.71</td>
<td>6.15</td>
<td>.003</td>
</tr>
<tr>
<td></td>
<td>High school&lt;sup&gt;b&lt;/sup&gt;</td>
<td>81 (56.3)</td>
<td>58.74 ± 19.46</td>
<td>a &lt; c&lt;sup&gt;i&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>≥ College&lt;sup&gt;c&lt;/sup&gt;</td>
<td>47 (32.6)</td>
<td>68.00 ± 18.24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monthly family income (KRW)</td>
<td>&lt; 1 milion&lt;sup&gt;a&lt;/sup&gt;</td>
<td>49 (34.0)</td>
<td>53.92 ± 19.77</td>
<td>6.60</td>
<td>.002</td>
</tr>
<tr>
<td></td>
<td>1–3 milion&lt;sup&gt;b&lt;/sup&gt;</td>
<td>50 (34.7)</td>
<td>60.88 ± 20.85</td>
<td>a &lt; c&lt;sup&gt;i&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>≥ 3 milion&lt;sup&gt;c&lt;/sup&gt;</td>
<td>45 (31.3)</td>
<td>68.29 ± 16.28</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Living with family</td>
<td>Yes</td>
<td>131 (91.0)</td>
<td>60.85 ± 19.75</td>
<td>–.040</td>
<td>.968</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>13 (9.0)</td>
<td>60.62 ± 22.10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regular exercise</td>
<td>Yes</td>
<td>79 (54.9)</td>
<td>66.53 ± 18.41</td>
<td>3.99</td>
<td>&lt; .001</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>65 (45.1)</td>
<td>53.89 ± 19.55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disease-related characteristics</td>
<td>Type of cancer</td>
<td>Ovarian</td>
<td>101 (70.1)</td>
<td>60.06 ± 18.53</td>
<td>0.85 (.469)</td>
</tr>
<tr>
<td></td>
<td>Endometrial</td>
<td>21 (14.6)</td>
<td>60.90 ± 24.02</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cervical</td>
<td>20 (13.9)</td>
<td>64.05 ± 22.77</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Others (vaginal/vulvar)</td>
<td>2 (1.4)</td>
<td>82.00 ± 18.39</td>
<td></td>
<td></td>
</tr>
<tr>
<td>First incidence of CIPN</td>
<td>1–3</td>
<td>99 (68.8)</td>
<td>60.64 ± 18.94</td>
<td>0.30</td>
<td>.744</td>
</tr>
<tr>
<td></td>
<td>4–6</td>
<td>28 (19.4)</td>
<td>59.50 ± 21.11</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>≥ 7</td>
<td>17 (11.8)</td>
<td>64.12 ± 23.90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duration of CIPN (month)</td>
<td>&lt; 6&lt;sup&gt;a&lt;/sup&gt;</td>
<td>57 (39.6)</td>
<td>62.23 ± 20.90</td>
<td>6.65</td>
<td>.002</td>
</tr>
<tr>
<td></td>
<td>6–23&lt;sup&gt;b&lt;/sup&gt;</td>
<td>47 (32.6)</td>
<td>66.68 ± 18.80</td>
<td>a, b &gt; c&lt;sup&gt;i&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>≥ 24&lt;sup&gt;c&lt;/sup&gt;</td>
<td>40 (27.8)</td>
<td>51.95 ± 16.77</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Types of chemotherapy drugs</td>
<td>Range, 1–7</td>
<td>1.97 ± 1.31</td>
<td>66.10 ± 19.41</td>
<td>6.10</td>
<td>.003</td>
</tr>
<tr>
<td></td>
<td>1&lt;sup&gt;a&lt;/sup&gt;</td>
<td>73 (50.7)</td>
<td>66.10 ± 19.41</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2&lt;sup&gt;b&lt;/sup&gt;</td>
<td>32 (22.2)</td>
<td>58.00 ± 21.36</td>
<td>a, b &gt; c&lt;sup&gt;i&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>≥ 3&lt;sup&gt;c&lt;/sup&gt;</td>
<td>39 (27.1)</td>
<td>53.28 ± 16.87</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of chemotherapy treatments</td>
<td>Range, 4–60</td>
<td>13.81 ± 11.91</td>
<td>61.32 ± 20.60</td>
<td>5.07</td>
<td>.008</td>
</tr>
<tr>
<td></td>
<td>1–5&lt;sup&gt;a&lt;/sup&gt;</td>
<td>37 (25.7)</td>
<td>61.32 ± 20.60</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6–10&lt;sup&gt;b&lt;/sup&gt;</td>
<td>42 (29.2)</td>
<td>68.05 ± 17.49</td>
<td>a, b &gt; c&lt;sup&gt;i&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>≥ 11&lt;sup&gt;c&lt;/sup&gt;</td>
<td>65 (45.1)</td>
<td>55.88 ± 19.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cumulative amount of paclitaxel (mg/m&lt;sup&gt;2&lt;/sup&gt;)</td>
<td>Range, 700–7,715</td>
<td>1,734.35 ± 1,184.03</td>
<td>61.26 ± 21.20</td>
<td>0.99</td>
<td>.374</td>
</tr>
<tr>
<td></td>
<td>700–999</td>
<td>39 (27.1)</td>
<td>61.26 ± 21.20</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1,000–1,499</td>
<td>44 (30.6)</td>
<td>63.86 ± 19.15</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>≥ 1,500</td>
<td>61 (42.3)</td>
<td>58.36 ± 19.56</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

CIPN: Chemotherapy-induced peripheral neuropathy; KRW: Korean won (1 million KRW is approximately 760 USD).

<sup>i</sup>Scheffé test.
This study was conducted to analyze data from gynecological cancer patients undergoing chemotherapy to understand the relationship between peripheral neuropathy symptoms, self-care ability, and disturbances to daily life, and identify the factors that affect QoL.

The QoL of gynecological cancer patients in this study was lower than in prior international and domestic studies conducted using the same instrument, which included QoL scores of 64.8 points [11], 78.8 points [28], 67.69 points [29], and 69.32 points [30]. The low QoL in this study was likely due to the high proportion of ovarian cancer patients at 70%; over 60% to 70% of whom had stage 3 or 4 cancer when they were diagnosed, as over 70% may experience recurrence even after treatment [15]. Moreover, the QoL was low for participants aged 60 years or above, those with a low education level (elementary/middle school graduates), and those with a monthly family income of less than 1 million KRW. Therefore, these factors should be considered when assessing the QoL of gynecological cancer patients, and different intervention programs should be devised according to age, education level, and income that are implemented based on the needs of participants when developing and implementing programs to improve QoL.

In this study, QoL had a negative correlation with peripheral neuropathy symptoms and disturbances to daily life and a positive correlation with self-care ability. This is similar to the results of a study that found that peripheral neuropathy symptoms and disturbances to daily life worsened as the number of neurotoxic anticancer agents administered increased [31] and a study that

### Table 2. Levels of quality of life, CIPN symptoms, self-care ability, and disturbances to daily life (N=144)

<table>
<thead>
<tr>
<th>Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of life</td>
</tr>
<tr>
<td>Psychological state</td>
</tr>
<tr>
<td>Physical state</td>
</tr>
<tr>
<td>Social state</td>
</tr>
<tr>
<td>Functional state</td>
</tr>
<tr>
<td>CIPN symptoms</td>
</tr>
<tr>
<td>Sensory symptoms</td>
</tr>
<tr>
<td>Motor symptoms</td>
</tr>
<tr>
<td>Self-care ability</td>
</tr>
<tr>
<td>Perception of self-monitoring</td>
</tr>
<tr>
<td>Attention to self-management</td>
</tr>
<tr>
<td>Cognitive aspects of self-cares</td>
</tr>
<tr>
<td>Judgment and decision-making process</td>
</tr>
<tr>
<td>Information-seeking behaviors</td>
</tr>
<tr>
<td>Physical skills</td>
</tr>
<tr>
<td>Disturbances to daily life</td>
</tr>
<tr>
<td>General activities</td>
</tr>
<tr>
<td>Manual dexterity</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of life</td>
</tr>
<tr>
<td>CIPN symptoms</td>
</tr>
<tr>
<td>Self-care ability</td>
</tr>
</tbody>
</table>

### Table 3. Relationships among study variables (N=144)

<table>
<thead>
<tr>
<th>Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of life</td>
</tr>
<tr>
<td>CIPN symptoms</td>
</tr>
<tr>
<td>Self-care ability</td>
</tr>
</tbody>
</table>

CIPN: Chemotherapy-induced peripheral neuropathy.
found that peripheral neuropathy symptoms and QoL had a negative correlation with each other among gynecological patients [11]. Peripheral neuropathy symptoms cause various physical dysfunctions in cancer patients that interfere with their activities of daily living and further decrease their QoL as well as self-care ability [32]. Although patients often attempt pharmacological and nonpharmacological interventions to alleviate their symptoms, no intervention methods or effective therapies to prevent peripheral neuropathy symptoms in cancer patients have been reported [33]. In accordance with studies that reported that exercise programs [34] and footbaths [35] improved blood circulation, this may be effective for mitigating peripheral neuropathy symptoms. More support is needed to develop effective interventions, and follow-up studies are needed on their effectiveness.

Self-care ability had the largest impact on QoL, followed by disturbances to daily life, the duration of CIPN symptoms, and regular exercise. In a prior study of general cancer patients, higher self-care ability corresponded to higher QoL [31], which is similar to the finding of another study that a higher level of self-care among colon cancer patients lead to proper symptoms management and improved QoL [19,21]. Self-care ability is a factor required of cancer patients to manage complications and return to normal life after treatment [32]. Thus, patients who have experienced peripheral neuropathy symptoms for a long time should periodically assess their ability to practice self-care when they go to the hospital. They should also be given sufficient information to improve their self-care ability, as well as be offered programs that improve self-efficacy, form support groups, and take advantage of community resources [36].

The second factor that affected the QoL of the participants was the impact of disturbances to daily life. Patients who received high doses of paclitaxel, a neurotoxic anticancer agent, constituted a high-risk group for peripheral neuropathy symptoms and faced many restrictions to their activities of daily living since their symptoms lasted for longer periods. In addition, cancer patients experience physical symptoms caused by the treatment process, including pain, fatigue, and a lack of concentration, even after treatment ends [37], which has a negative influence on the QoL of gynecological cancer patients [5]. Therefore, to improve the QoL of the participants, it is also important to routinely measure the strength of disturbances to daily life during chemotherapy and prevent the exacerbation of the symptoms by offering patients rehabilitation therapy during treatment if necessary.

The duration of peripheral neuropathy symptoms was the third factor that affected QoL in this study. Peripheral neuropathy symptoms restrict motor and sensory functions and worsen

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE</th>
<th>β</th>
<th>t (p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>35.22</td>
<td>12.91</td>
<td>3.37</td>
<td>.001</td>
</tr>
<tr>
<td>Regular exercise</td>
<td>-5.00</td>
<td>2.36</td>
<td>-.13</td>
<td>-2.12</td>
</tr>
<tr>
<td>Number of types of chemotherapy</td>
<td>-2.67</td>
<td>1.67</td>
<td>-.18</td>
<td>-1.60</td>
</tr>
<tr>
<td>Monthly family income (KRW)†</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1–3 million</td>
<td>2.87</td>
<td>2.98</td>
<td>.07</td>
<td>0.97</td>
</tr>
<tr>
<td>≥ 3 million</td>
<td>1.08</td>
<td>3.13</td>
<td>.04</td>
<td>0.58</td>
</tr>
<tr>
<td>Number of chemotherapy treatments</td>
<td>0.08</td>
<td>0.18</td>
<td>.05</td>
<td>0.45</td>
</tr>
<tr>
<td>Education level†</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ Middle school</td>
<td>0.64</td>
<td>3.86</td>
<td>.01</td>
<td>0.17</td>
</tr>
<tr>
<td>≥ College</td>
<td>1.28</td>
<td>2.69</td>
<td>.03</td>
<td>0.48</td>
</tr>
<tr>
<td>Age (year)</td>
<td>0.07</td>
<td>0.16</td>
<td>.03</td>
<td>0.44</td>
</tr>
<tr>
<td>Self-care ability</td>
<td>0.27</td>
<td>0.05</td>
<td>.39</td>
<td>5.65</td>
</tr>
<tr>
<td>Disturbances to daily life</td>
<td>-0.22</td>
<td>0.05</td>
<td>-.38</td>
<td>-4.51</td>
</tr>
<tr>
<td>Duration of peripheral neuropathy symptoms† (month)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6–23</td>
<td>6.04</td>
<td>2.82</td>
<td>.14</td>
<td>2.14</td>
</tr>
<tr>
<td>≥ 24</td>
<td>2.14</td>
<td>4.2</td>
<td>.05</td>
<td>0.51</td>
</tr>
<tr>
<td>CIPN symptoms</td>
<td>-0.06</td>
<td>0.08</td>
<td>-.06</td>
<td>-0.85</td>
</tr>
</tbody>
</table>

R² = 60.6, adjusted R² = 56.7, F(p) = 15.38(<.001)

CIPN: Chemotherapy-induced peripheral neuropathy; KRW: Korean won (1 million KRW is approximately 760 USD).
†References were duration of peripheral neuropathy symptoms (<6 months), regular exercise (yes), monthly family income (<1 million KRW), and education level (high school).
the strength of disturbances to daily life, and symptoms worsen as the total amount of anticancer agents a patient is administered increases [31]. When peripheral neuropathy symptoms persist, patients experience physical dysfunction, disturbances to daily life, and deteriorated QoL [21,38]. Moreover, patients experience restrictions in their daily lives due to psychological problems such as anxiety and fear even after the completion of cancer treatment [6]. Thus, patients must have access to appropriate interventions from the beginning of chemotherapy to when they first notice peripheral neuropathy symptoms.

Regular exercise was the fourth factor that influenced the QoL of the participants. In a previous study of cancer patients [39], the QoL score was highest among those in the group with a high rate of physical activity, and the frequency at which patients participated in muscle exercises had a significant correlation with QoL [40]. Since the physical and psychological functions of cancer patients deteriorate over time, the implementation of a regular exercise program for patients to improve their physical function will likely improve their QoL. An exercise program should be devised for gynecological patients who have been hospitalized multiple times, and the importance of physical function should be reiterated routinely based on assessments of their muscle strength.

Based on this study, to improve the QoL of gynecological patients undergoing chemotherapy, an exercise-based intervention program should be developed to alleviate patients’ peripheral neuropathy symptoms and reduce the impact of disturbances to their daily lives. Moreover, correct information about the disease should be provided, self-efficacy improvement programs should be adopted, community support systems should be established, and accessibility to available resources should be increased to improve patients’ QoL. The QoL of gynecological cancer patients will likely improve through these methods, and follow-up studies should be conducted that consider when patients’ symptoms change by analyzing changes in peripheral neuropathy symptoms according to the cumulative amount of anticancer agents administered in the chemotherapy process that also specifies the time at which nursing interventions were conducted.

This study has limitations since the impacts of surgery, postoperative side effects, and recurrence on patients’ QoL were not examined. Additionally, the results should be interpreted with caution since the data were from patients at a single hospital. Moreover, a total of 10 variables were analyzed using regression analysis in this study. When the sample size was calculated using G*Power 3.1.9 program with a significance level of .05, power of .85, a median effect size of .15, and 10 independent variables, the minimum sample size was 131 participants; however, when the power was set at .90, the minimum sample size was 147 participants. Thus, in future studies, the power should be increased by including more participants. This study makes meaningful contributions, however, as it showed that gynecological cancer patients who use neurotoxic anticancer agents have a high risk of peripheral neuropathy symptoms and identified the factors that influenced their QoL.

In conclusion, to improve the QoL of gynecological cancer patients, alleviation of peripheral neuropathy symptoms and promoting activities of daily living should be sought through the programs that improve physical function and the rehabilitation process. Furthermore, patients’ self-care ability should be enhanced through forming support groups and strengthening of self-efficacy. In terms of follow-up studies, we recommend conducting longitudinal studies on the development of web-based programs to expand support systems and improve accessibility and developing programs to improve physical function.

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Authors’ contributions
Conceptualization: Mun S, Park H; Formal analysis: Mun S, Park H; Writing–original draft: Mun S; Writing–review & editing: Park H.

Conflict of interest
The authors declared no conflict of interest.

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Data availability
The dataset files are available from Harvard Dataverse at https://doi.org/10.7910/DVN/2D3MXV.

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None.
References


Vulnerability to human immunodeficiency virus infection and associated factors among married women in northwest Ethiopia: a cross-sectional study

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Purpose: This study investigated the vulnerability to human immunodeficiency virus (HIV) infection and associated factors among married women in northwest Ethiopia.

Methods: A community-based cross-sectional survey (n=657) was conducted from April 1 to 15, 2020, in Metema District, northwest Ethiopia, in four randomly selected kebele administrations (the lowest level of local government). The inclusion criteria were married women aged ≥18 years residing with their husbands. Logistic regression analysis was conducted to identify factors associated with married women’s vulnerability to HIV infection.

Results: Participants were on average 33.70±9.50 years and nearly one-fourth (n=148, 22.5%) were identified as vulnerable to HIV infection (i.e., experienced sexually transmitted disease symptoms or an extramarital affair of either spouse within the past 12 months). Only 18.9% reported sexual communication with their husband. Respondents who did not discuss the risk of HIV infection with their husbands had fivefold odds of vulnerability (adjusted odds ratio [AOR], 5.02; 95% confidence interval [CI], 1.43–17.5). Those who did not have premarital sex (AOR, 0.20; 95% CI, 0.05–0.77) had no worries about HIV infection (AOR, 0.27; 95% CI, 0.08–0.94), sufficient income (AOR, 0.56; 95% CI, 0.16–0.86), and less than four children (AOR, 0.69; 95% CI, 0.50–0.97) had decreased odds of being vulnerable to HIV than their counterparts.

Conclusion: Not discussing risk of HIV infection with husband was a major factor of vulnerability to HIV infection as was premarital sex, worry about HIV, income, and number of children. Measures to strengthen couple’s sexual communication and support economical stability is important for decreasing HIV vulnerability.

Keywords: Acquired immunodeficiency syndrome; HIV; Marriage; Sexually transmitted diseases; Social vulnerability

Introduction

Human immunodeficiency virus (HIV)/acquired immune deficiency syndrome (AIDS) has profound social, economic, and health consequences and constitutes one of the world’s most serious health and development challenges. As a leading cause of death worldwide [1,2], the HIV epidemic resulted in 1.5 million new infections globally in 2021, adding up to a total of 38.4 million people living with HIV at the end of 2021. More than half of all people living with HIV are women [3,4].
According to the World Health Organization, 25.7 million people live with HIV in Sub-Saharan Africa, with 1.1 million new infections in 2018, and this region accounts for two-thirds of the HIV burden worldwide [4-6]. The female-to-male ratio of new HIV infections ranges from 1.22:1 in West and East Africa to 1.33:1 in Southern Africa, indicating the need to respond to women’s increasing vulnerability [7,8]. In Ethiopia, the prevalence of HIV among adults is estimated at 0.9%: 1.2% among women versus 0.6% among men [9].

The vulnerability of women and girls to HIV remains elevated in Sub-Saharan Africa, as 76% of all women in the world living with HIV reside in this region [5,7,10]. In addition, Ethiopia has approximately 612,925 people living with HIV, more than half of whom are female, and the Amhara region has the third-largest number of HIV-infected people [10].

Beyond a greater physiological susceptibility toward HIV infection, women are especially vulnerable due to their disadvantages in sociological, legal, and economic factors [12]. Vulnerability to HIV infection depends on factors that influence the risk of exposure to the virus, such as the frequency of changing partners and sexual intercourse with an infected partner, and factors that affect the risk of transmission of the virus, such as condom use or the presence of another sexually transmitted infection (STI) [13-16], biological risk factors [10,13], and socioeconomic, behavioral, and structural vulnerabilities [10,11,16-18].

A study conducted in Nigeria to assess the influence of marital status and other correlates of HIV infection showed that HIV prevalence among married women (5.9%) was greater than among those who had never been married (3.4%) [19]. The power differences between women and men and gender inequality often give men more power to decide on the timing and conditions of sex and the means of preventing infection, thereby limiting women’s ability to negotiate protection with their partners [2,20]. Women’s relatively weak negotiating power within marriage, as well as their limited ability to find social and economic support outside of marriage, makes it difficult for wives to stop their partners from having sex with others or engaging in extramarital sexual activities, and they cannot insist on protective measures like condom use with their spouses [13,21-25]. According to the Central Statistical Agency and ICF, the prevalence of HIV in adults is estimated at 0.9% (1.2% among women vs. 0.6% among men) [9]. Data on HIV infection patterns in India revealed that 90% of women were infected within long-term relationships or marriages [26]. Although both husbands and wives are at risk of contracting HIV from their spouses, cultural, social, and biological gender differences render women particularly vulnerable to transmission from their husbands [13,17].

