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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Publisher

Ahn, Sukhee, RN, PhD

Editor-in-Chief

Kim, Sue, RN, PhD

Editorial office

College of Nursing, Yonsei University, 50-1 Yonsei-ro, Seodaemun-gu, Seoul 03722, Korea
Tel: +82-2-2228-3276 Fax: +82-2-2227-8303 E-mail: kjwhn@kjwhn.org

Office of the Korean Society of Women Health Nursing

College of Nursing, Chungnam National University, 266 Munhwa-ro, Jung-gu, Daejeon 35015, Korea
Tel: +82-42-580-8124 Fax: +82-42-580-8309 E-mail: sukhnea@cnu.ac.kr

Printing office

M2PI
#905, 26 Sangwon 1-gil, Seongdong-gu, Seoul 04779, Korea
Tel: +82-2-4966-4930 Fax: +82-2-4966-4945 E-mail: support@m2-pi.com

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Corrigendum

146  English  Corrigendum: Effect of pectoralis major myofascial release massage for breastfeeding mothers on breast pain, engorgement, and newborns' breast milk intake and sleeping patterns in Korea: a randomized controlled trial
Update on the fourth version of the Principles of Transparency and Best Practice in Scholarly Publishing: relevance for the *Korean Journal of Women Health Nursing*

Ju-Hee Nho

College of Nursing, Research Institute of Nursing Science, Jeonbuk National University, Jeonju, Korea

Journals are published in accordance with submission guidelines, which adhere to publication ethics and policies. These policies are crucial in the expanding online publishing market, as they protect readers and authors from predatory practices, including slander, and ensure transparent disclosure of who publishes which materials and how [1]. Four organizations—the Committee on Publication Ethics (COPE), the Directory of Open Access Journals (DOAJ), the Open Access Scholarly Publishers Association (OASPA), and the World Association of Medical Editors (WAME)—jointly announced the Principles of Transparency and Best Practice in Scholarly Publishing. The first version was released in December 2013, and the fourth version was announced in September 2022 [2]. These principles serve as the primary evaluation criteria for significant databases such as Scopus, and publishers or journals that fail to meet these criteria are not included in their listings. The *Korean Journal of Women Health Nursing* (KJWHN) is indexed in SCOPUS, PubMed, and the Emerging Sources Citation Index (ESCI) in compliance with the relevant standards. As part of our efforts to be listed in MEDLINE and the Science Citation Index (SCI), we are committed to ensuring the transparency of our journal by adhering to the fourth version of these standards.

The introduction to Principles of Transparency and Best Practice in Scholarly Publishing states that publishers and editors are responsible for promoting accessibility, diversity, equity, and inclusivity in all aspects of publishing [2]. This is encouraged by publishing associations, publishers, academic societies, and various publication-related organizations. COPE ensures that there is no discrimination based on gender, race, or region in the research process and academic publication field, and that prejudice is eliminated in the review process [3]. Wiley also advocates for diversity, equity, and inclusivity among the editorial team, reviewers, and authors in its publishing policies [4]. KJWHN is committed to reviewing and publishing without discrimination or prejudice. Furthermore, to ensure the diversity of authors, editors, and reviewers, we have authors from various countries and editors and reviewers from the United States, Japan, Singapore, Israel, Hong Kong, and Switzerland [5].

The fourth version of the Principles of Transparency and Best Practice in Scholarly Publishing outlines 16 items pertaining to journal content, journal practices, organization, and business practices (*Table 1*). Each item will be discussed in detail, with a description of how KJWHN adheres to the item [2].

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http://kjwhn.org
1. Name of journal

The journal’s name should be original, and it should not cause authors and readers to misunderstand the journal’s publisher or its relationship to other journals.

2. Websites

As website use has become more frequent, the contents of the guidelines regarding websites are more detailed in the fourth version of the Principles of Transparency and Best Practice in Scholarly Publishing than in the 3rd version released in 2018. Firstly, it was emphasized that website security must be strengthened to safeguard users from computer viruses and malicious software. To achieve this, it was declared that websites should, at a minimum, utilize “https” protocol instead of “http.” Moreover, it was asserted that websites ought to adhere to web standards and uphold the best ethical practices in content, presentation, and application. Additionally, it is essential to verify whether any information could mislead readers or authors, and to refrain from copying the website, design, or logo of other academic journals/publishers. In instances of copying, the original site must be disclosed [2]. KJWHN employs https protocol (https://kjwhn.org) and is diligently working to bolster security [5].

3. Publishing schedule

Adherence to the journal’s publication schedule is required except under exceptional circumstances [2]. KJWHN is published quarterly on the last day of every March, June, September, and December.

4. Archiving

Journals and publishers should maintain electronic backups of journals and implement long-term digital preservation plans in case publication ceases [2]. KJWHN can be accessed without barriers through Synapse (https://synapse.koreamed.org/LinkX.php?code=2102KJWHN) and the Korea Citation Index (https://kci.go.kr) and is archived in the National Library of Korea (http://nl.go.kr) [5].

5. Copyright

Publication copyright policies must be clearly stated on the journal’s website, and it is important to differentiate between the copyright terms of the content and the copyright of the website itself [2]. KJWHN is copyrighted by the Korean Society of Women Health Nursing, as indicated on the website and in all published articles [5].