Ethiopia, like most other countries in Sub-Saharan Africa, has been experiencing severe HIV/AIDS epidemics. For instance, in a study done in Nazareth, in the Oromia region, more than 20 years ago, 26.8% of married Ethiopian women were found to be vulnerable to HIV [13]. As contributing factors responsible for HIV infection can differ by region, recent data are needed for a clearer understanding. Considering the current gap in the literature, this study aimed to investigate the vulnerability of married women to HIV infection in Metema District, northwest Ethiopia. Metema is the district (woreda) with the highest prevalence of HIV reported in the Amhara region and the 2009 antenatal care sentinel surveillance survey report of the Ethiopian Ministry of Health found an elevated prevalence (7.5%) of HIV infection in the District Hospital of Metema [11,27].
Methods

Ethics statement: The study was reviewed and approved by the Ethical Review Committee of the College of Health Sciences, Gondar University (CHS-SN-022-20). All participants provided written informed consent, and the study was conducted according to the Declaration of Helsinki.

Study design
A community-based cross-sectional survey was done, and this study adhered to the STROBE (https://www.strobe-statement.org/) reporting guidelines.

Setting and samples
The study was conducted in four out of the 19 administrative kebeles of Metema District within the Amhara region in northwest Ethiopia [28]. The inclusion criteria were married women aged ≥ 18 years residing in Metema District with their husbands, from four kebeles randomly selected by a simple randomization table. The exclusion criteria were those who were seriously ill and unable to respond to the questions, those who were unable to hear, those who had resided in the kebele for less than 6 months, and women who were living with HIV/AIDS. The sample size was determined using the formula for a single population proportion, considering the following assumptions: Zα/2 = 1.96 with a 95% confidence interval (CI), P = 26.8% (prevalence of married women vulnerable to HIV based on a previous study conducted in Nazareth, Ethiopia [13]), d = 0.05, design effect = 2, and non-response rate = 10%. The required sample size was 662. Of the 662 participants recruited, 657 (99.2%) responded and were included in the data analysis.

Measurements
A binary structured questionnaire was developed based on the literature by investigators in English, translated into the local language (Amharic) by a bilingual translator, and then back-translated to English by another bilingual translator. The internal consistency of the translation validity test was found to be adequate (0.86). The questionnaire consisted of vulnerability to HIV infection (i.e., either experiencing STI symptoms or having a history of an extramarital sexual relationship by either spouse in the past 12 months), sociodemographic characteristics, marital characteristics (marital willingness, premarital sex, frequency of being away from home), condom use with their partner (use, whether they would recommend condoms, counseling and testing, worried about being infected with HIV), HIV risk perception (whether the participant received voluntary HIV testing, worried about HIV, or worried about transmission to the fetus), and sexual communications with their partner (discussing the risk of HIV, sexual negotiating).

Data collection
Individual households in the selected kebele administration were selected using a systematic random sampling technique, and the number of households sampled from the selected kebele administrations was determined using the proportionate to population size method. The study subjects (married women) in the selected households were interviewed by a trained assistant (two female nurse supervisors and 10 health extension workers who received 2 days of intensive training) with the questionnaire. For households with more than one married woman, only one woman was selected using the lottery method. If no one responded at a selected household that was known to contain eligible women for the study, the interviewers revisited the household three times at different time intervals; when subsequent attempts failed, the household was registered as nonresponding.

Data analysis
The data were checked for completeness, cleaned manually, entered into statistical software for epidemiology (Epi Info ver. 7), and then exported to IBM SPSS for Windows ver. 20.0 (IBM Corp., Armonk, NY, USA) for further analysis. Frequencies and cross-tabulations were used to summarize the descriptive statistics of the data, and tables were used for data presentation. A bivariate analysis was first conducted to check which variables fulfill the minimum requirement with the dependent variable individually. Variables found to have the \( p < .25 \) with the dependent variables were then entered into multiple logistic regression to control for the possible effect of confounders, and finally the variables with significant associations were identified based on odds ratios, with 95% CIs and \( p \)-values. A variable with a \( p \)-value of less than 0.05 in the multivariate analysis was considered significant.

Results

Sociodemographic characteristics of study participants
The mean age of the 657 respondents was 33.70 ± 9.50 years. The Amhara ethnicity predominated (n = 514, 78.2%), followed by the Gumuz ethnic group (n = 78, 11.9%), which reflects the region’s ethnic composition. Four hundred and one of the participants (61.0%) were orthodox Christians.
More than half of the respondents were unable to read and write (n = 377, 57.4%) and lived in a rural area (n = 385, 58.6%). Four hundred and sixty-seven (71.1%) were housewives, and their average monthly income was US dollar (USD) 13.71 ± 9.40, which was poorer than the average monthly income of the area during the study, which was USD 55.5[28]. Three-fourths of the participants (n = 493, 75.0%) reported financial scarcity affecting their ability to cover their daily living expenses (Table 1).

Table 1. Sociodemographic characteristics of married women in Metema District, Amhara region, Ethiopia in 2020 (N=657)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Categories</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (year)</td>
<td>(mean ± SD, 33.70 ± 9.50)</td>
<td></td>
</tr>
<tr>
<td>18–24</td>
<td>103 (15.7)</td>
<td></td>
</tr>
<tr>
<td>25–29</td>
<td>133 (20.2)</td>
<td></td>
</tr>
<tr>
<td>30–34</td>
<td>125 (19.0)</td>
<td></td>
</tr>
<tr>
<td>35–39</td>
<td>124 (18.9)</td>
<td></td>
</tr>
<tr>
<td>&gt; 40</td>
<td>172 (26.2)</td>
<td></td>
</tr>
<tr>
<td>Ethnic group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amhara</td>
<td>514 (78.2)</td>
<td></td>
</tr>
<tr>
<td>Gumuz</td>
<td>78 (11.9)</td>
<td></td>
</tr>
<tr>
<td>Tigre</td>
<td>43 (6.5)</td>
<td></td>
</tr>
<tr>
<td>Oromo</td>
<td>22 (3.3)</td>
<td></td>
</tr>
<tr>
<td>Religion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orthodox Christian</td>
<td>401 (61.0)</td>
<td></td>
</tr>
<tr>
<td>Muslim</td>
<td>233 (35.5)</td>
<td></td>
</tr>
<tr>
<td>Protestant</td>
<td>15 (2.3)</td>
<td></td>
</tr>
<tr>
<td>Catholic</td>
<td>8 (1.2)</td>
<td></td>
</tr>
<tr>
<td>Educational level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unable to read and write</td>
<td>377 (57.4)</td>
<td></td>
</tr>
<tr>
<td>Grade 1–8</td>
<td>158 (24.0)</td>
<td></td>
</tr>
<tr>
<td>Grade 9–10</td>
<td>83 (12.6)</td>
<td></td>
</tr>
<tr>
<td>Grade 11–12</td>
<td>13 (2.0)</td>
<td></td>
</tr>
<tr>
<td>Above grade 12</td>
<td>26 (4.0)</td>
<td></td>
</tr>
<tr>
<td>Current occupation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housewife</td>
<td>467 (71.0)</td>
<td></td>
</tr>
<tr>
<td>Farmer</td>
<td>67 (10.2)</td>
<td></td>
</tr>
<tr>
<td>Private business</td>
<td>42 (6.4)</td>
<td></td>
</tr>
<tr>
<td>Governmental employee</td>
<td>36 (5.5)</td>
<td></td>
</tr>
<tr>
<td>NGO</td>
<td>34 (5.2)</td>
<td></td>
</tr>
<tr>
<td>Daily laborer</td>
<td>11 (1.7)</td>
<td></td>
</tr>
<tr>
<td>Women with sufficient income</td>
<td>Yes</td>
<td>164 (25.0)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>493 (75.0)</td>
</tr>
<tr>
<td>Number of children</td>
<td>(median, 4; range, 0–7)</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>563 (85.7)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>94 (14.3)</td>
<td></td>
</tr>
<tr>
<td>Place of residence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>272 (41.4)</td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>385 (58.6)</td>
<td></td>
</tr>
</tbody>
</table>

NGO: Nongovernmental organization.

Marital characteristics of the respondents

The mean duration of marriage was 12.50 ± 8.70 years, while one-fourth (n = 169, 25.7%) had been married for less than 5 years. More than half (n = 353, 53.7%) got married before the age of 18 years and three-fourths (74.7%) were married according to their will. The main reason for marriage other than love was the intention to be supported financially (65.9%) (Table 2). Of the 166 women (25.3%) who were married against their will, the major reasons were as follows: forced by parents (n = 101, 60.8%), pressure from relatives (n = 46, 27.7%), pressure from their spouse or fiancé (n = 17, 10.2%), and some sort of abduction (n = 2, 1.2%). Half of the participants (n = 331, 50.4%) reported never leaving their homes throughout the year, while 36.4% (n = 239) could occasionally be away from home. Absence of their husband from home once per week was reported by 357

Table 2. Marital characteristics of married women in Metema District, Amhara region, northwest Ethiopia in 2020 (N=657)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Categories</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration of marriage (year)</td>
<td>&lt; 5</td>
<td>169 (25.7)</td>
</tr>
<tr>
<td></td>
<td>5–9</td>
<td>95 (14.5)</td>
</tr>
<tr>
<td></td>
<td>10–14</td>
<td>137 (20.9)</td>
</tr>
<tr>
<td></td>
<td>15–19</td>
<td>96 (14.6)</td>
</tr>
<tr>
<td></td>
<td>&gt; 20</td>
<td>160 (24.4)</td>
</tr>
<tr>
<td>Age at first marriage (year)</td>
<td>&lt; 18</td>
<td>353 (53.7)</td>
</tr>
<tr>
<td></td>
<td>≥ 18</td>
<td>304 (46.3)</td>
</tr>
<tr>
<td>Marriage willingness</td>
<td>No</td>
<td>166 (25.3)</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>491 (74.7)</td>
</tr>
<tr>
<td>Husband’s premarital sex</td>
<td>No</td>
<td>517 (78.7)</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>140 (21.3)</td>
</tr>
<tr>
<td>Wife’s premarital sex</td>
<td>No</td>
<td>416 (63.3)</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>241 (36.7)</td>
</tr>
<tr>
<td>(If yes) Marriage for other</td>
<td>No</td>
<td>324 (65.9)</td>
</tr>
<tr>
<td>than love</td>
<td>Yes</td>
<td>167 (33.8)</td>
</tr>
<tr>
<td>(If yes) Reason for marriage</td>
<td>Unintended pregnancy</td>
<td>32 (19.2)</td>
</tr>
<tr>
<td></td>
<td>To be supported financially</td>
<td>110 (65.9)</td>
</tr>
<tr>
<td></td>
<td>Academic failure</td>
<td>25 (14.9)</td>
</tr>
<tr>
<td>Frequency of wife being</td>
<td>At least once per week</td>
<td>55 (8.4)</td>
</tr>
<tr>
<td>away from home</td>
<td>At least once per 3 months</td>
<td>8 (1.2)</td>
</tr>
<tr>
<td></td>
<td>At least once per 6 months</td>
<td>24 (3.7)</td>
</tr>
<tr>
<td></td>
<td>Occasionally</td>
<td>239 (36.4)</td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>331 (50.4)</td>
</tr>
<tr>
<td>Frequency of husband</td>
<td>At least once per week</td>
<td>357 (54.3)</td>
</tr>
<tr>
<td>being away from home</td>
<td>At least once per month</td>
<td>210 (32.0)</td>
</tr>
<tr>
<td></td>
<td>At least once per 3 months</td>
<td>10 (1.5)</td>
</tr>
<tr>
<td></td>
<td>At least once in 6 months</td>
<td>49 (7.4)</td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>31 (4.7)</td>
</tr>
</tbody>
</table>
participants (54.3%), and absence once per month was reported by 210 (32.0%). Premarital sexual relationships were reported for 241 of women (36.7%) and 140 of the husbands (21.3%) (Table 2).

Condom use and human immunodeficiency virus risk perception

Of all respondents, 71 (10.8%) had used a condom with their husbands in the past 12 months and 46 (64.8%) used condoms regularly. More than half of the respondents (n = 386, 58.8%), however, did not recommend condom use in married couples. The main reason condoms were not recommended for couples (n = 314, 81.3%) was that they could cause offense by implying speculation or suspicion that the husband has HIV or another STI.

Regarding HIV counseling and testing, 361 participants (54.9%) had received HIV counseling and testing before they got married and 224 (34.1%) had done so in the past 12 months preceding the study period.

In response to items on risk perceptions of HIV infection, 204 women (31.1%) reported that they had ever worried about being infected by HIV, and of those, 171 (83.8%) had such worries in the last 12 months. The main reasons for their worries were their husbands’ infidelity (43.8%) and their inability to be sure about their husbands’ serostatus (30.9%).

Finally, 103 women (15.7%) had been pregnant in the last 12 months, and most of them (n = 79, 76.7%) feared HIV transmission to their fetuses (Table 3).

Sexual communication within married couples

Less than one-fifth of the married women (n = 124, 18.9%) communicated about sexual matters with their husbands. Of this number, three-fourths (n = 93, 75.0%) reported that the discus-

<table>
<thead>
<tr>
<th>Table 3. Condom use and HIV risk perceptions among married women in Metema District, Amhara region, northwest Ethiopia in 2020 (N=657)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Variable</strong></td>
</tr>
<tr>
<td>Used condom with husband in the past 12 months</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>(If yes) Used condom regularly with husband</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>(If yes) Reason for using condoms</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Would recommend condom for married couples</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>(If no) Reason for not recommending condoms</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Voluntary premarital HIV counseling and testing</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Voluntary HIV counseling and testing in the past 12 months</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Ever worried about being infected with HIV</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Worry in the past 12 months (from the 204 “yes” respondents above)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>(If yes) Reason for worrying about HIV infection</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Pregnant in the last 12 months</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>(If yes) Worried about transmission to fetus</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

HIV: Human immunodeficiency virus; STI: sexually transmitted infection.
sions were initiated by their husbands, and nearly two-thirds (n = 81, 65.3%) encountered disagreement during the discussions. Of the respondents who communicated about sexual matters, more than half 73 of the couples (58.9%) trusted each other, which encouraged the transparency of their discussions and sexual negotiations (Table 4).

**Vulnerability to human immunodeficiency virus infection**

Of the 657 respondents, vulnerability to HIV as measured by either experiencing STI symptoms or having a history of an extramarital sexual relationship by either spouse in the past 12 months was found in 148 married women (22.5%), with STI symptoms reported for 47 women (7.2%) and 60 husbands (9.1%). Participants reported extramarital sexual affairs in the past 12 months for 39 women (5.9%) and 93 of their husbands (14.2%).

**Factors associated with vulnerability to human immunodeficiency virus infection**

Based on the bivariate analysis result (p < .25), candidate predictive variables for multivariable logistic regression analysis were as follows: residence, many children, income insufficiency, marriage willingness, condom use in married couples, extramarital relationship, sex before marriage, discussions about sexual matters, worrying about being infected by HIV, deciding on sexual matters by negotiation, and having experienced pregnancy in the last 12 months.

As reported in Table 5, women who did not discuss the risk of HIV infection with their husbands had fivefold odds of being vulnerable to HIV than those who did (adjusted odds ratio [AOR], 5.02; 95% CI, 1.43–17.5). Women who had engaged in premarital sex had 80% decreased odds (AOR, 0.20; 95% CI, 0.05–0.77); those who were not worried about being infected by HIV had 73% decreased odds (AOR, 0.27; 95% CI 0.08–0.94); those with sufficient income had 44% decreased odds (AOR, 0.56; 95% CI, 0.16–0.86); and women with < 4 children had 31% decreased odds (AOR, 0.69; 95% CI, 0.50–0.97) of vulnerability to HIV compared to their counterparts.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Categories</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication about sexual matters with husband</td>
<td>No</td>
<td>533 (81.1)</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>124 (18.9)</td>
</tr>
<tr>
<td>(If yes) Person who initiates discussion on sexual matters</td>
<td>Husband</td>
<td>93 (75.0)</td>
</tr>
<tr>
<td></td>
<td>Wife (self)</td>
<td>14 (11.3)</td>
</tr>
<tr>
<td></td>
<td>Both</td>
<td>17 (13.7)</td>
</tr>
<tr>
<td>(If yes on sexual communication) Discussed and disagreed on sexual matters</td>
<td>No</td>
<td>43 (34.7)</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>81 (65.3)</td>
</tr>
<tr>
<td>(If yes) Frequency of conflict</td>
<td>Always</td>
<td>12 (14.8)</td>
</tr>
<tr>
<td></td>
<td>Usually</td>
<td>40 (49.4)</td>
</tr>
<tr>
<td></td>
<td>Occasionally</td>
<td>29 (35.8)</td>
</tr>
<tr>
<td>(If yes on disagreement) Reaching conflict resolution</td>
<td>Always</td>
<td>16 (19.8)</td>
</tr>
<tr>
<td></td>
<td>Most of the time</td>
<td>29 (35.8)</td>
</tr>
<tr>
<td></td>
<td>Occasionally</td>
<td>24 (29.6)</td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>12 (14.8)</td>
</tr>
<tr>
<td>(If yes on sexual communication) Discussed family planning</td>
<td>No</td>
<td>76 (61.3)</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>48 (38.7)</td>
</tr>
<tr>
<td>(If yes on sexual communication) Discussed risk of HIV/AIDS</td>
<td>No</td>
<td>81 (65.3)</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>43 (34.7)</td>
</tr>
<tr>
<td>(If yes on sexual communication) Discussed trustfulness of marriage</td>
<td>No</td>
<td>51 (41.1)</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>73 (58.9)</td>
</tr>
<tr>
<td>Decided sexual matters by negotiation</td>
<td>No</td>
<td>586 (89.2)</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>71 (10.8)</td>
</tr>
<tr>
<td>Forced sexual practice by husband</td>
<td>No</td>
<td>406 (61.8)</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>251 (38.2)</td>
</tr>
</tbody>
</table>

AIDS: Acquired immune deficiency syndrome; HIV: human immunodeficiency virus.
Discussion

Studies assessing married women’s vulnerability to HIV infection are lacking, and to our knowledge, this is the second study in Ethiopia to focus on this topic. The goal of this study was to assess the vulnerability to HIV infection and associated factors in married women in Metema District, Ethiopia. We found that 22.5% of participants were vulnerable to HIV, as determined by either having a symptom of an STI or a history of an extramarital sexual relationship by either spouse in the past 12 months. This finding is lower than that of the previous study conducted in Nazareth, in central Ethiopia, which reported that 26.8% of married women were vulnerable to HIV infection [13]. A possible explanation for the discrepancy between these study results might be due to time-based differences in HIV prevalence. Nazareth was previously the area in Ethiopia with the highest prevalence of HIV, whereas now the Gambella region shows the highest prevalence, followed by the Addis Ababa administrative region and the Amhara region. In this study, 39 (5.9%) and 93 (14.2%) of married women and their husbands, respectively, had extramarital relationships within the last 12 months, as reported by married women. Another study conducted in Kenya indicated that married men engaging in sex with extramarital partners had an increased vulnerability to HIV infection [29].

In this study, married women who did not discuss the risk of HIV infection with their husbands were five times more likely to

Table 5. Factors associated with the vulnerability of married women to HIV infection in Metema District, Amhara region, Ethiopia in 2020 (N=657)

<table>
<thead>
<tr>
<th>Explanatory variable</th>
<th>Categories</th>
<th>Vulnerability to HIV, n (%)</th>
<th>Crude OR (95% CI)</th>
<th>Adjusted OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Yes (n = 148)</td>
<td>No (n = 509)</td>
<td></td>
</tr>
<tr>
<td>Sociodemographic factors</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of children</td>
<td>≥4</td>
<td>148 (42.0)</td>
<td>204 (58.0)</td>
<td>1.07 (1.01–1.7)*</td>
</tr>
<tr>
<td></td>
<td>&lt;4</td>
<td>123 (40.3)</td>
<td>182 (59.7)</td>
<td>1</td>
</tr>
<tr>
<td>Residence</td>
<td>Urban</td>
<td>47 (17.3)</td>
<td>225 (82.7)</td>
<td>1.70 (0.86–2.86)</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>101 (26.2)</td>
<td>284 (73.8)</td>
<td>1</td>
</tr>
<tr>
<td>Sufficient income to cover expenses</td>
<td>No</td>
<td>107 (21.7)</td>
<td>386 (78.3)</td>
<td>0.83 (0.55–0.25)</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>41 (25.0)</td>
<td>123 (75.0)</td>
<td>1</td>
</tr>
<tr>
<td>Marital characteristics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marriage willingness</td>
<td>No</td>
<td>46 (27.9)</td>
<td>119 (72.1)</td>
<td>1.47 (0.98–2.21)</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>102 (20.7)</td>
<td>390 (79.3)</td>
<td>1</td>
</tr>
<tr>
<td>Married before</td>
<td>No</td>
<td>85 (19.7)</td>
<td>346 (80.3)</td>
<td>0.63 (0.43–0.92)</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>63 (27.9)</td>
<td>163 (72.1)</td>
<td>1</td>
</tr>
<tr>
<td>Husband’s premarital sex</td>
<td>No</td>
<td>96 (18.6)</td>
<td>421 (81.4)</td>
<td>0.38 (0.25–0.58)</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>52 (37.1)</td>
<td>88 (62.9)</td>
<td>1</td>
</tr>
<tr>
<td>Wife’s premarital sex</td>
<td>No</td>
<td>54 (13.0)</td>
<td>362 (87.0)</td>
<td>0.23 (0.16–0.34)</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>94 (39.0)</td>
<td>147 (61.0)</td>
<td>1</td>
</tr>
<tr>
<td>Condom use and HIV risk perception factors</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Used a condom with husband</td>
<td>No</td>
<td>122 (20.8)</td>
<td>464 (79.2)</td>
<td>0.45 (0.27–0.76)</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>26 (36.6)</td>
<td>45 (63.4)</td>
<td>1</td>
</tr>
<tr>
<td>Worried about being infected by HIV</td>
<td>No</td>
<td>63 (13.9)</td>
<td>391 (86.1)</td>
<td>0.22 (0.15–0.32)</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>85 (41.9)</td>
<td>118 (58.1)</td>
<td>1</td>
</tr>
<tr>
<td>Pregnancy in the last 12 months</td>
<td>No</td>
<td>112 (20.2)</td>
<td>443 (79.8)</td>
<td>0.46 (0.29–0.73)</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>36 (35.3)</td>
<td>66 (64.7)</td>
<td>1</td>
</tr>
<tr>
<td>Sexual communication factors</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discussed the risk of HIV infection</td>
<td>No</td>
<td>27 (33.3)</td>
<td>54 (66.7)</td>
<td>3.08 (1.15–8.20)</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>6 (14.0)</td>
<td>37 (86.0)</td>
<td>1</td>
</tr>
<tr>
<td>Decided on sexual matters by negotiating</td>
<td>No</td>
<td>122 (20.8)</td>
<td>464 (79.2)</td>
<td>0.45 (0.27–0.76)</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>26 (36.6)</td>
<td>45 (63.4)</td>
<td>1</td>
</tr>
</tbody>
</table>

CI: Confidence interval; HIV: human immunodeficiency virus; OR: odds ratio.
* p<.050, **p<.001, ***p<.0001.
be vulnerable to HIV than those who did, which was supported by a study done in Mozambique [30]. In a qualitative study conducted in Nigeria, women who fully engaged in open discussions about sexual health became knowledgeable about sex, and this ultimately improved women's ability to make informed decisions about risk reduction. On a similar note, research conducted in Malawi revealed that women who had open discussions with their husbands were less likely to be vulnerable to HIV [24]. The finding of the present study in which only 18.9% reported sexual communication with their husband, is similar to a study conducted in Nepal that showed that nearly half of the participants not being able to ask their husbands about HIV and other STIs even if they wondered about being vulnerable to HIV [31]. A reason for this might be that women are financially dependent on their husbands and unable to make independent decisions because of male dominance. As such, this underscores the importance of helping married couples to communicate about sex, especially in relation to the risk of HIV and other STIs.

Women who did not have sex before marriage had 80% decreased odds of vulnerability to HIV infection than those who had premarital sex. Of those who had premarital sex, 7.5% used condoms regularly on all occasions. This is quite different from the study conducted in Nazareth, Ethiopia, in which 33.9% of married women stated that they had engaged in premarital sex, and of those, 13.9% reported having used condoms consistently on all occasions [13]. Variations in condom utilization during premarital sex might be due to differences in educational status, culture, and ability to access information. Nazareth, which is located in the center of Ethiopia, has a higher degree of educational accessibility, which changes the culture of gender-based differences. Despite the over 20-year gap of this study, male dominance is still highly prevalent in Metema District.

Regarding the finding that women not worried about being infected by HIV were 73% less likely to be vulnerable than those who were worried, it is worthy to the main reasons for their worries; i.e., husbands’ infidelity (43.8%) and their inability to be sure about their husbands’ serostatus (30.9%). This is supported by previous research conducted in Uganda, Nigeria, Ethiopia (Nazareth), and Mozambique [2,13,32]. This suggests areas for interventional health studies.

As for the study finding that married women who had sufficient income to cover their expenses were 44% less likely to be vulnerable than those who had insufficient income, this indicates the commonality of economic factors that increase the vulnerability of women to HIV infection in developing countries [2,20,31]. Women who depend on their husbands for financial security are likely to be uneducated, and thus likely to lack knowledge of the consequences of unsafe sex practices. Women who married to secure their financial needs and those who were married against their will were also found to be more vulnerable to HIV infection and more likely to be unaware of being at risk [13]. In many societies, especially in developing countries, women and girls are the primary victims of poverty. Of the 1.2 billion people living on less than USD 1 a day, 70% are women. Women's economic dependence also makes them vulnerable to HIV/AIDS [23]. Thus, legal considerations, political involvement, and economic stability may help reduce women's vulnerability to HIV infection.

Finally, this study found that women who had three or fewer children were 31% less likely to be vulnerable to HIV infection than those with four or more children. Number of children may reflect level of income in this sample, as the overall sample reported financial difficulty and sufficient income was an influential factor as noted above. However, the lack of similar studies on this topic makes it difficult to compare the findings.

A limitation of this study is that despite efforts to randomly select from the community, the attitudes of married women toward their sexual partners, as well as the sexual history of married men reported by their wives, might have been either under-reported or over-reported. Although more than half of the participants were rural inhabitants and unable to read and write, responding through a research assistant provided them with the opportunity to participate.

In conclusion, this study found that vulnerability to HIV, as measured by either experiencing STI symptoms or having a history of an extramarital sexual relationship by either spouse in the past 12 months, was found in 148 married women (22.5%). As such, to reduce married Ethiopian women's vulnerability to HIV infection, efforts to encourage negotiation about sexual matters and communication about HIV infection within married couples are crucial. Particular attention is also needed for women with a history of premarital sex, express worry about HIV infection, lack sufficient income, and have a higher number of children (≥ 4).

Since the health of reproductive women is one of the top priorities of the government, empowering and economically strengthening married women through education is important. The Ethiopian Federal Ministry of Health and the Amhara regional health bureau should collaborate to provide continued training for health extension workers to address married couples through health education, especially focusing on clearer sexual communication and risk reduction measures.
Authors' contributions

Conceptualization, Formal analysis, Writing–original draft, Writing–review & editing: All authors.

Conflict of interest

The authors declared no conflict of interest.

Funding

None.

Data availability

The dataset files are available from Harvard Data verse at https://doi.org/10.7910/DVN/5OPO18.

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References


Development and effects of a high-risk pregnancy emotive role-play program for nursing students: a quasi-experimental study

Bo Gyeong Lee, Sun-Hee Kim

College of Nursing, Research Institute of Nursing Science, Daegu Catholic University, Daegu, Korea

**Purpose:** This study aimed to develop an emotive role-play program for nursing students focusing on high-risk pregnancy and analyze its effects on communication skills, clinical performance, and emotional intelligence.

**Methods:** A quasi-experimental nonequivalent comparison group design was adopted with 83 nursing students (experimental group, 45; comparison group, 38) who participated voluntarily in an extracurricular program. The preliminary survey was conducted on November 3 and November 4, 2020, and the follow-up survey was conducted on November 12, 2020, for the comparison group and on November 27, 2020, for the experimental group. A program that included five role-play scenarios related to induced labor, preeclampsia, premature rupture of membranes, preterm labor, and infertility was developed by a group of experts and presented to the experimental group over 11 total hours across 3 days. Each student participated in a role-play scenario as a patient, family member, or nurse and observed three other scenarios. The comparison group received a workbook after the follow-up evaluation. The independent t-test was performed to analyze changes in communication skills, clinical performance, and emotional intelligence.

**Results:** Communication skills \((t=1.84, p=.035)\) and clinical performance \((t=2.75, p=.004)\) significantly increased in the experimental group compared to the comparison group. A significant difference was not observed between the experimental and comparison groups for emotional intelligence \((t=1.36, p=.088)\).

**Conclusion:** The emotive role-play program concerning high-risk pregnancy was effective in improving nursing students’ communication skills and clinical performance and can be used in nursing education related to high-risk pregnancy and childbirth.

**Keywords:** Communication; Emotional intelligence; Nursing students; Role playing; Work performance

**Introduction**

High-risk pregnancy refers to a physiological and psychological condition that increases the likelihood of endangering the health or life of the fetus and mother [1]. Approximately 15% of all pregnancies are high-risk, and high-risk pregnancies are expected to become more common due to late pregnancy and childbirth in Korea’s low birthrate era [2,3]. Therefore, there is an urgent need for healthcare professionals who can offer expert services that can improve the health outcomes of high-risk pregnant women.

High-risk pregnant women have been reported to experience high levels of anxiety [1,4,5], stress [1,5], and depression [1,4]. For example, in induced labor, healthcare providers often strug-
Summary statement

- **What is already known about this topic?**
  High-risk pregnancy causes higher levels of anxiety and depression in pregnant women. Role-play is useful for nursing students to develop emotional empathy and communication skills with patients.

- **What this paper adds**
  An emotive role-play program focusing on high-risk pregnant women was developed to enhance the emotional dimension of nursing care. It was found to improve nursing students' communication skills and clinical performance.

- **Implications for practice, education, and/or policy**
  This emotive role-play program can be used to improve nursing students' communication skills and clinical performance. In nursing education, a role-play program is a method that can supplement the limitations of simulators by improving communication skills and showing nursing students how to form therapeutic relationships with patients and families.

gle to predict the progress of delivery when uterine contractions are artificially induced by uterine stimulants. Along with extreme pain, women in labor experience fear and anxiety about surgery and complications following failed induced labor [6,7]. In addition, women suffering from preterm labor, premature rupture of membranes, and preeclampsia feel psychological pressure to extend the pregnancy period and also experience high anxiety due to concerns about their own health, as well as fetal well-being [8-10]. Infertile women, another high-risk group, experience stress and depression due to the loss of opportunities for pregnancy, the risk of pregnancy failure, and prolonged social isolation [11]. As such, high-risk pregnancy causes stress, anxiety, helplessness, and uncertainty, which are related to obstetric complications, such as hypertension, preeclampsia, dystocia, and low birth weight, and can negatively impact the maternal-fetal relationship. Therefore, psychological interventions are crucial for high-risk pregnant women [5,12].

Emotional intelligence refers to the ability to recognize one's own and others’ emotions, distinguish between physical and mental reactions, and use one’s judgment to interact with the thoughts and actions of others [13]. Emotional intelligence is an important competency for healthcare providers in treating and caring for high-risk pregnant women since it enables appropriate responses to others’ emotional needs and can enhance the physical and psychological well-being of patients [14]. Emotional intelligence can be improved through continuing training and education [15] and would benefit nursing students as they learn how to become nurses.

Furthermore, nursing students must have strong interpersonal skills to manage the needs of the patients they encounter during clinical practicum [16] and improving communication skills to form strong interpersonal relationships with patients is important [17]. Nevertheless, due to the lecture-oriented approach in theoretical education and observation-oriented approach in clinical practicum, nursing students often lack sufficient educational opportunities to acquire strong patient communication skills [18]. Thus, they may experience difficulties forming therapeutic relationships with patients as nurses [15]. Since well-grounded communication skills are essential for forming therapeutic trust between nurses and patients as well as patients’ families [18], this underscores the need for creative ways to strengthen nursing students’ communication competency.

Additionally, nursing students need continuous clinical performance training in their courses to improve their adaptability to actual nursing situations and professionalism [19]. Clinical performance refers to the ability to adopt appropriate nursing practices in clinical settings by applying one’s knowledge, skills, attitudes, and judgments [20]. Role-play is widely used in nursing education as a tool to improve clinical performance and communication skills.

Role-play is an experiential learning strategy in which learners actively participate in scenarios to understand the intended learning outcomes and receive feedback. Role-play has been recognized as a useful strategy for developing communication and clinical performance skills of health care providers [21,22]. In the field of women’s health, few studies have used role-play and analyzed its effects; however, many previous studies have evaluated the effects of role-play programs for patients with mental illness [23], terminal cancer [24], and arthritis [25], as well as emergency room patients [26]. In these studies, role-play improved nursing students’ nursing performance [26,27], communication skills [23-25,28], emotional intelligence [28], and
knowledge and skills [24,26,29]. During role-play, participants can explore the clients’ emotional realm and experience others’ emotions in realistic scenarios [30,31]. In this sense, role-play based on emotional intelligence, which focuses on strengthening empathy for and communication with clients, can be useful in learning how to care for and communicate with high-risk pregnant women. Therefore, in this study, we used role-play as a method to improve the emotional intelligence of nursing students in caring for women with high-risk pregnancies.

Our review of previous studies in South Korea (hereafter, Korea) and overseas on the effects of role-play programs for nursing students showed only a few that focused on the relationships between nurses and patients in the field of women’s health [32,33]. In particular, few studies have examined the effects of role-play programs related to nurses’ relationships with high-risk pregnant women. Therefore, this study aimed to develop an emotive role-play program focused on high-risk pregnant women to improve nursing students’ communication skills, clinical performance, and emotional intelligence; also, to evaluate the program’s effectiveness. Therefore, the hypotheses of this study were as follows. First, we hypothesized that the change in communication skills after the application of the program would be greater in the experimental group than in the comparison group. Second, the change in the clinical performance of caring for high-risk pregnant women (hereafter, clinical performance) would be greater in the experimental group than in the comparison group. Third, compared to the comparison group, the experimental group would show a greater change in emotional intelligence after the program.

Methods

**Ethics statement:** This study was approved by the Institutional Review Board of Daegu Catholic University (CUIRB-2019-0077). Informed consent was obtained from the participants by an independent research assistant, and all students were assured that their participation was strictly voluntary.

**Study design**

This was a quasi-experimental nonequivalent comparison group pretest-posttest study to evaluate the effects of an emotive role-play program for nursing students focused on caring for high-risk pregnant women. The study was described according to the TREND (Transparent Reporting of Evaluations with Nonrandomized Designs) reporting guidelines [34].

**Development of a high-risk pregnancy emotive role-play program**

As the first step of developing a high-risk pregnancy emotive role-play program for nursing students, expert consultation was sought from three professors in women’s health in nursing and three delivery room nurses. They were asked to select four high-risk pregnancy and childbirth-related health problems for which they felt the strongest need and greatest importance in clinical practice. As a result, five areas were identified: induced labor, preeclampsia, preterm premature rupture of membranes, preterm labor, and infertility. The experts consulted were on average 40.8 years of age, had nursing education experience of 4.5 years, and had clinical experience in pregnancy and childbirth for 10.3 years. Among them, two delivery room nurses developed a role-play scenario for nursing students based on real clinical cases. The authors then modified the scenario and finalized it after reviewing and discussing it with the two nurses who had originally developed it.

Based on the nine-session role-play model of teaching [35], the researchers designed the program, modified as follows: session 1 for introduction, sessions 2 and 3 for preparation, session 4 for role-play training, session 5 for performing and watching role-play scenarios, and session 6 for evaluation and feedback. Among the nine sessions of the role-play class model [32], “focusing the attention of the group” was incorporated into the introduction session; “selection of participants to select actors,” “preparation in advance,” and “preparation of observers” were incorporated into the preparation session; “performance” and “discussion and evaluation of important points” were incorporated into the role-play training session; “reacting” was incorporated into performing and watching role-play scenarios; and “discussion and evaluation” and “exchange of experiences” were incorporated into evaluation and feedback.

In the final program, the introduction session (session 1, 30 minutes) consisted of welcoming the participants, providing an introduction to the program, and drafting participants’ pledge of sincere participation, respect for humanity, and confidentiality. The preparation sessions (sessions 2 and 3) included a workshop (session 2, 2.5 hours) on communication skills for nurses when providing emotional nursing care for pregnancy and delivery; and a session (session 3, 2 hours) to hear stories from women who experienced induced labor, preeclampsia, preterm premature rupture of membranes and preterm labor, and infertility. Role-play training was done in session 4 (2 hours) and included group role-plays script writing and practice. Session 5 (3 hours)
was performing and watching role-plays and session 6 (1 hour) was evaluation and feedback, which included sharing experiences, evaluation, and wrap-up (Table 1).

**Testing the high-risk pregnancy emotive role-play program**

**Participants**
The participants in this study were third-year nursing students enrolled at the researchers’ institution who provided written informed consent to participate in the study. The number of participants required for this study was calculated using G*Power 3.1.2. Since the main effect variable was communication skills, considering the effect sizes of previous studies on communication skills [15,23,36], the minimum number of samples required per group was 29 when calculated using an effect size of 0.67, a significance level of .05, and a power of .80 for the independent t-test. Considering a possible dropout rate of 35%, a total of 90 participants (45 per group) was set as the target number of study participants. After posting a recruitment announcement on the campus, an assistant researcher explained the purpose and methods of the study to the first 90 students who expressed interest in participating. Among the first 90 applicants, those who were able to follow the program schedule were assigned to the experimental group, while those who were unable to accommodate the schedule were assigned to the comparison group. After excluding the data from seven dropouts in the comparison group, data from 45 participants in the experimental group and 38 participants in the comparison group were used for the final analysis (Figure 1).

**Table 1. Main contents of the emotive role-play program on high-risk pregnancy**

<table>
<thead>
<tr>
<th>Day</th>
<th>Session</th>
<th>Theme</th>
<th>Contents</th>
<th>Materials</th>
<th>Methods</th>
<th>Duration (minute)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Introduction</td>
<td>-Welcome and self-introduction</td>
<td>-Workbook</td>
<td>-Group building and sharing</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-Program introduction</td>
<td>-Participant pledge</td>
<td>-Writing the participant’s pledge</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>Preparation session 1: The importance of communication and communication methods</td>
<td>-The importance of communication between patients and nurses</td>
<td>-Workbook</td>
<td>-Lecture on communication by director of the Communication Center</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-Communication methods using cases of high-risk pregnancy and childbirth</td>
<td>-Painting tools</td>
<td>-Group presentation</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-Group communication work</td>
<td></td>
<td>-Reflection journal</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>Preparation session 2: Hearing the stories of women who have experienced high-risk pregnancy or childbirth</td>
<td>-Understanding and empathizing through stories about induced labor, preeclampsia, preterm premature rupture of membranes and preterm labor, and infertility</td>
<td>-Workbook</td>
<td>-Presentations of the experiences of four women</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-Reflection journal</td>
<td>-Reflection journal</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>Role-play training</td>
<td>-Empathizing, engaging emotions, and understanding and applying nursing performance through role-play scenarios involving induced labor, preeclampsia, preterm premature rupture of membranes and preterm labor, and infertility</td>
<td>-Workbook</td>
<td>-Review of eight different scenarios assigned to groups and discussion</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-Painting tools</td>
<td>-Select one case per group</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-Revise the scenario script</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-Practice role-play with an actress</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-Making a role-play poster</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-Reflection journal</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>Performing and watching role-play scenarios</td>
<td>-Empathizing, engaging emotions, and understanding and applying nursing performance through role-play and watching performances</td>
<td>-Role-play props, stage installation, and auditorium preparation</td>
<td>-Role-play</td>
<td>180</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-Watching performances</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-Making a pregnant woman’s body shape using balloons</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-Mutual evaluation using “like” stickers</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-Reflection journal</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>Evaluation and feedback</td>
<td>-Review previous session</td>
<td>-Role-play</td>
<td>-Reflecting on the role-play</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-Sharing and presentation of impressions</td>
<td>-Individual presentation</td>
<td>-Individual presentation</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-Evaluation of role-play</td>
<td>-Reflection journal</td>
<td>-Reflection journal</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-Conclusion</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total 660
Study procedures
A preliminary survey to evaluate the effects of the high-risk pregnancy emotive role-play program was conducted on November 3 and November 4, 2020, for both the experimental and comparison groups. Research assistants independent of the intervention program distributed questionnaires to all students who chose to voluntarily participate in an empty classroom 1 week before the program. The students took approximately 10 to 15 minutes to complete the preliminary survey questionnaire. To avoid the spread of information, the follow-up survey of the comparison group was completed on November 12, 2020, before the intervention program for the experimental group had begun. For the experimental group, the follow-up survey was completed on November 27, 2020, immediately after the end of the program. Each participant in both groups was provided with a small gift (worth approximately 4 US dollars) upon completing and submitting the questionnaire.

Experimental treatment
The experimental group participated in the program, which was conducted for a total of 11 hours across 3 days in a room modeled as a clinical setting and a lecture room. The participants were divided into eight groups of five or six students. On the first day, in session 1, an introduction to the program and participants was provided; and in session 2 (the first part of the preparation stage), the director of the communication center delivered a lecture on the importance of communication and communication methods using examples from pregnancy- and childbirth-related scenarios. This was followed by group activities and student presentations about communication-related topics. On the second day, in session 3 (the second part of the preparation stage), four women shared their high-risk pregnancy experiences, and in session 4, each group randomly reviewed two scenarios from one of the following nine scenarios of five themes: induced labor (3 scenarios), preeclampsia (3 scenarios), preterm premature rupture of membranes and premature labor (2 scenarios), and infertility (1 scenario). Each group then selected one case for script modification and role assignment. Ultimately the nursing scenarios were for women with induced labor (two groups), preeclampsia (three groups), preterm premature rupture of membranes and preterm labor (two groups), and infertility (one group). Each group received directing and acting lessons from a theater actor. After giving the groups one week to practice the role-play scenario, sessions 5 and 6 were conducted on the third day of the program to perform and observe the role-play scenarios and provide evaluation and feedback. After a rehearsal, role-play scenarios with the same theme (e.g., preeclampsia scenario in three
groups) were performed simultaneously during session 5, and those who were not performing at the time were asked to observe the other groups’ performances; thus, each student participated in one role-play scenario and observed three other role-play scenarios. Each role-play scenario lasted approximately 30 minutes. Students in the experimental group recorded a reflection diary for each activity across the 3 days of participating in the program. After performing the role-play scenarios in session 6, students gathered in a classroom to share their experiences and feelings and evaluate the role-play performances (Table 1). The comparison group did not attend any intervention and received the same workbook as the experimental group after the follow-up survey.

Measurements
In the preliminary and follow-up surveys, communication skills, clinical performance, and emotional intelligence were assessed.

Communication skills
Communication skills were assessed using a tool modified and supplemented by Yoon [37] based on the items used in Kim’s study (unpublished data). The tool contains 10 subdomains related to communication skills, including noticing, participating, sharing, active listening, accompanying, complimenting, comforting, hoping, forgiving, and accepting. The 50-item tool contains five questions on each subdomain, with each rated on a 5-point Likert scale (from “very little,” 1 to “very much,” 5). In the study by Yoon [37], the point-average scores for each of the 10 subdomains were used; however, in the current study, the item mean scores were used with higher scores indicating stronger communication skills. At the time of the development of the tool, Cronbach’s a was .95 [37]; in our study, it was .97.

Clinical performance of nursing care for high-risk pregnant women
The 19-item tool developed by Yang and Park [38] based on the clinical performance tool designed by Lee et al. [39] was used after obtaining approval for its use and modification. Some items were modified to better cover the topic of nursing care for high-risk pregnant women, e.g., “I can perform nursing process to solve nursing problems for high-risk pregnant women,” “I can conduct effective education suitable for high-risk pregnant women.” The tool has six subdomains: nursing process (four items), nursing intervention (four items), psychosocial nursing (three items), education (three items), physical assessment and patient monitoring (two items), and basic nursing (three items). Each item is answered on a 5-point Likert scale (from “not at all,” 1 to “very much so,” 5). The point-average score was calculated in this study, the item mean scores were used with higher scores indicating better clinical performance. Cronbach’s α was .96 at the time of development by Lee et al. [39], .86 in Yang and Park’s study [38], and .95 in the current study.

Emotional intelligence
Emotional intelligence was assessed using the Emotional Intelligence Scale developed by Wong and Law [40] that was adopted by Jung [41] after securing approval from the developers for its use. The tool consists of a total of 16 items across four subdomains: understanding one’s own emotions (four questions), understanding others’ emotions (four questions), comparisonling emotions (four questions), and use of emotions (four questions). Each item is rated on a 7-point Likert scale (from “not at all,” 1 to “very much so,” 7). The point-average score was calculated in this study, the item mean scores were used with higher scores indicating greater emotional intelligence. Cronbach’s α was .87 at the time of development [40] and was .93 in the current study.

General characteristics
For general characteristics, students’ age, sex, and religion were asked in the preliminary survey.

Data analysis
All data in this study were analyzed using IBM SPSS for Windows ver. 25.0 (IBM Corp., Armonk, NY, USA). Frequencies and percentages were used for the general characteristics of the participants. The chi-square test, Fisher exact test, and t-test were used to test the homogeneity of the two groups’ communication skills, clinical performance, and emotional intelligence. The independent t-test was used to compare differences in the changes in communication skills, clinical performance, and emotional intelligence between the experimental and comparison groups. The normality of the measured variables was confirmed using the Shapiro-Wilk test (pretest and posttest). There were no missing data for the main variables and general characteristic variables, and the statistical significance level of the analysis data was .05.

Results
Homogeneity testing for general characteristics, communication skills, clinical performance, and emotional intelligence
The average age of the experimental group was 21.24 ± 1.05 years, and 21.55 ± 1.18 years for the comparison group. Most
participants were women (44 in the experimental group [97.8%] and 34 in the comparison [89.5%]) and many had no religion (27 in the experimental group [60.0%] and 29 in the comparison [76.3%]) (Table 2). Age \( (p = .211) \), sex \( (p = .174) \), and religion \( (p = .114) \) were not significantly different between the groups, indicating homogeneity.

In the preliminary survey, for the experimental group the average communication skills score was 4.01 ± 0.41 points, while the average clinical performance score was 3.70 ± 0.48 points and the average emotional intelligence score was 5.32 ± 0.74 points. The comparison group had average scores of 4.08 ± 0.49 points for communication skills, 3.80 ± 0.51 points for clinical performance, and 5.24 ± 0.83 points for emotional intelligence. Communication skills \( (p = .499) \), clinical performance \( (p = .396) \), and emotional intelligence \( (p = .608) \) were not significantly different between the groups, indicating homogeneity (Table 2).

**Testing the effects of the high-risk pregnancy emotive role-play program**

The average change in communication skills in the experimental group after the program was 0.20 ± 0.40 points, which was statistically significantly greater than the average change of 0.04 ± 0.37 points in the comparison group \( (t = 1.84, p = .035) \). Therefore, the first hypothesis was supported (Table 3).

The average change in the clinical performance in the experimental group after the program was 0.52 ± 0.50 points, which was statistically significantly greater than the average change of 0.21 ± 0.51 points in the comparison group \( (t = 2.75, p = .004) \). Therefore, the second hypothesis was also supported (Table 3).

The average change in emotional intelligence in the experimental group after the program was 0.47 ± 0.77 points, while it was 0.25 ± 0.69 points in the comparison group. Although communication skills increased more in the experimental group, no statistically significant difference was observed \( (t = 1.36, p = .088) \). Therefore, the third hypothesis was not supported (Table 3).

**Discussion**

In this study, the communication skills of the experimental group showed a significant increase compared to the comparison group after the implementation of the emotive role-play program. A direct comparison is difficult due to the lack of studies examining the effect of role-playing on the relationships between nursing

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**Table 2.** Homogeneity of general characteristics and outcome variables between the experimental and comparison groups (N=83)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Categories</th>
<th>Mean ± SD or n (%)</th>
<th>( t ) or ( \chi^2 )</th>
<th>( p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (year)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Experimental (n = 45)</td>
<td>21.24 ± 1.05</td>
<td>–1.26</td>
<td>.211</td>
</tr>
<tr>
<td></td>
<td>Comparison (n = 38)</td>
<td>21.55 ± 1.18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td>Male</td>
<td>1 (2.2)</td>
<td>4 (10.5)</td>
<td>.174†</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>44 (97.8)</td>
<td>34 (89.5)</td>
<td></td>
</tr>
<tr>
<td>Religion</td>
<td>Yes</td>
<td>18 (40.0)</td>
<td>9 (23.7)</td>
<td>2.50</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>27 (60.0)</td>
<td>29 (76.3)</td>
<td></td>
</tr>
<tr>
<td>Communication skills</td>
<td></td>
<td>4.01 ± 0.41</td>
<td>–0.68</td>
<td>.499</td>
</tr>
<tr>
<td>Clinical performance</td>
<td></td>
<td>3.70 ± 0.48</td>
<td>–0.85</td>
<td>.396</td>
</tr>
<tr>
<td>Emotional intelligence</td>
<td></td>
<td>5.32 ± 0.74</td>
<td>0.51</td>
<td>.608</td>
</tr>
</tbody>
</table>

†Fisher exact test.

**Table 3.** Comparison of dependent variables between the experimental and comparison groups (N=83)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group</th>
<th>Mean ± SD</th>
<th>( t )</th>
<th>( p ) (one-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pretest</td>
<td>Posttest</td>
<td>Mean differences (posttest–pretest)</td>
<td></td>
</tr>
<tr>
<td>Communication skills</td>
<td>Experimental (n = 45)</td>
<td>4.01 ± 0.41</td>
<td>4.21 ± 0.42</td>
<td>0.20 ± 0.40</td>
</tr>
<tr>
<td></td>
<td>Comparison (n = 38)</td>
<td>4.08 ± 0.49</td>
<td>4.12 ± 0.45</td>
<td>0.04 ± 0.37</td>
</tr>
<tr>
<td>Clinical performance</td>
<td>Experimental (n = 45)</td>
<td>3.70 ± 0.48</td>
<td>4.22 ± 0.47</td>
<td>0.52 ± 0.50</td>
</tr>
<tr>
<td></td>
<td>Comparison (n = 38)</td>
<td>3.80 ± 0.51</td>
<td>4.00 ± 0.47</td>
<td>0.21 ± 0.51</td>
</tr>
<tr>
<td>Emotional intelligence</td>
<td>Experimental (n = 45)</td>
<td>5.32 ± 0.74</td>
<td>5.79 ± 0.60</td>
<td>0.47 ± 0.77</td>
</tr>
<tr>
<td></td>
<td>Comparison (n = 38)</td>
<td>5.24 ± 0.83</td>
<td>5.48 ± 0.88</td>
<td>0.25 ± 0.69</td>
</tr>
</tbody>
</table>
students and patients in the field of women’s health nursing. However, a study by Seo and Jeong [23] showed that a role-play program for nursing students on psychological nursing care resulted in significant improvement in communication skills. Bosse et al. [42] also examined the effect of a role-play program for medical students and reported that compared to a comparison group who received the existing curriculum, the experimental group that participated in the role-playing program had higher self-efficacy in terms of their communication skills with pediatric patients and their parents, showing similar results to those of our study. Judging from these results, role-play programs can be regarded as a useful educational method to improve nursing students’ communication skills. In recent years, simulation-based education programs using high-fidelity simulators have been actively used in nursing education; however, these programs have limitations such as high initial costs, difficulties in operating equipment, and providing training for instructors [43,44]. In addition, while many studies have consistently reported improved nursing knowledge, critical thinking, and clinical performance through high-fidelity simulation-based education programs [44-46], their effects on communication skills have not been extensively investigated, and the few results in this area have been inconsistent. For example, no significant difference in communication skills was observed between an experimental group and a comparison group that participated in a simulation-based program [46]. As such, role-play programs may be a more feasible and effective alternative for strengthening nursing students’ communication competency, especially in terms of their relationships with patients who require psychological support and intervention. Therefore, role-play programs can be actively used as a teaching method for strengthening the communication competency of nursing students in caring for high-risk pregnant women.

The finding that clinical performance in the experimental group significantly improved is also similar to prior studies. In a study by Bosse et al. [42], in addition to communication skills, the objective structured clinical examination score of the experimental group that participated in role-play scenarios was significantly improved compared to that of the comparison group. In addition, according to a study by Heidarzadeh et al. [26], education on an emergency patient classification system conducted with nursing students using role-play scenarios resulted in significant improvement in applying the classification system, compared to the group who followed the traditional curriculum. Based on these results, role-play can likely be widely adopted not only to strengthen students’ communication competency but also to improve various clinical performance skills. To overcome some of the limitations of simulators, such as difficulties with communication between nursing students and patients/families, a hybrid program that combines simulation-based training and standardized patients has been proposed as an alternative [44,47]. According to previous studies, these measures have a positive effect on nursing students’ communication skills and the formation of therapeutic relationships with patients and family members [44,47]. Future studies that develop and analyze the effectiveness of a program that combines simulators and role-play scenarios are needed to improve our understanding.

In this study, emotional intelligence did not improve significantly compared to the comparison group after implementing the program, which contrasts with the literature. In a previous study by Oh and Kim [48], an emotive intelligence-based interpersonal relationship training program was conducted with freshmen at a nursing school, and the average emotional intelligence score was found significantly improve among those in the experimental group compared to the comparison group. In addition, a study of an emotional intelligence improvement program for nursing students found that the average emotional intelligence score of the experimental group significantly improved compared to the comparison group [15], which contrasts with our study findings. This difference may be due to diffusion of the experimental effect; since this study was conducted during the semester at a single university and with students in the same grade, despite our efforts to comparison for diffusion between the groups, it may have been difficult to completely exclude its effects. Furthermore, as the emotional intelligence scores at baseline were relatively high, a ceiling effect may be considered. In Lee and Gu’s study [15], the same measurement tool was used as our study to assess emotional intelligence and the baseline average scores (3.40 ± 0.41 for the experimental group, 3.25 ± 0.44 points for the comparison group) were lower than our study. The emotional intelligence scores of the experimental group, which were measured twice after the program (3.95 ± 0.41 and 3.80 ± 0.40 points) were also both lower than our students’ average score. Similar results were also found in other studies that measured nursing students’ emotional intelligence using the same tool. Kim [49] analyzed the effects of nursing students’ metacognition and emotional intelligence on self-leadership and reported an average emotional intelligence score of 3.63 ± 0.48 points and Shin and Lee’s [50] study on emotional intelligence according to enneagram personality type reported an average of 4.70 ± 0.75 points, which are both slightly lower than that of the participants in our study. This is likely due to differences in the
nursing students’ experience levels as most of the research participants in prior studies were freshmen or students in earlier stages of their nursing program who had not yet developed clinical experience, whereas the participants in our study were third-year students with direct or indirect exposure to caring for high-risk pregnant women from the previous semester through a clinical practicum. Therefore, the participants in our study were likely better able to understand and sympathize with the physical and psychological pain of high-risk pregnant women. Therefore, emotive role-play programs for nursing care of high-risk pregnant women may be more effective when provided for nursing students in earlier curricular stages.

The duration and intensity of the intervention may have also played a role in outcome differences. While our program was conducted on an intensive timeline over a short period (a total of 11 hours across 3 days), in Oh and Kim’s study [48], which observed significant improvement in emotional intelligence, the program was conducted in weekly 100-minute sessions over a total of 8 weeks. In Lee and Gu’s study [15], the program was conducted in eight sessions for a total of 20 hours across 4 weeks. In other words, our study examined the possibility of using a short-term intensive role-play program as a way to improve communication skills and clinical performance. However, given that the short period may have been limited for improving emotional intelligence, such programs should be supplemented with routine, long-term training and further tested in the future. In addition, no unintended effects of the intervention program were observed in this study.

Since this study was conducted with nursing students from a single university, there are limitations in applying study findings to all nursing students. In addition, since the study was conducted during the semester with third-year students at the same university, the effect of diffusion cannot be completely ruled out. Nevertheless, this study is significant as the first to our knowledge, to develop a role-play program focused on high-risk pregnancy and to test its effectiveness in improving nursing students’ emotional intelligence and communication competency. In addition, our study confirmed the effectiveness of role-play programs as a feasible supplementary teaching method for overcoming the limitations of high-fidelity simulators, which are currently actively used in nursing education.

In conclusion, an emotive role-play program focused on caring for high-risk pregnant women, delivered over a total of 11 hours over 3 days, was effective in improving nursing students’ communication skills and clinical performance; but no significant changes in emotional intelligence were found. Thus, emotive role-play is a feasible teaching mode that can be used to improve nursing students’ communication skills and clinical performance. Future studies that apply the program to clinical nurses who encounter high-risk pregnant women and examine its effectiveness may be helpful for identifying the utility of role-playing in clinical practice. Further research that is designed to reinforce emotional intelligence may also benefit emotive role-playing for nursing students.

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Authors’ contributions
Conceptualization: Lee BG, Kim SH; Formal analysis: Kim SH; Writing–original draft: Lee BG; Writing–review & editing: Kim SH, Lee BG.

Conflict of interest
Sun-Hee Kim has been editorial board of the Korean Journal of Women Health Nursing since January 2022. She was not involved in the review process of this editorial. Otherwise, there was no conflict of interest.

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Data availability
Dataset files are available at Harvard Dataverse at https://doi.org/10.7910/DVN/XLCI6C.

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None.

References


24. Rotter B, Braband B. Confidence and competence in pallia-


The influence of eHealth literacy, reproductive health knowledge, and self-esteem on health-promoting behaviors in early adult women: a cross-sectional survey

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¹College of Nursing Science, Kyung Hee University, Seoul, Korea
²Department of Nursing, Ansan University, Ansan, Korea

Purpose: The purpose of this study was to investigate the influence of eHealth literacy, reproductive health knowledge, and self-esteem on early adult women’s health-promoting behaviors (HPB). This study was based on Pender’s health promotion model as a theoretical underpinning.

Methods: Early adult women aged 18 to 35 years (n=165) were recruited by posting advertisements on social network sites for a student club and a faith-based community in Ansan, Korea. Willing individuals were invited to participate in the online survey from June 1 to June 30, 2022. Standardized instruments were used to measure HPB, eHealth literacy, reproductive health knowledge, and self-esteem. General characteristics included income level, perceived subjective health, and internet usage time. The collected data were analyzed using the independent t-test, one-way analysis of variance, Pearson correlation coefficients, and multiple regression.

Results: The mean age of the respondents was 21.97±3.87 years. The total HPB score was 120.69, corresponding to a moderate level; and the total scores for eHealth literacy (30.24), knowledge of reproductive health (23.04), and self-esteem (35.62) were higher than the midpoint. The model explained 53.3% of variance in HPB, and self-esteem (β=.48, \(p<.001\)) was the most influential factor. Other influential factors were, in descending order, higher economic level, higher subjective health status, greater eHealth literacy, and less internet use time (<2 hours/day).

Conclusion: In order to promote the health of early adult women, counseling or programs that positively improve self-esteem appear promising, and eHealth literacy should be considered as a way to promote HPB using information technology.

Keywords: Health knowledge; Health literacy; Health promotion; Self concept
Summary statement

· What is already known about this topic?
  Self-esteem influences women's health-promoting behaviors (HPB) in early adulthood, and high eHealth literacy and health knowledge in adulthood are known to affect the practice of HPB.

· What this paper adds
  In this sample of early adult women, self-esteem was the most influential factor explaining HPB, followed by economic level, good subjective health status, eHealth literacy, and less internet time. Knowledge of reproductive health was not significant.

· Implications for practice, education, and/or policy
  Measures to increase self-esteem and eHealth literacy can promote HPB in early adult women, and efforts should be made to improve health promotion education, along with policies that enable health and medical services considering economic status.

Introduction

Health-promoting behaviors in early adult women

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Health-promoting behaviors in early adult women

Introduction

보건복지부와 한국건강증진개발원에서 발표한 제5차 국민건강증 진 종합계획(Health Plan 2030)에 여성의 생애주기별 맞춤형 건강 정책이 포함되어 추진되고 있고[1]. 지역사회 건강증진사업에서 여성의 건강증진 프로그램을 계획하는 등 건강진단 및 건강서비스 사

각지대 협소와 건강증진 교육 실시과제로 실천하고 있다[1, 2]. 질병관리청에서는 여성의 생애주기뿐만 아니라 사회·경제적수준을 고려한 건강상태와 이슈를 제시하고 있고, 젊은 여성의 영양 섭취 부족이 심각한데, 이는 향후 여성의 건강과 가임력에 영향을 미쳐 저출산 등의 인구·사회학적 문제로 연결될 것이라고 하였다[2].

18~25세는 성인기 진입 시기로 흡연, 음주, 약물 남용, 열악한 식습관 및 신체 활동 부족과 같은 건강에 해롭고 위험한 다양한 건강 행동을 하는 경향이 있는데, 이러한 행동 경향은 젊은 인구의 질병 위험 증가로 이어질 수 있다[3].


Summary statement

· What is already known about this topic?
  Self-esteem influences women's health-promoting behaviors (HPB) in early adulthood, and high eHealth literacy and health knowledge in adulthood are known to affect the practice of HPB.

· What this paper adds
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· Implications for practice, education, and/or policy
  Measures to increase self-esteem and eHealth literacy can promote HPB in early adult women, and efforts should be made to improve health promotion education, along with policies that enable health and medical services considering economic status.
로 진행될 수 있는 건강의 이상증상을 조기 발견하여 예방할 수 있어야 한다[1]. 최근 가임기 여성의 성 활동이 활발해지고 있으나 상대적으로 이에 대한 예방적 건강행동이 부족한 성인초기에서 건강 증진행동은 건강 이슈로 되돌아 붙 수 있어야 한다[2].


본 연구는 결혼, 임신과 출산, 육아 등의 중요한 발달과업을 성공적으로 완수해야 하는 중요한 시기인 성인초기 여성을 대상으로 건강증진행위에 미치는 영향요인을 알아보고, 이를 통해 성인초기 여성의 건강을 유지, 증진하기 위한 효율적인 교육중재 방안을 마련하며, 건강정책과 건강증진행위 프로그램을 개발하는 데에 유용한 기초 자료가 될 것이다.

본 연구의 구체적 목적은 다음과 같다. 첫째, 대상자의 건강증진행위, e헬스 문해력, 생식건강지식, 자아존중감 정도를 파악한다. 둘째, 대상자의 특성에 따른 건강증진행위, e헬스 문해력, 생식건강지식, 자아존중감의 차이를 파악한다. 셋째, 건강증진행위, e헬스 문해력, 생식건강지식, 자아존중감의 상관관계를 파악한다. 넷째, 대상자의 건강증진행위에 미치는 영향요인을 파악한다.

Methods

Ethics statement: This study was approved by the Institutional Review Board of Ansan University (AN01-202106-HR-003-01) and obtaining informed consent was exempted because there was no sensitive information and the online survey was anonymously treated.

연구 설계
본 연구는 성인초기 여성을 대상으로 일반적 특성과 e헬스 문해력, 생식건강지식, 자아존중감, 건강증진행위를 확인하며 건강증진행위에 영향을 미치는 요인들을 파악하기 위한 성인초기 조사연구이다. 연구의 기술은 STROBE 보고지침(https://www.strobe-statement.org/)에 따라 작성하였다.
대상자의 특성에 따른 건강증진행위, e헬스 문해력, 자아존중감 및 생식건강지식

연구 대상자의 평균 나이는 21.97±3.87세였고, 20세 이하가 78명 (47.3%)이었다. 종교는 없이 115명 (69.7%)이었으며, 경제적 수준은 ‘중’인 경우가 124명 (75.2%)이었고, 인터넷 사용시간은 4시간 이상이 83명 (50.3%)으로 가장 많았으며, 주관적 건강상태는 전향적인 경우가 108명 (65.5%)으로 가장 많았다 (Table 1).

진강증진행위의 총점은 120.69±22.5점(평균 점수 2.41점)으로 중족도 수준이었고, 대상자의 특정 중 종교가 있는 경우가 있는 경우도 많지 않아(관속성 t=2.36, p=0.02), 경제적 수준이 '상'인 경우가 증점이 가장 높았으며(F=8.08, p<.001). 경제적 수준이 '하', '중'인 집단과 '상'인 집단 간에 유의한 차이가 있는 것으로 나타났다. 인터넷 사용시간이 2시간 미만인 경우가 가장 높았고(F=4.25, p=0.016), 2시간 미만 집단과 4시간 이상 집단 간에 유의한 차이가 있는 것으로 나타났다. 주관적 건강상태는 매우 건강한 집단에서 가장 높았고(F=10.92, p<.001), '전혀 건강하지 않음' 집단과 '건강함'과 '매우 건강함' 집단 간에 유의한 차이가 있는 것으로 나타났다.

e헬스 문해력의 총점은 30.24±5.75점(평균 점수 3.78점)으로 중등도 이상의 수준이었으며, 대상자의 특성에 따른 통계적으로 유의한 차이가 없는 것으로 나타났다. 생식건강지식의 총점은 23.04±0.32점으로 중등도 이상의 수준이었고, 대상자의 연령에 따라 유의한 차이를 보인 것으로 나타났다. 일반교육 수준이 26세 이상인 경우 생식건강지식이 가장 높은 것으로 나타났다(F=11.69, p<.001). 자아존중감의 총점은 35.62±4.71점으로 중등도 이상의 수준이었고, 대상자의 종교, 경제적 수준, 인터넷 사용시간과 주관적 건강상태에 따라 차이를 보였다. 종교가 있는 경우도 있는 경우보다 높았고(관속성 t=2.15, p=0.033), 경제적 수준이 상인 경우가 가장 높았으며(F=6.02, p=0.003). 인터넷 사용시간이 2시간 미만인 경우(F=3.82, p=0.024)와 주관적 건강상태가 매우 건강한 경우(F=12.93, p<.001)에서 자아존중감이 가장 높았다 (Table 1).

대상자의 특성에 따른 건강증진행위, e헬스 문해력, 자아존중감 및 생식건강지식의 관계

대상자의 건강증진행위와 e헬스 문해력, 자아존중감의 관계를 알아보기 위해 Pearson 상관계수로 분석하였고, 대상자의 특성, e헬스 문해력, 생식건강지식, 자아존중감이 건강증진행위에 미치는 영향을 파악하기 위하여 다중회귀분석(multiple regression analysis)을 이용하였다.

자료 수집
자료 수집 기간은 2021년 6월 1일부터 30일까지였으며, coronavirus disease 2019 (COVID-19) 상황을 고려하여 경기도 안산시 안산대학의 대학회 청년부와 일반동아리 회원을 대상으로 모집 공고를 홍보하여 관심자 인터넷 링크를 통해 접속하도록 하였다. 온라인 설문지 첫 화면에서 연구 대상자 선정 조건을 제시하여 부합 여부를 확인하고, 자료 수집 시 대상자가 설문을 시작하기 전 첫 화면에 연구내용에 대한 설명과 연구 대상자 제외 기준 등에 관한 안내문을 온라인으로 제공하였다. 설문조사 소요 시간은 15분 정도였고, 연구 참여자에게는 5,000원 상당의 커피 모바일 쿠폰을 제공하였다.
Table 1. Differences in HPB, eHealth literacy, RHK, and self-esteem according to participants' characteristics (N=165)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean ± SD</th>
<th>Range or Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (year)</td>
<td>36.70 ± 1.94</td>
<td>21–29.50</td>
</tr>
<tr>
<td>Religion</td>
<td>32.54 ± 0.74</td>
<td>b</td>
</tr>
<tr>
<td>Economic level</td>
<td>33.26 ± 0.74</td>
<td>a</td>
</tr>
<tr>
<td>Internet use time (hour/day)</td>
<td>32.93 ± 0.88</td>
<td>b</td>
</tr>
<tr>
<td>Subjective health status</td>
<td>32.93 ± 0.88</td>
<td>a,b,c</td>
</tr>
<tr>
<td>HPB: Health-promoting behaviors; RHK: reproductive health knowledge.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discussion

본 연구에서는 성인초기 여성의 건강정보 문해력, 생식건강지식, 자아존중감, 건강증진행위 정도를 파악하고, 이에 미치는 영향요인을 중심으로 논의하고자 하였다. 대상자의 건강증진행위 정도는 동일한 측정 도구를 이용한 선행연구에서 총점 대신 병구 평점을 제시한 것과 비교하면, 본 연구는 (r = .31, p < .001)은 약한 양의 상관관계, e헬스 문해력과 자아존중감 (r = .28, p < .001)도 약한 양의 상관관계가 있는 것으로 나타났다 (Table 2).

Table 2. Relationships among HPB, eHealth literacy, RHK, and self-esteem (N=165)

<table>
<thead>
<tr>
<th>Variable</th>
<th>r (p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPB</td>
<td>1</td>
</tr>
<tr>
<td>eHealth literacy</td>
<td>.37 (&lt;.001)</td>
</tr>
<tr>
<td>RHK</td>
<td>.04 (.653)</td>
</tr>
<tr>
<td>Self-esteem</td>
<td>.61 (&lt;.001)</td>
</tr>
</tbody>
</table>

Discussion

본 연구에서는 성인초기 여성의 건강정보 문해력, 생식건강지식, 자아존중감, 건강증진행위 정도를 파악하고, 이에 미치는 영향요인을 중심으로 논의하고자 하였다. 대상자의 건강증진행위 정도는 동일한 측정 도구를 이용한 선행연구에서 총점 대신 병구 평점을 제시한 것과 비교하면, 본 연구는


자아존중감은 가능점수 10~50점 중 35.62점이었으며, 대학생의 자아존중감 연구[32]에서 100점 만점에 92.9점으로 보고한 바[25]와 비교시 각각 92.9점에서 74.1점, 대학생의 자아존중감은 평균 73.6점(35점 만점)으로 보고한 바[33]와 비교시 각각 73.6점에서 74.1점으로 보고한 바[25]. 대학생의 자아존중감은 가능점수 10~50점 중 35.62점이었으며, 대학생의 자아존중감 연구[32]에서 100점 만점에 92.9점으로 보고한 바[25]와 비교시 각각 92.9점에서 74.1점, 대학생의 자아존중감은 평균 73.6점(35점 만점)으로 보고한 바[33]와 비교시 각각 73.6점에서 74.1점으로 보고한 바[25].

<table>
<thead>
<tr>
<th>Variable</th>
<th>β</th>
<th>SE</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Religion</td>
<td>4.23</td>
<td>2.76</td>
<td>1.53</td>
<td>0.128</td>
</tr>
<tr>
<td>Economic level, lower</td>
<td>-22.81</td>
<td>7.43</td>
<td>-3.07</td>
<td>0.003</td>
</tr>
<tr>
<td>Economic level, middle</td>
<td>-20.46</td>
<td>7.00</td>
<td>-2.92</td>
<td>0.004</td>
</tr>
<tr>
<td>Internet use time, &lt; 2 hour/day</td>
<td>10.89</td>
<td>4.85</td>
<td>2.25</td>
<td>0.026</td>
</tr>
<tr>
<td>Subjective health status, not healthy</td>
<td>-15.79</td>
<td>6.62</td>
<td>-2.39</td>
<td>0.018</td>
</tr>
<tr>
<td>HD literacy</td>
<td>0.70</td>
<td>0.24</td>
<td>2.87</td>
<td>0.005</td>
</tr>
<tr>
<td>Reproductive health knowledge</td>
<td>-0.46</td>
<td>0.32</td>
<td>-1.45</td>
<td>0.150</td>
</tr>
<tr>
<td>Self-esteem</td>
<td>1.73</td>
<td>0.25</td>
<td>6.88</td>
<td>&lt; 0.001</td>
</tr>
</tbody>
</table>

Adjusted R² = 0.533, F(r) = 15.90, p < 0.001

1. The reference groups were religion (none), economic level (upper), internet use time (≥ 4 hours/day), and subjective health status (very healthy).


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Shin HS and Song YA • Health-promoting behaviors in early adult women

형 보건 교육 정책과 교육 프로그램을 실시하여 성인초기 여성들의 건강증진행위 실천을 도모할 수 있다고 생각한다.

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Authors’ contributions

All work was done by Shin HS and Song YA.

Conflict of interest

The authors declared no conflict of interest.

Funding

None.

Data availability

The data are available upon reasonable request to the corresponding author.

Acknowledgments

None.

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Do taegyo practices, self-esteem, and social support affect maternal-fetal attachment in high-risk pregnant women? A cross-sectional survey

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Purpose: The incidence of high-risk pregnancies is increasing in Korea as the birth age increases due to late marriage. Maternal-fetal attachment is an important factor that affects children even after childbirth, but it is difficult for high-risk pregnant women to form maternal-fetal attachment. The current study aimed to explore whether taegyo practice (i.e., pregnant women’s efforts for fetal good growth and development), self-esteem, and social support influenced the degree of maternal-fetal attachment in women with high-risk pregnancies.

Methods: The participants included 226 pregnant Korean women at ≥20 gestational weeks, hospitalized with 15 high-risk pregnancy conditions as defined by the Ministry of Health and Welfare. Recruitment via convenience sampling was done at four sites in Busan, Korea. Surveys were distributed and collected from February 1 to 28, 2022. Data analysis was conducted using descriptive statistics, the t-test, one-factor analysis of variance, Pearson correlation coefficients, and hierarchical multiple regression.

Results: On average, participants were 33.97±4.23 years of age and at 31.65±6.23 gestational weeks. Preterm labor (35.4%) and gestational diabetes (21.0%) were the most common high-risk conditions. Maternal-fetal attachment was positively correlated with taegyo practice (r=.70, p<.001), self-esteem (r=.53, p<.001), and social support (r=.53, p<.001), all with statistical significance. Taegyo practice (β=.50, p<.001) and social support (β=.17, p=.030) explained 53% of variance in maternal-fetal attachment in women with high-risk pregnancies.

Conclusion: Nurses caring for women with high-risk pregnancies during hospitalization can use these findings by promoting taegyo practice and enhancing social support to increase maternal-fetal attachment.

Keywords: High-risk pregnancy; Maternal-fetal relations; Self concept; Social support

주요어: 고위험 임신; 태아애착; 자존감; 사회적 지지
Introduction


모아애착은 출산 전 모아관계의 출발점으로 임부와 태아가 정서적·물리적·심리적 삶의 토대가 되는 것으로 보고되고 있으며[7]. 고위험 임부는 정상 임부에 비해 임신 기간 동안 태아와 자신의 안녕을 예측하기 힘든 상태로 걱정·불안과 같은 부정적인 정서를 더 많이 경험하게 되며[8], 이로 인해 모아애착 형성에 어려움을 겪게 된다[9]. 임신 중 모아애착 형성은 출산 후 자녀와의 관계에 영향을 미치며[10], 모체의 모아애착이 낮은 경우 영아는 카다로운 성격을 가지는 경우가 많고, 수면과 적응 행동 발달에도 문제가 발생한다고 보고 한 체계적 문헌고찰([11])을 고려한다면 자녀의 성격, 신체적인 발달에도 영향을 미치는 요소가 될 수 있으므로 그 중요성이 매우 높다.

일부의 모아애착에 영향을 미치는 요인 중 하나로 태교실천이 포함된다[12]. 태교실천이란 태아를 인식하고 최적의 성장발달을 달성하기 위한 출산전까지의 임부의 노력을 의미한다[13]. 우리나라에서 태교실천은 임부가 마음을 안정하고 출산을 기다리며 정성을 다하는 중요한 과정으로 여기고 있다[14]. 태교실천은 태아에 대한 존중과 사랑을 바탕으로 하여 출산 후 자녀와의 관계에 영향을 미치며 중요성이 매우 높다.


지금까지 모아애착에 영향을 미치는 요인과 관련된 선행 연구는 주로 정상 임부에 초점을 맞추고 있으며, 일부의 태교실천 정도.

이에 본 연구에서는 고위험 임부가 임신 장기에서 겪게 되는 모아애착, 태교실천, 자존감, 사회적 지지 정도와 이들 간의 관계를 규명하고 모아애착에 영향을 주는 요인을 파악함으로써, 고위험 임부를 위한 체계적이고 효과적인 교육 프로그램의 방향 제시와 간호 중개 개발의 이론적 근거가 되는 기초자료를 제공하고자 하였다.

### Methods

**Ethics statement:** This study was approved by the Institutional Review Board of Pukyong National University (1041386-202201-HR-4-02). Informed consent was obtained from the participants.

**연구 설계**
본 연구는 고위험 임신을 진단받은 임부의 모아애착 및 태교실천, 자존감, 사회적 지지 정도와 이들 변수 간의 관계를 파악하고 모야애착에 영향을 주는 요인을 확인하기 위한 횡단면 조사연구이다. 본 연구는 STROBE 보고지침 [32]에 따라 기술하였다.

**연구 대상**
본 연구 대상자는 부산에 소재한 1개의 2차 의료기관과 3개의 1차 의료기관인 여성병원을 포함한 총 4개 병원에 입원하고 있는 고위험 임부를 대상으로 하였다. 고위험 임신을 진단받은 임부를 대상으로 본 연구의 목적을 이해하고 자발적으로 참여로 연구에 동의한 자로 한정하여 설문서를 수령하였다. 구체적으로 선정기준은 15개 고위험 임신 질환 [6]을 진단받고 입원한 임부. 임신 20주 이상의 임부, 연구의 목적을 이해하고 자발적으로 참여로 동의한 임부이며, 조기에 국가에서 지정한 임신 질환이 모두 포함되도록 계획하였으나 모양도의 판단 하에 상대가 위중하거나 응급 분만이 예상되는 고위험 임부로 하였다. 연구 대상자는 G-power 3.1.9.7 program을 이용하였고, 효과 크기를 삼성 연구 [30]에 근거하여 .15 (중간 크기), 유의수준 α = .05, 검정력 80%로 예측 변수 14개(일반적 특성 6개, 산과적 특성 5개 및 태교실천, 자존감, 사회적 지지)를 투입하였음에 따라 필요한 대상자 수는 194명이었다. 탈락을 15%를 고려하여 총 230명을 대상으로 자료를 수집하였고, 누락된 항목이 있거나 불합실한 응답을 한 설문지 4부를 제외한 226명의 설문지를 총계 분석에 사용하였다.

**연구 도구**
모아애착
본 연구에서 모아애착은 Cranley [33]가 개발한 모아애착도구 (Maternal-Fetal Attachment Scale)를 Kim [34]이 수정·변한한 도구를 사용하였다. 본 도구는 총 24개 문항으로 자신의 태아의 구별 3문항, 태아와의 상호작용 5문항, 역할 수행 4문항, 태아의 특성과 의도에 대한 주도 6문항, 자기 자신의 6문항으로 구성되어 있다. 도구의 측도는 4점 Likert 척도이며(‘ 전혀 아니다’ 1점, ‘전혀 아니다’ 4점), 점수 범위는 24~96점으로 점수가 높음수록 모아애착 정도가 높음을 의미한다. 개발 당시 도구 신뢰도 Cronbach's α는 .85. Kim [34]의 연구에서는 .89, 본 연구에서는 .96이었다.

태교실천
본 연구에서 태교실천은 Choi와 Kim [35]이 임부를 대상으로 개발한 태교실천 도구를 Kim [34]이 수정·변한한 도구를 사용하였다. 본 도구는 총 37문항으로 권장행위 19문항과 긍정 행위 18문항으로 구성되어 있다. 도구의 척도는 5점 Likert 척도이며(‘전혀 하지 않는다’ 1점, ‘발상 한다’ 5점, 태교 긍정행위를 ‘ 전혀 하지 않는다’ 1점, ‘발상 긍하게 한다’ 5점) 점수 범위는 37~185점으로 점수가 높음수록 태교실천 정도가 높음을 의미한다. 긍정행위를 묻는 문항 중에는 개인에 따라서 임신 기간 동안에 접할 기회가 없을 행위들일 수 있으므로 TV, 라디오, 비디오 등을 통한 간접 경험이나 만약 그러한 상황을 접할 경우를 가정하여 응답하도록 하였다. 개발 당시 도구 신뢰도 Cronbach’s α는 .96. Kim의 [34] 연구에서는 .89였고, 본 연구에서는 .90이었다.

자존감
본 연구에서 자존감은 Rosenberg [36]가 개발한 자존감 척도 (Rosenberg Self Esteem Scale)를 Lee와 Won [37]이 변형한 도구를 사용하였다. 본 도구는 총 10문항으로 긍정적인 5 문항, 부정적인 5문항으로 구성되어 있으며 3, 5, 8, 9, 10번은 역계정 문항이다. 도구의 측도는 5점 Likert 척도이며(‘전혀 그렇지 않다’ 1점, ‘매우 그렇다’ 5점), 점수 범위는 10~50점으로 점수가 높음수록 자존감 수준이 높음을 의미한다. 개발 당시 도구 신뢰도 Cron-
barch's α는 .93. Lee와 Won [37]의 연구에서는 .89이었고, 본 연구에서는 .83이었다.

사회적 지지

일반적 특성 및 산과적 특성
임부의 일반적 특성은 연령, 교육 정도, 종교, 직업, 결혼 만족도, 스스로 느끼는 건강상태 등의 문항으로 구성되어 있다. 임부의 산과적 특성은 분만 예정일과 임신 주수, 계획 임신 여부, 임신 방법, 자궁의 질환, 양막의 질환, 자궁의 전치태반이 있는 경우가 4명(4.6%)이었으며 본 연구에서는 , 자궁 경부 무력증 14명(4.0%), 자궁 다중 임신중 7명(3.1%), 자궁성 부수기 질환 11명(3.1%), 임신전증 7명(2.0%), 중증 임신중독증 4명(1.1%), 자궁 내 성장 제한 4명(1.1%), 심부전 3명(0.8%) 순으로 많았다(Table 1).

자료수집
본 연구는 2022년 2월 1일부터 2월 28일까지 부산에 소재한 1개의 종합병원과 3개의 여성병원의 병원 진료 및 간호부를 방문하여 본 연구의 목적 및 참여 방법을 설명하고 자료 수집 승인을 얻은 후 시행하였다. 자료 수집 시 연구자가 해당 병원의 분만실 및 병동을 방문하여 모집 공고문을 게시하였고, 연구에 관심 있는 임부들에게 연구의 목적과 내용에 대해 설명한 후 연구 참여에 동의한 대상자 중 33명이 참여하였다. 연구자는 업무대의 태아 애착에 대해 4명(1.1%), 심부전 3명(0.8%) 순대로 많았다(Table 1). 본 연구에서 고위험 임부의 모아애착은 결혼 만족도(t=31.78, p<.001), 경기임상(t=12.61, p<.001), 계획 임신 여부(t=2.98, p=.003)에서 유의한 차이가 있었으며 계획 임신 여부는 있는 경우가 많았다. 이는 Scheffé test로 사후검증하여 실시한 결과에서 결혼 만족도는 '만족'이 '보통'과 '불만족'인 경우보다 모아애착이 높았다. 간은 .001. 경기임상은 '종종'과 '보통'이 '나쁨'보다 (F=12.61, p<.001) 대가 애착이 높았다(Table 1).

고위험 임부의 모아애착과 태교실천
본 연구에서 고위험 임부의 모아애착은 76.64±14.82로 중종등 이상 수준이었다. 태교실천 136.47±15.18점, 자존감 35.50±5.90 점으로 중종등 이상 수준이었으며, 사회적 지지는 102.61±22.94점으로 높은 편이었다(Table 2).

고위험 임부의 모아애착, 태교실천, 자존감
본 연구에서 고위험 임부의 모아애착과 태교실천(r=.70, p<.001), 자존감(r=.53, p<.001), 사회적 지지(r=.53, p<.001) 모두와 통계적으로 유의한 정적 상관관계가 있는 것으로 나타났다(Table 3).
Table 1. Differences in maternal-fetal attachment according to general and obstetric characteristics (N=226)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Categories</th>
<th>n (%)</th>
<th>Mean ± SD</th>
<th>t/F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (year)</td>
<td>&lt; 35</td>
<td>127 (56.2)</td>
<td>74.87 ± 15.55</td>
<td>0.26</td>
<td>.793</td>
</tr>
<tr>
<td></td>
<td>≥ 35</td>
<td>99 (43.8)</td>
<td>74.34 ± 13.90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>≤ High school</td>
<td>35 (15.5)</td>
<td>70.09 ± 17.99</td>
<td>2.09</td>
<td>.126</td>
</tr>
<tr>
<td></td>
<td>University</td>
<td>166 (73.5)</td>
<td>75.67 ± 14.33</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>≥ Graduate school</td>
<td>25 (11.0)</td>
<td>74.12 ± 12.26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Religion</td>
<td>Yes</td>
<td>82 (36.3)</td>
<td>73.60 ± 14.74</td>
<td>−0.80</td>
<td>.427</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>144 (63.7)</td>
<td>75.23 ± 14.88</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employment</td>
<td>Yes</td>
<td>144 (63.7)</td>
<td>73.83 ± 14.57</td>
<td>−1.08</td>
<td>.281</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>82 (36.3)</td>
<td>76.05 ± 15.24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marriage satisfaction</td>
<td>Satisfieda</td>
<td>183 (81.0)</td>
<td>77.98 ± 12.48</td>
<td>31.78</td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td>Moderateb</td>
<td>38 (16.8)</td>
<td>61.16 ± 16.52</td>
<td>(a &gt; b,c)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unsatisfiedc</td>
<td>5 (2.2)</td>
<td>54.60 ± 2.19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical condition</td>
<td>Gooda</td>
<td>52 (23.0)</td>
<td>79.92 ± 11.88</td>
<td>12.61</td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td>Moderateb</td>
<td>136 (60.2)</td>
<td>75.30 ± 14.85</td>
<td>(a, b &gt; c)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Poorc</td>
<td>38 (16.8)</td>
<td>65.03 ± 14.19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gestational age (week)</td>
<td>&lt; 29</td>
<td>78 (34.5)</td>
<td>72.78 ± 16.77</td>
<td>−1.37</td>
<td>.172</td>
</tr>
<tr>
<td></td>
<td>≥ 29</td>
<td>148 (65.5)</td>
<td>75.61 ± 13.64</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planned pregnancy</td>
<td>Yes</td>
<td>146 (64.6)</td>
<td>76.90 ± 13.44</td>
<td>2.98</td>
<td>.003</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>80 (35.4)</td>
<td>70.51 ± 16.36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Method of pregnancy</td>
<td>Naturally</td>
<td>159 (70.4)</td>
<td>75.38 ± 14.80</td>
<td>1.17</td>
<td>.244</td>
</tr>
<tr>
<td></td>
<td>Infertility procedures</td>
<td>67 (29.6)</td>
<td>72.87 ± 14.84</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of pregnancies</td>
<td>First</td>
<td>144 (63.7)</td>
<td>74.18 ± 15.09</td>
<td>−0.61</td>
<td>.541</td>
</tr>
<tr>
<td></td>
<td>≥ Second</td>
<td>82 (36.3)</td>
<td>75.44 ± 14.40</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Scheffé test.

Table 2. Scores for maternal-fetal attachment, taegyo practices, self-esteem, and social support (N=226)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean ± SD</th>
<th>Possible range</th>
<th>Data range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal-fetal attachment</td>
<td>74.64 ± 14.82</td>
<td>24–96</td>
<td>34–96</td>
</tr>
<tr>
<td>Practice of taegyo</td>
<td>136.47 ± 15.18</td>
<td>37–185</td>
<td>97–178</td>
</tr>
<tr>
<td>Self-esteem</td>
<td>35.50 ± 5.90</td>
<td>10–50</td>
<td>21–50</td>
</tr>
<tr>
<td>Social support</td>
<td>102.61 ± 22.94</td>
<td>25–125</td>
<td>42–125</td>
</tr>
</tbody>
</table>

Table 3. Correlations among maternal-fetal attachment, taegyo practices, self-esteem, and social support attachment (N=226)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Maternal-fetal attachment</th>
<th>Practice of taegyo</th>
<th>Self-esteem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal-fetal attachment</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practice of taegyo</td>
<td>.70 ( &lt;.001)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Self-esteem</td>
<td>.53 ( &lt;.001)</td>
<td>.58 ( &lt;.001)</td>
<td>1</td>
</tr>
<tr>
<td>Social support</td>
<td>.60 ( &lt;.001)</td>
<td>.60 ( &lt;.001)</td>
<td>.69 ( &lt;.001)</td>
</tr>
</tbody>
</table>
모델 1에는 모아애착에 유의한 차이를 보인 일반적 특성 중 결혼 만족도와 건강상태, 산과적 특성 중 계획 임신을 투입하였고, 모델 2에는 모아애착에 유의한 상관관계를 보인 태교실천, 자존감, 사회적 지지를 투입하여 모아애착에 미치는 영향을 파악하였다. 이중 결혼 만족도, 건강상태, 계획 임신은 가변수(dummy variables)로 처리하여 회귀분석을 실시하였다. 모델 1의 설명력은 24%였고, 통계적으로 유의하였다(F = 14.90, p < .001). 결혼만족도가 보통(β = -.36, p < .001)이나 불만족(β = -.17, p = .005)인 경우 만족하는 경우보다 모아애착이 높았다(β = -.19, p = .016).

모델 2의 설명력은 53%로 모델 1에 비해 29% 증가하였으며, 통계적으로 유의하였다(F = 46.28, p < .001). 태교실천(β = .50, p < .001)과 사회적 지지(β = .17, p = .030)가 높을수록 모아애착이 높은 것으로 나타났다(Table 4).

### Discussion
본 연구에서 고위험 임부의 모아애착에 가장 큰 영향을 미치는 변수는 태교실천이었다. 이는 정상 임부를 대상으로 모아애착에 영향을 미치는 요인을 분석한 연구[12]에서 태교실천이 가장 큰 영향을 미치는 변수로 나타난 것과 일치하는 결과로, 태교실천 관련 과학적, 실증적 연구를 지속적으로 수행하여 태교실천의 필요성을 확보할 필요가 있다. 또한 의료인은 고위험 임부에 대한 체계적인 정보 제공과 함께 고위험 임부가 접근할 수 있는 다양한 사회적 지지체계를 마련하는 것이 모아애착을 높이는 데 효과적일 것으로 생각된다. 예를 들어 입원 기간 중 의료인의 고위험 임부에 대한 체계적인 정보 제공과 함께 고위험 임부들이 서로 비슷한 경험을 공유하고 교류할 수 있는 인터넷 기반 모임이 만들어질 수 있으며, 고위험 임부가 신체적, 정신적으로 건강하게 출산을 준비할 수 있도록 가족, 사회 및 의료인을 포함한 포괄적인 연계를 통해 함께 노력하는 것이 필요할 것이다.

본 연구에서 고위험 임부의 모아애착은 평균 76.64점으로, 정상 임부를 대상으로 한 선행 연구[44]에서의 평균 83.28점보다 다소 낮은 수준이었다. 이는 고위험 임신의 경우 임신의 진행이나 결과의 불확실성으로 인해 태아에 대한 애착 형성을 주저하는 경우가 많고[17], 장기간 입원이 필요한 고위험 임부는 신체적인 불편감과 스트레스가 높아져 모아애착이 감소할 가능성이 있었다. 특히 입원한 고위험 임부의 스트레스와 관련하여 본 연구 기간 중 전 세계적 coronavirus disease 2019 (COVID-19)의 유행으로 임부들이 감염 위험에 대한 우려와 함께 감염병 예방과 보호에 대한 지식 Table 4. Factors affecting maternal-fetal attachment (N=226)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Categories</th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>B</td>
<td>SE</td>
</tr>
<tr>
<td>(Constant)</td>
<td></td>
<td>3.24</td>
<td>.09</td>
</tr>
<tr>
<td>Marriage satisfaction</td>
<td>Moderate</td>
<td>-0.59</td>
<td>-.36</td>
</tr>
<tr>
<td>Marriage satisfaction</td>
<td>Unsatisfied</td>
<td>-0.73</td>
<td>-.17</td>
</tr>
<tr>
<td>Physical condition</td>
<td>Moderate</td>
<td>-0.07</td>
<td>-.06</td>
</tr>
<tr>
<td>Physical condition</td>
<td>Poor</td>
<td>-0.31</td>
<td>-.19</td>
</tr>
<tr>
<td>Planned pregnancy</td>
<td>Yes</td>
<td>0.13</td>
<td>.10</td>
</tr>
<tr>
<td>Practice of taegyo</td>
<td></td>
<td>0.76</td>
<td>.50</td>
</tr>
<tr>
<td>Self-esteem</td>
<td></td>
<td>0.08</td>
<td>.08</td>
</tr>
</tbody>
</table>

*The reference groups were marriage satisfaction (satisfied), physical condition (good), and planned pregnancy (no).
과 조치, 삼림상담 등의 요구도가 높아진 점(45)을 고려한다면 외부적, 환경적 요인과 관련된 고위험 임부의 모아애착의 변화에 대한 추가적인 후속 연구가 필요할 것으로 생각한다.

또한 증증도 이상으로 확인된 태교실태(평균 136.47점)은 정상 임부를 대상으로 한 선형 연구(12)의 평균 138.74와 유사한 수준이다. 그러나 고위험 임부의 경우 정상 임부보다 임신 유지 및 정과 관리를 위해 임부 안정을 해야 하는 경우가 많아 태교실천의 TV 시청이나 인터넷 사용 등에 주로 집중하게 되어(16) 태교실천의 정도가 더 낮아질 가능성도 있으므로, 임신 중인 고위험 임부의 모아애착의 변화에 대한 추가적인 후속 연구가 필요할 것으로 생각한다.

본 연구에서의 자존감 평균 35.50점으로, 동일한 도구를 사용한 정상 임부 대상 국내 연구(20)에서의 평균 37.15과 유사한 수준이다. 이는 임신 중인 고위험 임부의 자존감 수준이 정상 임부보다 낮게 나타난 것과 상관관계(12)가 있는 것으로 보인다. 본 연구에서 자존감과 태교실천의 상관관계를 통해 모아애착의 정도와 밀접한 관련성을 발견할 수 있었다(48)。

본 연구에서 고위험 임부의 태교실천과 사회적 지지, 자존감, 태교실천의 상관관계를 분석한 결과 모두 정적 상관관계를 보는 데, 이는 사회적 지지, 자존감, 태교실천이 높을수록 모아애착이 높아지는 것으로 볼 수 있다. 이러한 결과는 고위험 임부의 모아애착과 관련된 다른 연구에 대한 복합화된 전제를 제공하는 데 도움이 될 것으로 생각한다. 본 연구는 조사 지역이 국한되어 있으며, 임신 중인 고위험 임부의 사회적 지지가 모아애착과 관련되며, 이는 임신 중인 고위험 임부의 모아애착을 높이기 위한 치료 프로그램 개발에 중요하다고 판단한다. 본 연구의 한계로는 조사 지역이 국한되어 있으며, 임신 중인 고위험 임부의 사회적 지지가 모아애착과 관련되며, 이는 임신 중인 고위험 임부의 모아애착을 높이기 위한 치료 프로그램 개발에 중요하다고 판단한다.
치는 요인으로 나타나지 않았는데, 이는 2단계에서 투입된 태교실천, 자존감, 사회적 지지와 1단계에서 유의했던 결혼 만족도, 건강 상태 간의 매개효과 [S3]의 가능성이 제기된다. 이는 향후 결혼만족도, 건강상태와 모아애착의 관계에서 태교실천, 자존감, 사회적 지지의 매개효과를 검정하는 연구를 통해 확인해 볼 필요가 있다.

결론적으로, 입원 중인 20주 이후 고위험 임부의 모아애착에 영향을 미치는 요인은 태교실천과 사회적 지지로 확인되었으며 이는 모아애착에 53%의 설명력이 있었다. 고위험 임부를 돌보는 간호사 는 입원 중인 고위험 임부의 태교실천과 사회적 지지를 높일 수 있는 중개 역할을 할 수 있으며, 접근성을 높이 입원 중 간호중재 개 발이 필요하다.

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**Authors’ contributions**

Conceptualization, Methodology: Da-In Kang, Euna Park; Data curation, Formal analysis, Investigation: Da-In Kang; Supervision: Euna Park; Writing—original draft: Da-In Kang; Writing—review & editing: Euna Park.

**Conflict of interest**

The authors declared no conflict of interest.

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**Data availability**

Please contact the corresponding author for data availability.

**Acknowledgments**

None.

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34. Kim GY. Effects on maternal-infant attachment by the taegyo perspective prenatal class [master's thesis]. Seoul: Yonsei Uni-
Maternal, infant, and perinatal mortality statistics and trends in Korea between 2018 and 2020

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Purpose: This study aimed to identify maternal, infant, and perinatal mortality using the national population data of South Korea between 2018 and 2020, and to analyze mortality rates according to characteristics such as age, date of death, and cause of death in each group. This study updates the most recent study using 2009 to 2017 data.

Methods: Analyses of maternal, infant, and perinatal mortality were done with data identified through the supplementary investigation system for cases of death from the Census of Population Dynamics data provided by Statistics Korea from 2018 to 2020.

Results: Between 2018 and 2020, a total of 99 maternal deaths, 2,427 infant deaths, and 2,408 perinatal deaths were identified from 901,835 live births. The maternal mortality ratio was 11.3 deaths per 100,000 live births in 2018; it decreased to 9.9 in 2019 but increased again to 11.8 in 2020. The maternal mortality ratio increased steeply in women over the age of 40 years. An increasing trend in the maternal mortality ratio was found for complications related to the puerperium and hypertensive disorders. Both infant and perinatal mortality continued to decrease, from 2.8 deaths per 1,000 live births in 2018 to 2.5 in 2020 and from 2.8 in 2018 to 2.5 in 2020, respectively.

Conclusion: Overall, the maternal, infant, and perinatal mortality statistics showed improvements. However, more attention should be paid to women over 40 years of age and specific causes of maternal deaths, which should be taken into account in Korea’s maternal and child health policies.

Keywords: Cause of death; Infant mortality; Maternal mortality; Perinatal mortality; Republic of Korea

Introduction

Maternal, infant, and perinatal death statistics provide information on the health conditions of pregnant women, mothers, and infants and offer crucial basic data for directing public policies. Each year, Statistics Korea publishes information on maternal, infant, and perinatal deaths in the cause of death statistics, which offers a general idea of mortality trends [1]. However, these reports encompass all ages, posing limitations for analysis [1]. Furthermore, there is a high chance of omitting postpartum maternal deaths from the data [1] because the hospitals where mothers give birth and where they die postpartum may differ, unlike deaths during pregnancy or labor. Therefore, it is challenging to understand maternal deaths solely from death certificates. Similarly, fetal deaths can be omitted, unlike neonatal deaths immediately after birth. Therefore, we need to understand changing...
Summary statement

- **What is already known about this topic?**
  Statistics on maternal, infant, and perinatal mortality are important data in setting the directions of maternal and child health policies. The maternal, infant, and perinatal mortality ratio in Korea steadily decreased from 2009 to 2017.

- **What this paper adds**
  Population data from 2018 to 2020 showed a continuing decline in the maternal, infant, and perinatal mortality ratios in Korea. However, the maternal mortality ratio increased again in 2020. In particular, a sharp increase was found among women over 40 years of age. The maternal mortality ratio due to hypertensive disorders and maternal complications related to the puerperium, such as embolism, increased about two times in 2020 compared to 2018 or 2019.

- **Implications for practice, education, and/or policy**
  It is essential to consider the maternal age and cause of death in operating and planning maternal and child health policies.

Methods

**Ethics statement:** This study was a secondary analysis of existing data and did not require Institutional Review Board approval or informed consent.

**Study design**
This was a chronological analytic study based on maternal, infant, and perinatal mortality population data.

**Data sources**
The birth and death statistics produced by Statistics Korea are complete survey data. In our study, the maternal, infant, and perinatal death data from the cause of death supplementary investigations were analyzed among the Census of Population Dynamics data from the Microdata Integrated Service [6] offered by Statistics Korea between 2018 and 2020. The mortality data were collected from death certificates, child cremation reports, and supplementary investigations on fetal deaths and causes of death. Data collection was done using the following sources: When a death certificate is registered by an administrative district to the death report and population dynamics system according to the Act on Registration of Family Relations [7], it is subsequently added to Statistics Korea database. Crematorium child/infant death reports are first registered at the crematorium and then at the city/province level according to the Act on Funeral Services [8], and eventually the death report data are added to Statistics Korea database. Finally, all data on infant deaths that
occurred within a year of birth, maternal deaths during pregnancy or within 6 months of childbirth, and fetal deaths at 16 weeks or later are entered into the cause of death supplementary investigation system by medical institutions, along with additional details regarding death, pregnancy, and delivery. These are then automatically reported to Statistics Korea. To comprehensively investigate maternal deaths, supplementary investigations of the cause of death conduct further analyses at the hospitals of childbirth and hospitals of death for dead mothers for whom information was recorded on their maternal death or a delivery code was present in their health insurance records within 6 months of death. Final maternal death cases are determined through reviews by an advisory committee consisting of obstetric and pediatric experts. Child and fetal deaths are also determined through cremation report data [9].

Definition of terms
Maternal death is a death that occurs during pregnancy or within 42 days of childbirth due to pregnancy, management related to pregnancy, or a specific cause aggravated by pregnancy, without coincidence or an accidental cause, regardless of the duration or site of the pregnancy [10]. The maternal mortality ratio is the number of female deaths that occur during pregnancy or within 42 days of childbirth due to pregnancy-related causes, divided by the number of children born that year, shown as a ratio of 1:100,000 [10].

The underlying cause of death was defined as "a disease or damage that caused a series of events that directly led to death, or accidents or violence that caused a fatal injury," according to the seventh Korean standard classification of diseases [11]. The causes of maternal, infant, and perinatal death were derived based on these underlying causes of death.

A direct obstetric death is a death caused by obstetric complications during pregnancy, labor, and the puerperal period. An indirect obstetric death refers to death caused by an underlying disease or a disease that developed during pregnancy and was aggravated by the physiological effects of pregnancy, but not directly by obstetric causes [10].

An infant death is a death within a year of birth (365 days). The infant mortality rate is the number of infant deaths within a year of birth (365 days) divided by the number of childbirths from the same year, shown as a 1:1,000 ratio [10].

A perinatal death refers to a case of fetal or neonatal death that occurs before and after childbirth; it encompasses fetal death at the 28th gestational week or later and neonatal death within seven days of birth. The perinatal mortality rate is the number of fetal deaths at the 28th gestational week or later and neonatal deaths within 7 days of birth, divided by the total number of childbirths (defined as childbirths and fetal deaths at week 28 or later from the same year), shown as a 1:1,000 ratio [9].

Statistical methods
The complete survey data were analyzed using descriptive statistics and calculations according to formulas based on terms' definitions.

Results
Maternal deaths by maternal age and time of delivery
The maternal mortality ratio decreased from 11.3 per 100,000 childbirths in 2018 to 9.9 in 2019. However, it increased to 11.8 in 2020, reflecting an increase of 1.9 (19.2%) compared to the previous year (Table 1). The age range of maternal death was between 19 and 41 years. The maternal mortality ratio in those aged 24 years or younger was 13.7 in 2018, 8.1 in 2019, and 9.5 in 2020, showing a considerable decrease. Maternal deaths in the past 3 years mainly occurred among women in their 30s, especially in the age range of 35 to 39 years. However, the maternal mortality ratio rapidly increased in those aged 40 years and older, from 7.8 in 2018 to 14.6 in 2019 and 28.9 in 2020. This suggests a considerable increase in the risk of maternal death in women with advanced maternal age (over 40 years old).

An analysis of maternal deaths by the time of delivery showed that the proportion of antepartum maternal deaths was 10.8% in 2018, 16.7% in 2019, and 6.3% in 2020. Most maternal deaths occurred postpartum. The proportion of deaths within a day of delivery in the past 3 years was 46.0% in 2018, 46.7% in 2019, and 59.4% in 2020, showing a consistently high level. The number of deaths between 15 and 42 days was one and two in 2018 and 2019, respectively; however, it showed a considerable increase to six in 2020 (Table 1).

Maternal mortality ratio by cause of death
Among the 99 maternal deaths between 2018 and 2020, the number of direct and indirect obstetric deaths was 75 (75.8%) and 24 (24.2%), respectively. The maternal mortality ratio from direct obstetric causes showed a steady increase, from 7.0 per 100,000 childbirths in 2018 to 8.6 in 2019 and 9.5 in 2020. Among them, 31 maternal deaths were caused by complications related to the puerperium (e.g., obstetric embolism), accounting for 41.3% of direct obstetric maternal deaths in the past 3 years. The maternal mortality ratio showed an increasing trend, from...
Table 1. Maternal mortality by age and time of delivery (Korea, 2018–2020)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Categories</th>
<th>n, ratio, or n (%)</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2018–2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal death (total)</td>
<td></td>
<td></td>
<td>37</td>
<td>30</td>
<td>32</td>
<td>12.1</td>
</tr>
<tr>
<td>Maternal mortality ratio †</td>
<td></td>
<td></td>
<td>11.3</td>
<td>9.9</td>
<td>11.8</td>
<td></td>
</tr>
<tr>
<td>Age-specific maternal mortality ratio ‡</td>
<td>≤ 24</td>
<td></td>
<td>13.7</td>
<td>8.1</td>
<td>9.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>25–29</td>
<td></td>
<td>4.6</td>
<td>8.6</td>
<td>7.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30–34</td>
<td></td>
<td>11.2</td>
<td>7.6</td>
<td>8.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>35–39</td>
<td></td>
<td>16.5</td>
<td>13.7</td>
<td>16.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>≥ 40</td>
<td></td>
<td>7.8</td>
<td>14.6</td>
<td>28.9</td>
<td></td>
</tr>
<tr>
<td>Death by time of delivery</td>
<td>Antepartum</td>
<td>4 (10.8)</td>
<td>5 (16.7)</td>
<td>2 (6.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Postpartum</td>
<td>31 (83.8)</td>
<td>25 (83.3)</td>
<td>30 (93.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unknown †</td>
<td>2 (5.4)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specific time of postpartum death (day)</td>
<td>0–1</td>
<td>17 (45.9)</td>
<td>14 (46.7)</td>
<td>19 (59.4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2–7</td>
<td>4 (10.8)</td>
<td>4 (13.3)</td>
<td>4 (12.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8–14</td>
<td>4 (10.8)</td>
<td>4 (13.3)</td>
<td>1 (3.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>15–42</td>
<td>1 (2.7)</td>
<td>2 (6.7)</td>
<td>6 (18.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unknown ‡</td>
<td>5 (13.5)</td>
<td>1 (3.3)</td>
<td>0 (0)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

† Deaths per 100,000 live births.
‡ Unknown deaths.
§ Unknown time of death.

Table 2. Maternal mortality ratio by causes of death (Korea, 2018–2020)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Categories</th>
<th>n (maternal mortality ratio) †</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of cause</td>
<td>Direct causes</td>
<td>23 (7.0)</td>
<td>75 (75.8)</td>
</tr>
<tr>
<td></td>
<td>Indirect causes</td>
<td>14 (4.3)</td>
<td>24 (24.2)</td>
</tr>
<tr>
<td>Detailed causes of direct death</td>
<td>Pregnancy with abortive outcome</td>
<td>1 (0.3)</td>
<td>2 (2.7)</td>
</tr>
<tr>
<td></td>
<td>Hypertensive disorders</td>
<td>3 (0.9)</td>
<td>9 (12.0)</td>
</tr>
<tr>
<td></td>
<td>Other maternal disorders</td>
<td>1 (0.3)</td>
<td>1 (1.3)</td>
</tr>
<tr>
<td></td>
<td>Maternal care-related problems</td>
<td>2 (0.6)</td>
<td>5 (6.7)</td>
</tr>
<tr>
<td></td>
<td>Complications of labor and delivery ‡</td>
<td>7 (2.1)</td>
<td>24 (32.0)</td>
</tr>
<tr>
<td></td>
<td>Complications related to the puerperium §</td>
<td>8 (2.5)</td>
<td>31 (41.3)</td>
</tr>
<tr>
<td></td>
<td>Other obstetric conditions</td>
<td>1 (0.3)</td>
<td>3 (4.0)</td>
</tr>
</tbody>
</table>

† Deaths per 100,000 live births.
‡ Including abnormalities of the intensity of labor (e.g., uterine inertia) and hemorrhage.
§ Including obstetric embolism.

2.5 in 2018 to 3.6 in 2019 and 4.4 in 2020. Next, the number of maternal deaths caused by complications of labor and delivery (e.g., postpartum hemorrhage) was 24, accounting for 32.0% of direct obstetric maternal deaths in the past 3 years. The maternal mortality ratio caused by labor and delivery complications was 2.6 in 2020, similar to that of 2.1 in 2018. Regarding hypertensive disorders, the maternal mortality ratio was 0.9 in 2018, 0.7 in 2019, and 1.5 in 2020, showing an increase of more than two-fold in 2020 compared to the previous year (Table 2). The three most common causes of maternal death in the past 3 years were postpartum hemorrhage, obstetric embolism, and hypertensive disorders during pregnancy, delivery, and the postpartum period (Supplementary Table 1).

Infant mortality by sex, survival period, and gestational age

The number of infant deaths was 674 in 2020, which decreased by 257 from 2018. The infant mortality rate in 2020 was 2.5 per 1,000 childbirths, which decreased by 0.3 from 2018. In 2020, the number of infant deaths was 387 (57.4%) in male and 287 (42.6%) in female infants. A comparison with 2018 showed that...
the mortality rate of female infants decreased from 2.5 to 2.2, and the mortality rate of male infants decreased from 3.2 to 2.8, which was still higher than that of female infants. The neonatal mortality rate within 28 days of birth was higher than the post-natal mortality rate after 28 days of birth in all 3 years. The post-neonatal mortality rate after 28 days of birth was 1.2 in all 3 years, whereas the neonatal mortality rate within 28 days of birth was 1.6, 1.5, and 1.3 in 2018, 2019, and 2020, respectively, showing a decrease.

The infant mortality rate at less than 28 weeks decreased from 368.5 in 2018 to 300.0 in 2020; at 28 to 36 gestational weeks, it decreased from 6.1 in 2018 to 4.2 in 2020. The infant mortality rate according to gestational age between 2018 and 2020 was highest at less than 28 weeks, and the magnitude of the decrease in 2020 compared to 2018 was greatest at less than 28 weeks (Table 3). The major causes of infant death between 2018 and 2020 were certain conditions originating in the perinatal period (50.6%, 51.0%, and 48.5%, for 2018, 2019, and 2020 respectively); congenital malformations, deformations, and chromosomal abnormalities (18.7%, 16.9%, and 17.1% respectively); and symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified (NEC) (17.5%, 18.0%, and 19.4%, respectively) (Supplementary Table 2).

**Perinatal mortality rate by sex, survival period, and gestational age**

The perinatal mortality rate decreased from 2.8 per 1,000 in 2018 to 2.5 in 2020. The mortality rate was higher in males regardless of year. The female mortality rate slightly decreased from 2.5 in 2018 to 2.4 in 2020, and the male mortality rate decreased from 2.8 in 2018 to 2.4 in 2020. The fetal mortality rate at 28 gestational weeks or later was higher than the neonatal mortality rate within 7 days of birth. The perinatal mortality rate at 37 to 41 gestational weeks decreased from 0.8 in 2018 to 0.7 in 2020. The perinatal mortality rate at gestational week 42 or later also decreased, from 6.8 in 2018 to 3.3 in 2020. The perinatal mortality rate according to gestational age between 2018 and 2020 was the highest at less than 28 weeks, and the extent of the decrease in 2020 compared to 2018 was greatest in week 42 or later (Table 4).

**Discussion**

The number of maternal deaths in Korea has decreased in the past decade [5]. Maternal deaths since 2018 have decreased as well; however, the maternal mortality ratio was 11.8 per 100,000 live births in 2020, exceeding the OECD mean of 10.9 [5]. The increase in the maternal mortality ratio despite the decrease in overall maternal deaths is likely due to the rapid decrease in childbirths in recent years [12]. Although maternal deaths in the past 3 years were high among those aged 35 to 39 years, the risk of maternal death substantially increased in women with advanced maternal age (40 years or older). This increase may need to be considered in light of the National Supporting Program for Infertile Couples [13], which has steadily expanded its targets and extent of support since its introduction in 2006. Indeed, the birth rate of Korean women aged 40 to 44 years increased from 4.1% in 2010 to 7.1% in 2020 [12], and the rate of multiple births in women aged 40 years or older was 6.0% in 2020, a 0.8% increase from the previous year [13]. As the use of assisted reproductive technology is widespread in women with advanced maternal age (40 years or older) [14], a subsequent increase in multiple births and high-risk preg-

!! **Table 3. Infant mortality by sex, survival period, and gestational age (Korea, 2018-2020)**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Categories</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Live births</td>
<td></td>
<td>326,822</td>
<td>302,676</td>
<td>272,337</td>
</tr>
<tr>
<td>Infant mortality (total)</td>
<td></td>
<td>931 (2.8)</td>
<td>822 (2.7)</td>
<td>674 (2.5)</td>
</tr>
<tr>
<td>Sex</td>
<td>Male</td>
<td>534 (3.2)</td>
<td>465 (3.0)</td>
<td>387 (2.8)</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>397 (2.5)</td>
<td>357 (2.4)</td>
<td>287 (2.2)</td>
</tr>
<tr>
<td>Survival period</td>
<td>Neonatal (&lt; 28 days)</td>
<td>533 (1.6)</td>
<td>467 (1.5)</td>
<td>345 (1.3)</td>
</tr>
<tr>
<td></td>
<td>Postneonatal (≥ 28 days)</td>
<td>398 (1.2)</td>
<td>355 (1.2)</td>
<td>329 (1.2)</td>
</tr>
<tr>
<td>Gestational age (week)</td>
<td>&lt; 28</td>
<td>339 (368.5)</td>
<td>340 (383.7)</td>
<td>240 (300.0)</td>
</tr>
<tr>
<td></td>
<td>28–31</td>
<td>98 (52.7)</td>
<td>63 (35.7)</td>
<td>65 (41.6)</td>
</tr>
<tr>
<td></td>
<td>32–36</td>
<td>136 (6.1)</td>
<td>99 (4.6)</td>
<td>87 (4.2)</td>
</tr>
<tr>
<td></td>
<td>37–41</td>
<td>357 (1.2)</td>
<td>319 (1.2)</td>
<td>281 (1.1)</td>
</tr>
<tr>
<td></td>
<td>≥ 42</td>
<td>1 (2.3)</td>
<td>1 (3.0)</td>
<td>1 (3.3)</td>
</tr>
</tbody>
</table>
nancies can also be expected [15]. Multiple births can increase the risk of developing obstetric complications such as prenatal hypertensive diseases and postpartum hemorrhage [16], which can lead to maternal death. Therefore, the management of these obstetric complications is critical, and special attention is required for women aged 40 years and over.

The Korean government’s response to counteract maternal and infant mortality is worth reviewing. The Ministry of Health and Welfare established a management system for pregnant mothers, fetuses, and infants from pregnancy to childbirth in high-risk pregnant women, which covers 15 districts across Korea, and maternal-fetal intensive care units (MFICUs) have been introduced and operated in each district since 2014 [17]. The proportion of antepartum deaths was 6.3% in 2020, reflecting a considerable improvement compared to 10.8% in 2018 and 16.7% in 2019. This is likely due to the comprehensive management of antepartum risk factors for pregnant women by the 19 MFICUs established nationwide in 2020, except for the Jeju district [17]. However, maternal deaths within 1 day of delivery accounted for 59.4% of the total maternal deaths in 2020, which indicates that there is room for improvement in postpartum complication management immediately after delivery. Specifically, the maternal death ratio caused by complications related to the puerperium, including embolism, was 4.4 in 2020, constituting a nearly two-fold increase compared to 2.2 in 2017 [4]. Maternal deaths caused by hypertensive disorders have also steadily increased. Amniotic fluid embolism mainly occurs during or immediately after delivery, and considering that high-risk pregnancies, such as those with induced labor, advanced maternal age, and preeclampsia, are risk factors for amniotic fluid embolism [18], we can presume that high-risk pregnancies are linked to high maternal death within 1 day of delivery for the last 3 years. As a gradual increase in high-risk pregnancies, including those in women with advanced maternal age, is anticipated [19], management focused on high-risk childbirth and postpartum care will be needed all the more. Further efforts are also needed to analyze maternal mortality statistics by region and to increase access to childbirth and postpartum care, especially in obstetrically underserved areas [20].

The recent increase in rates of maternal death within 15 to 42 days of delivery was found to be high. Approximately 75% of mothers in Korea use postnatal care centers (sunhoojori-won) for the first 2 weeks after giving birth [21], and afterward most mothers spend the rest of the puerperium at home. Thus, the time of returning home, 15 days after delivery, appears to be when efforts to prevent maternal death are most needed. To help mothers’ postpartum recovery and newborn care, health managers are provided to families after childbirth as part of the Maternal and Newborn Health Management Support Program implemented since 2006 [22]. Mothers during this time adjust to physiological postpartum changes and must be fully aware of danger signs and symptoms, such as postpartum hemorrhage and infections, so they can immediately go to the hospital when these symptoms appear [23]. However, the checkup rate at 6 weeks postpartum is reported as 94.3%, which is lower than the prenatal checkup rate of 100% [24]. This postpartum checkup rate was even lower for mothers younger than 30 years and those between 40 and 45 years, as well as for those with low household incomes [24]. Hence, healthcare providers should offer meticulous education to prepare mothers for discharge and emphasize the importance of postpartum checkups, especially for these mothers. Furthermore, the health managers sent to each home

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Table 4. Perinatal mortality rate by sex, survival period, and gestational age (Korea, 2018–2020)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Categories</th>
<th>n (%)</th>
<th>n (%)</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perinatal mortality (total)†</td>
<td></td>
<td>2018</td>
<td>2019</td>
<td>2020</td>
</tr>
<tr>
<td>Sex</td>
<td>Male</td>
<td>473 (2.8)</td>
<td>401 (2.6)</td>
<td>340 (2.4)</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>396 (2.5)</td>
<td>378 (2.6)</td>
<td>317 (2.4)</td>
</tr>
<tr>
<td>Survival period</td>
<td>Fetal (≥ 28 GW)</td>
<td>559 (1.7)</td>
<td>516 (1.7)</td>
<td>464 (1.7)</td>
</tr>
<tr>
<td></td>
<td>Neonatal (&lt; 7 days)</td>
<td>345 (1.1)</td>
<td>312 (1.0)</td>
<td>212 (0.8)</td>
</tr>
<tr>
<td>Gestational age (week)</td>
<td>&lt; 28</td>
<td>168 (182.6)</td>
<td>168 (189.6)</td>
<td>111 (138.8)</td>
</tr>
<tr>
<td></td>
<td>28–31</td>
<td>226 (110.8)</td>
<td>199 (102.7)</td>
<td>194 (112.3)</td>
</tr>
<tr>
<td></td>
<td>32–36</td>
<td>272 (12.0)</td>
<td>245 (11.2)</td>
<td>198 (9.6)</td>
</tr>
<tr>
<td></td>
<td>37–41</td>
<td>235 (0.8)</td>
<td>215 (0.8)</td>
<td>172 (0.7)</td>
</tr>
<tr>
<td></td>
<td>≥ 42</td>
<td>3 (6.8)</td>
<td>1 (3.0)</td>
<td>1 (3.3)</td>
</tr>
</tbody>
</table>

GW: Gestational week.
†Deaths per 1,000 live births; including cases where the sex was unknown.
The number of infant deaths gradually decreased over the 3-year period of this study, and the number of male infant deaths was 387 (57.4%). The infant mortality rate was higher in male infants (2.8) than in female infants (2.2). Since male sex has been found to be associated with an increased risk of prematurity, respiratory distress syndrome, intrauterine growth restriction, and abnormalities of the sex chromosomes [25], it may be warranted to pay closer attention to male infants in this regard. As medical services became more advanced and affordable, their accessibility has also increased [26]; with the government support system for prenatal care and universal healthcare services, the infant mortality rate in Korea (2.5) was lower than the OECD mean (4.2) [27]. According to the OECD statistics, the country with the lowest infant mortality rate among the 38 member nations was Estonia (1.4), followed by Norway (1.6); Finland and Japan (1.8); Slovenia (2.2); Czech Republic (2.3); Italy, Portugal, and Sweden (2.4); and Israel and Korea (2.5) [27]. The most frequent cause was certain conditions originating in the perinatal period (48.5%), followed in descending order by symptoms, signs, and abnormal clinical and laboratory findings, NEC (19.4%) and congenital malformations, deformations, and chromosomal abnormalities (17.1%). Conditions originating in the perinatal period, as well as congenital malformations, deformations, and chromosomal abnormalities, require pre-pregnancy and prenatal health management. However, symptoms, signs, and abnormal clinical and laboratory findings, NEC are unclear causes of death that are subcategorized into sudden infant death syndrome. As such, the incidence of mortality due to unclear causes of death appears to be increasing in Korea amid the overall decrease in infant mortality rate. Therefore, more studies are required to clarify these unclassified causes and better understand the causes of infant deaths to prepare preventive measures.

Regarding the high neonatal mortality rate within 28 days of birth, this rate has steadily decreased over 3 consecutive years and is now only slightly higher than the post-neonatal mortality rate after 28 days of birth, which was maintained at 1.2. This gradual decrease in the infant mortality rate is likely due to rapid advances in medical technology and active social investments for high-risk pregnancies and children, including advanced medical systems, a skilled medical workforce, efforts to establish and expand MFI-CUs and management support programs, and the 2015 medical aid sponsor program for high-risk pregnancies [26].

In light of the World Health Organization Multicountry Survey [28] data, which reported high neonatal deaths within 28 days of birth in mothers aged 35 years or older, along with gradual increases in Korea’s birth rate among women aged 40 to 44 years (reaching 7.1% in 2020), the management of pregnancies in women with advanced maternal age is critical. In addition, failing to provide proper care to infants born prematurely can further contribute to infant mortality. Given that Korea’s policies regarding premature infants are centered on postnatal support, and the procedures for preventing premature birth are still lacking [29], the public healthcare system infrastructure for premature infants should be developed, and medical, financial, and psychosocial support should be offered to families with premature infants.

As for perinatal mortality, the rate decreased from 2018 to 2020, which echoes the results reported by Lee et al. [4], according to which perinatal mortality gradually improved between 2009 and 2017. The perinatal mortality rate between 2018 and 2020 decreased among infants born at 42 gestational weeks or later, which is consistent with a report that the risk of fetal death decreases as the gestational age increases [30]. This result is likely due to improvements in prenatal survival at advanced gestational age and related postnatal survival [31], and it underscores the importance of supportive policies aimed at prolonging pregnancy to reduce fetal death.

In this study, the highest mortality rate was observed at less than 28 gestational weeks, while the greatest decrease in mortality rate was found at 42 gestational weeks or later. This is likely to have resulted from efforts to reduce the mortality rate for infants at gestational ages and birthweights with a high probability of survival [32] through prenatal care involving diagnostic tests at the initial and third-trimester prenatal checkups [33]. Therefore, in order to facilitate continued reductions in the perinatal mortality rate, policy efforts such as strengthening monitoring, expanding the scope of medical information systems, and intervening in medical services are required [34].

The finding of a higher perinatal mortality rate in male infants coincides with the results of the study by Lee et al. [4]. Likewise, Woldeamanuel and Gelebo [35] reported a higher perinatal mortality rate in male infants in Ethiopia, and perinatal death or major morbidity was more noticeable in male infants in general [27]. More studies are required to understand differences in the perinatal mortality rate according to biological differences [27]. Determining the factors that are significantly associated with the perinatal mortality rate through repeated analyses and concentrated efforts to reduce perinatal mortality will be needed in the future.

In our study, the fetal mortality rate at the 28th gestational week or later was higher than the neonatal mortality rate within 7 days of birth. Preterm delivery is the major cause of infant mor-
tality rate [31]. A study on the perinatal mortality rate between 2015 and 2018 suggested that the correlation of perinatal mortality with chronic hypertension was mostly mediated through preterm births and that preventing preterm births caused by chronic hypertension could eliminate 87% of perinatal deaths [36]. Therefore, efforts are required to diagnose and treat various underlying diseases in addition to chronic hypertension and follow up on diseases mediated by preterm birth to prevent them.

This study followed a prior analysis comparing population data on mortality between 2009 and 2017 [4] and updated the statistics on maternal death, infant death, and perinatal mortality from 2018 to 2020. We found that advanced maternal age (40 years or older) was a crucial influencing factor for maternal, infant, and perinatal deaths [29], which echoes the results of the previous study by Lee et al. [4]. Hence, comprehensive management of high-risk pregnancy-related diseases, the complications of multiple pregnancies, preterm births, stillbirths, and premature babies will be required. Active maternal and child public health policies, such as implementing maternal and newborn health management support programs, establishing MFICUs and premature baby support programs, and continuing advances in medical technology, have enabled the active management of high-risk pregnant mothers and infants in Korea. However, the management of postpartum complications is still lacking and requires intensive supervision. Furthermore, more studies are necessary to understand the biological differences according to sex, which manifested as disparities in male infant and perinatal deaths. Endeavors are also needed to prevent infant deaths through follow-up investigations and management of infant deaths with “unclear causes,” which are increasing despite the overall decrease in infant deaths.

Supplementary materials

Further details on supplementary materials are presented online (available at https://doi.org/10.4069/kjwhn.2022.12.23).

Authors’ contributions

Conceptualization: Choi H, Jang H, Nho JH; Formal analysis: Yi N, Park S, Kang B; Writing–original draft: Choi H, Jang H, Nho JH, Park S; Writing–review & editing: Choi H, Jang H, Nho JH.

Conflict of interest

Ju-Hee Nho has been the associate editor of the Korean Journal of Women Health Nursing since 2021, and Hyunkyung Choi has been an editorial board member of the Korean Journal of Women Health Nursing since January 2022. They were not involved in the review process of this manuscript. Otherwise, there is no conflict of interest to declare.

Funding

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Data availability

Please contact the corresponding author for data availability.

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None.

References


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https://doi.org/10.4069/kjwhn.2022.12.23


26. Kim EJ, Park HJ. Expansion of health insurance coverage for prenatal care and its association with low birth weight and


Addendum: Clinical trial registration number for interventional health studies

This addendum was issued to note clinical trial registration numbers for the following publications. In line with strengthening journal guidelines on adhering to the ICMJE guidelines on specifying clinical trial registration for interventional studies, the following manuscripts declare their clinical trial registration numbers. Prospective registration was not mandated by the funding agencies at start of the study and thus, retrospective registration was done by the author(s).


→ KCT0008015


→ KCT0008010

The clinical trial registration number has also been updated to the manuscript PDF and online access.

*Korean Journal of Women Health Nursing* strongly recommends prospective registration of interventional health studies.
Special Issue – Call for Papers

Digital Era Education for Women’s Health and Well-being
To be published in September 2023

Aims and scope

The COVID-19 pandemic induced changes that have potentiated digital transformation on multiple levels world-wide. Although the pandemic initially created gaps in educational support for women with health issues, adapting digital technology made new teaching modalities and supportive interventions possible. Meanwhile, in clinical practicum, stricter infectious disease management protocols and privacy concerns have doubled the challenge of preparing nursing students to adequately assess and meet the needs of women. In this context, digital technologies can offer teaching solutions that can reach women more effectively and support their health and well-being, as well as prepare nursing students to learn more effectively about women’s health nursing.

The thematic scope of this special issue includes scientific issues related to the design and implementation or to the utility and usability of novel digital solutions, tools, and/or systems, provided that they contribute to women's health.

Main topics

This special issue will focus on the design, development, evaluation, and use of digital solutions that support the health and well-being of women through education. Contributions should demonstrate how digital transformation based solutions support nurse clinicians and/or educators in enhancing women’s health.

Contributions are solicited on, but not limited to, the following topics:

- Design and implementation of digital solutions to improve reaching and teaching women to manage and promote their health and well-being.
- Design and implementation of novel tools to help nurse clinicians and/or educators adapt teaching modalities for women, nurses, and/or nursing students, to the changing needs of the digital era.
- Topics include, but are not limited to, digital transformation, artificial intelligence, mixed reality (MR) modalities, etc., applied to educational support for women's health issues.
- Various manuscript types are welcome in either English or Korean: Systematic reviews, scoping reviews, methodology papers, concept papers, experimental research, qualitative research, action research, etc.

Important dates

Deadline for submission of papers has been extended to 31st Mar 2023.
Notification of acceptance: 15th Jun 2023
Deadline for submission of final version of accepted papers: 15th Aug 2023

Submission guidelines

Submissions should be prepared according to the author instructions available at the journal homepage, https://www.kjwhn.org/authors/authors.php. Typical length of a manuscript is 14–15 pages.
Instructions to Authors

Korean Journal of Women Health Nursing
Enacted in March 1995 and most recently revised in November 2022 and applied from Vol 28, No 4 (December 2022)

1. General Guidelines for Manuscript

The Korean Journal of Women Health Nursing is focused on women's healthy life processes or on conditions relevant to women due to greater risk or prevalence among women. It features original articles and review papers. Manuscripts for submission should be prepared according to the following instructions. The Journal follows the Uniform Requirements for Manuscripts Submitted to Biomedical Journals: Writing and Editing for Biomedical Publication (http://www.icmje.org) if not otherwise described below.

1-1. QUALIFICATION FOR AUTHORS AND LANGUAGE
Nurses or researchers throughout the world can submit a manuscript if the scope is appropriate for Korean Journal of Women Health Nursing. Manuscripts should be submitted in English or in Korean. Medical or nursing terminology should be written based on the most recent edition of Dorland’s Illustrated Medical Dictionary, the most recent edition of English-Korean English Medical Terminology (https://term.kma.org/search/list.asp) published by the Korean Medical Association or the most recent edition of Standard Nursing Terminology published by the Korean Society of Nursing Science. Authors are required to state their affiliation and related status (job titles) upon submission, to support the reliability of the research.

1-2. RESEARCH AND PUBLICATION ETHICS
For the policies on research and publication ethics that are not stated in these instructions, the Good Publication Practice Guidelines for Medical Journals (https://www.kamje.or.kr/board/view?b_name=bo_publication&bo_id=13&per_page=1) or the Guidelines on Good Publication Practice (https://publicationethics.org/guidance/Guidelines) can be applied.

Conflict-of-interests statement: Authors are required to disclose commercial or similar relationships to products or companies mentioned in or related to the subject matter of the article being submitted. Sources of funding for the article should be acknowledged in a footnote on the title page. Affiliations of authors should include corporate appointments relating to or in connection with products or companies mentioned in the article, or otherwise bearing on the subject matter thereof. Other pertinent financial relationships, such as consultancies, stock ownership or other equity interests, or patent-licensing arrangements should be disclosed to the Editor-in-Chief in the cover letter at the time of submission. Such relationships may be disclosed in the Journal at the discretion of the Editor-in-Chief in footnotes appearing on the title page. Questions about this policy should be directed to the Editor-in-Chief. If there is no conflict of interest, this should also be explicitly stated as “The author(s) declared no conflicts of interest.”

Statement 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/). Clinical studies that do not meet the Declaration of Helsinki will not be considered for publication. Research participants’ rights to privacy must be protected, and personal identifiable information should not be disclosed unless absolutely necessary. Human subjects should not be identifiable, i.e., patients’ names, initials, hospital numbers, dates of birth, photographs, or other protected healthcare information should not be disclosed. If such personal information is needed as scientific data for publication, this should be explained to participants (or legal guardians) and written consent must be obtained. The possibility of online information sharing (not only printed publications) must also be explained. For animal subjects, research should be performed based on the National or Institutional Guide for the Care and Use of Laboratory Animals, and the ethical treatment of all experimental animals should be maintained. For studies using literature review and meta-analysis, Institutional Review Board (IRB) approval is not required. For secondary data analysis studies, the editorial committee will decide whether IRB approval is needed.

Statement of informed consent: Copies of written informed consents 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.
**Authorship:** All authors, including the co-authors, should be responsible for a significant part of the manuscript. All authors and co-authors should have taken part in writing the manuscript, reviewing it, and revising its intellectual and technical content. Any author whose name appears on a paper assumes responsibility and accountability for the results.

**Originality and duplicate publication:** All submitted manuscripts should be original and should not be considered by other scientific journals for publication at the same time. Manuscripts are accepted for publication with the understanding that their contents, or their essential substance, have not been published elsewhere, except in abstract form or by the express consent of the Editors. Any part of the accepted manuscript should not be duplicated in any other scientific journal without the permission of the Editorial Board. The duplication will be checked through Similarity-Check powered by iThenticate (https://www.crossref.org/services/similarity-check/) before review. If duplicate publication related to the papers of this journal is detected, the authors will be announced in the journal and their institutes will be informed, and there also will be penalties for the authors. Materials taken from other sources must be accompanied by written permissions for reproduction, obtained from the original publisher. Editors should follow the procedure set out in the Committee on Publication Ethics (COPE) flowcharts (https://publicationethics.org/resources/flowcharts-new/translations) that are designed to help editors follow COPE’s Code of Conduct and implement its advice when faced with cases of suspected misconduct.

**Secondary publication:** It is possible to republish manuscripts if the manuscripts satisfy the condition of secondary publication of the Uniform Requirements for Manuscripts Submitted to Biomedical Journals (http://www.icmje.org).

**Publication of master’s thesis or doctoral dissertation:** When thesis or dissertation work is submitted for publication, the first author should be the thesis awardee and should declare that content is from thesis/dissertation.

1-3. TRIAL REGISTRATION & DATA SHARING

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 (ICMJE)” (https://doi.org/10.3346/jkms.2017.32.7.1051). As of July 1, 2018 manuscripts submitted to ICMJE journals that report the results of interventional clinical trials must contain a data sharing statement as described below. Clinical trials that begin enrolling participants on or after January 1, 2019 must include a data sharing plan in the trial’s registration. The ICMJE’s policy regarding trial registration is explained at http://www.icmje.org/about-icmje/faqs/clinical-trials-registration/. Authors of interventional clinical trials are expected to submit the registration number (e.g., CRIS registration number, https://cris.nih.gov.kr/) at submission. If the data sharing plan changes after registration this should be reflected in the statement submitted and published with the manuscript, and updated in the registry record. All of the authors of research articles that deal with interventional clinical trials must submit data sharing plan of example 1 to 4 in Table 1. Based on the degree of sharing plan, authors should deposit their data after de-identification and report the digital object identifier (DOI) of the data and the registered site.

1-4. PEER REVIEW PROCESS

All contributions (including solicited articles) are critically reviewed by the editorial board members, and/or reviewers. If the manuscript does not fit the aims and scope of the Journal or does not adhere to the Instructions to Authors, it may be returned to the author immediately after receipt and without a review. Before reviewing, all submitted manuscripts are inspected by Similarity-Check powered by iThenticate (https://www.crossref.org/services/similarity-check/), a plagiarism-screening tool. Reviewers’ comments are usually returned to authors. The decision of the editor is final. Manuscripts are sent simultaneously to two reviewers for double blinded peer review. A third reviewer will be assigned if there is discrepancy. Authors will receive notification of the publication decision, along with copies of the reviews and instruction for revision, if appropriate, within two months after receipt of the submission.

Final revised manuscript: A final version of the accepted manuscript should be submitted on the web. If aspects of the research are reported elsewhere, include a copy of the publication(s). Include all main manuscript material in one file (with exception of title page). Save your file as MS Word. Failure to resubmit the revised manuscript within two weeks of the editorial decision is regarded as a withdrawal and will be treated as a new submission if submitted again later.

**Peer review process for handling submissions from editors, employees, or members of the editorial board:** All manuscripts from editors, employees, or members of the editorial board are processed same to other unsolicited manuscripts. During the review process, submitters will not engage in the selection of reviewers and decision process. Editors will not handle their own manuscripts if they are commissioned ones.
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The author will also be asked to confirm that the material has not been published or submitted for publication elsewhere. All material published in the Journal will be copyrighted by Korean Society of Women Health Nursing. This is an Open Access journal distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0/) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

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• The full title of the article.
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• A running title of no more than 45 characters (including spaces).
• A structured abstract of no more than 250 words, stating purpose, methods, results (including the sample size), and conclusion drawn from the study.
• Up to five keywords (MeSH terms, in alphabetical order).

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Upon acceptance, an article processing charge (APC) of 600 USD (approximately 600,000 Korean Won) per article is requested to publish.
the corresponding author. Further information can be found at https://kjwhn.org/authors/processing_charge.php.

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Any inquiries regarding suitability of manuscripts according to the aims and scope of the Journal, submission, review, publication, or journal-related issues are welcomed. Please contact the Editorial Office (kjwhn@kjwhn.org).

For manuscript submission, please visit: http://submit-kjwhn.org

2. Publication Type and Manuscript Preparation

2-1. WRITING MANUSCRIPTS
All manuscripts must be prepared in accordance with the “Uniform Requirements for Manuscripts Submitted to Biomedical Journals” available at http://www.icmje.org. Manuscripts are accepted for publication with the understanding that their contents, or their essential substance, have not been published elsewhere, except in abstract form or by the express consent of the Editors. Materials taken from other sources must be accompanied by written permissions for reproduction, obtained from the original publisher. Statistical methods should be identified. Priority claims are discouraged. All materials must be written in clear, appropriate English using Microsoft Word (doc or docx). Each page must be numbered at the lower central portion. Number pages consecutively.

2-2. TITLE PAGE
On the title page include title (only capitalize first letter of the first word); subtitle (if any); running title, first name, middle initial, and last names of each author, ORCID number (required for all authors), name of department(s) and institution(s) to which the work should be attributed. The address, phone number, and email of the person responsible for correspondence concerning the manuscripts should be listed separately and clearly labeled as such. List keywords and present authors’ contributions. The journal does not limit first author status to only one person, in cases where equal contribution is evident. Describe contributions, such as the following:

Example 1:
Conceptualization: Piao H, Kim MH; Formal analysis: Piao H, Kim MH, Cui M, Choi G; Writing–original draft: Piao H, Kim MH; Writing–review & editing: Piao H, Choy JH.

Example 2: All work was done by Jeong GH.

Also, describe conflicts of interest, funding, data availability, and acknowledgements (acknowledge only those people and their institutions that have made significant contributions to the study). If applicable, state disclaimers, such as whether manuscript was adapted from thesis/dissertation.

The title page must be submitted separately from the manuscript. A template is available online (https://www.kjwhn.org/authors/authors.php).

2-3. MAIN MANUSCRIPT
Organize the main manuscript in the following order; title, abstract and keywords, summary statement, text, references, tables, figures, and pictures.

Original articles

Abstract and Keywords
An abstract of no more than 250 words should be typed double-spaced on a separate page. It should cover the main factual points, according to the following subheadings: Purpose, Methods, Results, and Conclusion. The abstract should be accompanied by a list of up to five keywords for indexing purposes. Be very specific in your word choice. Use MeSH keywords (https://meshb.nlm.nih.gov/); present keywords in alphabetical order.

Summary Statement
Following the abstract, describe a summary statement on a separate page according to the following subheadings, with 30 words or less under each subtitle.

• What is already known about this topic?
  Example: The 75 years and older age group, with its complex health needs, is likely to make up an increasing proportion of the workload of accident and emergency strain the coming years.

• What this paper adds
Example: An alcohol-based surgical hand rub is more effective than a 6-minute surgical hand scrub using 4% chlorhexidine gluconate in terms of microbial counts immediately after scrubbing.

• Implications for practice, education and/or policy

Example: Parents’ ability and willingness to participate in their child’s care in the hospital should be thoroughly assessed and their participation needs to be supported.

Main Text

Maximum word count should be within 5,000 words, although less is preferred, excluding tables, figures, and references. The manuscript should be written on A4 sized paper, in Times New Roman 12-point font, double-spaced and have margins of at least one inch (2.54 cm). In general, the text should be organized under the following headings: Introduction, Methods, Results, and Discussion.

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

Methods: Present an “Ethics statement” immediately after the heading “Methods” in a boxed format.

Example 1:

Ethics statement: This study was approved by the Institutional Review Board of XXXX University (IRB-201903-0002-01). Informed consent was obtained from the participants.

Example 2:

Ethics statement: Obtaining informed consent was exempted by the Institutional Review Board (IRB) of YYYY University (IRB-201903-0002-01) because there was no sensitive information and the survey was anonymously treated.

Describe the study design, setting and samples, and measurements, procedure, analysis used. Authors are encouraged to describe the study according to the reporting guidelines relevant to their specific research design, such as those outlined by the EQUATOR Network (http://www.equator-network.org/home/) and the United States National Institutes of Health/National Library of Medicine (http://www.nlm.nih.gov/services/research_report_guide.html).

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., ovarian cancer). Authors should define how they determined race or ethnicity and justify their relevance.

Results: Describe the main results in a concise paragraph. This section should be the most descriptive. Note levels of statistical significance and confidence intervals where appropriate.

Discussion: Make discussions based only on the reported results. Describe conclusions and recommendations for further study needed. Do not summarize the study results.

Abbreviations: Use standard abbreviations and units recommended in the publication manual of the to the NLM Style Guide for Authors, Editors, and Publishers (2007), 2nd ed., National Library of Medicine, Bethesda, MD, USA (http://www.nlm.nih.gov/citingmedicine). Non-standard abbreviations should be defined the first time they appear in the text. At first usage, spell out terms and give abbreviations in parentheses. Thereafter, use only abbreviations. It is not necessary to spell out standard units of measure, even at first usage.

Review article

An invited review will be published on an interesting or a new topic. Also submitted reviews are welcomed on any field according to the aims and scope, including systematic review and meta-analysis, scoping reviews, and integrative reviews. The main text is composed of introduction, methods, results, and discussion. There is no limit to the total number of references for a review article. The word count for the main text should be within 8,000 words.

Invited paper

It is a commissioned article for specific purpose only with request base. The topics were discussed between editors and authors before submission. The main text is composed of 3 sections: introduction, text, and conclusion. The total number of references article is recommended to be equal to or less than 30. The word count for the main text should be within 8,000. An abstract is optional and is limited to 250 words.

Issues and perspectives

Issues and Perspectives is usually an invited short article, which deals with the present hot issues in women’s health nursing, al-
though not limited to this field. Authors of general interest to nursing and health care are also invited. Its format consists of introduction, main content, and conclusion. Length of the main text is limited to 2,000 words and keywords are limited to 5, preferably in MeSH terms. Number of references is limited to 20 and figures and tables are limited to 10 in total.

Special essay
It is a commissioned publication type for the presentation of experiences in nursing or health field. Authors are invited by the editor-in-chief. Topics are discussed upon request. There is no specific format.

Editorials
An editorial is usually invited by the Editorial Board. It provides the brief review and comments on pressing developments and events in the field of women's health nursing. It also may deal with a change in the journal’s style and format and communication with an outside organization or professional. Other various topics shall be dealt by the Editorial Board as deemed appropriate. Divisions in the body of an editorial are not required. The total number of references is recommended to be equal to or less than 10. The word count of the main text should be less than 2,500 words.

Letter to the editor
Any opinion or inquiry on a paper published can be addressed to the editor. Title, author, affiliation, main text and the references are the required sections. The total number of references is recommended to be less than 10. The word count of main text should be equal to or less than 1,000 words.

In reply
As the reply to “Letter to the editor” its format is same to the “Letter to the editorial” and will be published simultaneously.

2-4. References
In the text, references should be cited with Arabic numerals in brackets (e.g. [1]), numbered in the order cited.

In the references section, the references should be numbered in order of appearance in the text and listed in English citation form.
Journal titles should be described in NLM style.
References within the past 5 years are encouraged, and un-published PhD or master’s thesis are not recommended as reference.
Other types of references not described below should follow the NLM Style Guide for Authors, Editors, and Publishers (http://www.nlm.nih.gov/citingmedicine). There are no limits to the number of references. However, limit supporting citations in text to 1-2 per statement. Note the DOI in URL form, if available.

Journal article with up to six authors:

Journal article with more than six authors:

Book:

Book Chapter:
Meltzer PS, Kallioniemi A, Trent JM. Chromosome alterations in

Table 2. Recommended maximums for articles submitted to the Korean Journal of Women Health Nursing

<table>
<thead>
<tr>
<th>Publication type</th>
<th>Abstract (word count)</th>
<th>Text (word count)</th>
<th>References</th>
<th>Tables &amp; figures</th>
<th>Invited or unsolicited</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original articles</td>
<td>250</td>
<td>5,000</td>
<td>No limit</td>
<td>6</td>
<td>Unsolicited</td>
</tr>
<tr>
<td>Review articles</td>
<td>250</td>
<td>8,000</td>
<td>No limit</td>
<td>6</td>
<td>Invited or unsolicited</td>
</tr>
<tr>
<td>Invited papers</td>
<td>Optional (250)</td>
<td>8,000</td>
<td>30</td>
<td>10</td>
<td>Invited</td>
</tr>
<tr>
<td>Issues and Perspectives</td>
<td>None</td>
<td>2,000</td>
<td>20</td>
<td>10</td>
<td>Invited</td>
</tr>
<tr>
<td>Special essays</td>
<td>None</td>
<td>3,000</td>
<td>10</td>
<td>3</td>
<td>Unsolicited</td>
</tr>
<tr>
<td>Editorials</td>
<td>None</td>
<td>2,500</td>
<td>5</td>
<td>3</td>
<td>Invited</td>
</tr>
<tr>
<td>Letter to the editor</td>
<td>None</td>
<td>1,000</td>
<td>3</td>
<td>3</td>
<td>Invited</td>
</tr>
<tr>
<td>In reply</td>
<td>None</td>
<td>1,000</td>
<td>3</td>
<td>3</td>
<td>Invited</td>
</tr>
</tbody>
</table>

*Maximum number of words excludes the abstract, references, tables, and figure legends

*Above limitations are negotiable. If more word count or number of figures and tables are required, authors can contact the editor-in-chief.

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Unpublished thesis or dissertation:

Web reference:

2-5. Tables/Figures/Pictures
Each table, figure, and picture should be placed on a separate sheet. Number tables consecutively and supply a brief title at the top for each. Footnotes to tables should be indicated by superscript symbols (†, ‡, §, ¶, ††, ‡‡…) unless abbreviations are explained in which case superscripts are not required. All abbreviations used should be described in table footnote by writing the abbreviation followed by colon sign and definition, placed in alphabetical order.

Tables and figures are printed only when they express more than can be done by words in the same amount of space.
Do NOT indicate placement of tables of figures in the text. The editor will automatically place your tables and figures.

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The policy of Korean Journal of Women Health Nursing is primarily aimed at protecting the authors, reviewers, editors, and the publisher of the journal. If not described below, the process of handling complaints and appeals follows the COPE guidelines available from: https://publicationethics.org/appeals

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What may be the consequence of the remedy?
It depends on the type or degree of misconduct. The consequence of resolution will follow the guidelines of COPE.

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Copies of written informed consents 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.

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All authors, including the co-authors, should be responsible for a significant part of the manuscript. All authors and co-authors should have taken part in writing the manuscript, reviewing it, and revising its intellectual and technical content. Any author whose name appears on a paper assumes responsibility and accountability for the results.

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Title page
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☐ A4, 12 point font Times New Roman in MS Word file
☐ Line space: Double spacing / Margins of at least 1 inch (2.5 cm)
☐ Within 5,000 words (excluding figures, tables, references)
☐ Author information is removed

Abstract
☐ 250 words or less (240-250 words are suggested)
☐ Subheadings of Purpose, Methods, Results, and Conclusion

Summary Statement
☐ 30 words or less under each subtitle

Main Text
☐ Subheadings of Introduction, Methods, Results, and Discussion
☐ Permission to use instruments should have been obtained
☐ Specify Ethics statement under Methods subheading. Avoid redundant descriptions in the text

References
☐ References follow NLM style
☐ Limit supporting references to 1-2 per statement

Table, figure, and picture
☐ No more than 6 figures, tables, and pictures altogether
☐ According to Instructions to Authors
☐ Abbreviations are noted under the table, in alphabetical order, and are congruent with text descriptions
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