6. Licensing

The website must clearly explain license information, and if Creative Commons licenses are utilized, the license terms should also be linked to the appropriate site. A licensing policy for publishing manuscripts in third-party repositories should be in place. For instance, Wiley provides an article-sharing guideline, which offers recommendations for sharing articles on personal websites, blogs, and social media [2]. KJWHN uses Creative Commons Attribution License (https://creativecommons.org/licenses/by/4.0/) and displays it on the website [5].

7. Publication ethics and related editorial policies

Publication ethics encompasses the ethical guidelines that authors must adhere to and the policies required for publishing. These areas include authorship and contributorship policies, handling complaints and appeals, addressing allegations of research misconduct, managing conflicts of interest, ensuring data sharing and reproducibility, providing ethical oversight, respect-
ing intellectual property, facilitating post-publication discussions, and implementing corrections and retractions [2]. Among these, the fourth version of the Principles of Transparency and Best Practice in Scholarly Publishing particularly emphasizes handling allegations of research misconduct and policies on corrections and retractions. Addressing allegations of research misconduct involves managing whistleblowers and cases where fraudulent activities are discovered before or after publication. With regard to corrections and retractions, it is essential to establish a policy for addressing errors or ethical issues identified in the paper after publication.

In instances where errors are identified in early access data prior to official publication, they are promptly corrected online and documented. Following publication, any corrections are published as a separate paper and linked to the original paper [1]. KJWHN has made its publication ethics and related editorial policies available on its website [5].

8. Peer review

In the fourth version of the Principles of Transparency and Best Practice in Scholarly Publishing, compared to the 3rd version, the detailed description of the peer review process has been strengthened. The information that should be provided on the website regarding peer review includes the following: whether or not the submitted manuscript undergoes peer review, who is responsible for conducting the peer review, all policies related to the review process, the final decision-making process for the manuscript and the individuals involved, and any exceptional cases of expert review. To ensure adherence to the review timeline, the submission and acceptance dates must be indicated on the paper approved for publication. If the review process is delayed, the author should be informed of the reason and given the option to withdraw the manuscript if they so choose [2]. KJWHN adheres to relevant standards, including website posting, for its peer review policy [5].

9. Access

If online content is not freely accessible to everyone, such as subscription-based or paid papers, the method of access must be clearly explained, and the subscription fee must be specified if a print copy is available [2]. KJWHN can be freely accessed at https://kjwhn.org [5].

10. Ownership and management

Ownership and management information must be disclosed on the website [2], and KJWHN adheres to this standard [5].

11. Advisory body; 12. Editorial team/contact information

Journals must have an editorial board or advisory board consisting of experts in the relevant subject area, and the names and affiliations of these members must be regularly reviewed and updated [2]. KJWHN features an editorial board composed of specialists in women’s health and nursing, and the information regarding its members is consistently updated and made available [5].

13. Author fee

Publication fees should be indicated, and information regarding waivers should be provided if an author fee waiver is available [2]. KJWHN’s author processing fee is 600 US dollars (approximately 600,000 Korean won), which is requested from the corresponding author upon manuscript acceptance [5].

14. Other revenue

If there is a business model or source of revenue (e.g., author fees, subscriptions, advertising), it should be stated on the website [2]. KJWHN is financially supported by a grant from the Korean Federation of Science and Technology Societies, which is funded by the Korean government (Ministry of Science and ICT), the Korean Society of Women Health Nursing, and the authors’ article processing charges [5].

15. Advertising

Journals must specify whether or not they publish advertisements [2]. Currently, KJWHN does not feature advertisements for products or services [5].

16. Direct marketing

All marketing activities carried out on behalf of journals, including manuscript submissions, must be accurate and appropriate [2]. Invitations to submit a manuscript for KJWHN are typically extended to presenters at conferences, seminars, or workshops if
the topic aligns with the journal’s aims and scope [5].

As previously noted, KJWHN is committed to adhering to the Principles of Transparency and Best Practices in Scholarly Publishing standards, and continuously strives to improve in accordance with the updated principles. In addition, KJWHN will continue to comply with relevant standards to guarantee transparency in journal publication and will diligently continue to communicate with our readers and potential authors.

**ORCID**

Ju-Hee Nho, https://orcid.org/0000-0002-5260-5605

**Authors' contributions**

All work was done by Nho JH.

**Conflict of interest**

Ju-Hee Nho has been an associate editor of the *Korean Journal of Women Health Nursing* since January 2021. She was not involved in the review process of this editorial. Otherwise, there was no conflict of interest.

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Please contact the corresponding author for data availability.

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**References**


Key findings on women’s reproductive health: the Korea Nurses’ Health Study

Chiyoung Cha¹, Heeja Jung²

¹College of Nursing, Ewha Womans University, Seoul, Korea
²College of Nursing, Konyang University, Daejeon, Korea

Introduction

The Korea Nurses’ Health Study (KNHS; http://www.nhskorea.kr) is a large-scale prospective cohort study currently being conducted among female nurses in Korea. The study is based on the protocol and content of the United States Nurses’ Health Study 3 (US NHS3), adapted to account for Korea’s cultural and hospital organizational characteristics [1,2]. The purpose of the KNHS is to examine the effects of environmental, occupational, and lifestyle risk factors on the health of women of reproductive age [1]. Nurses were chosen as participants for the KNHS because their advanced understanding of disease helps ensure the validity of responses, and their commitment to study participation can help improve the follow-up rate, both of which are crucial factors in cohort studies.

The participants of KNHS are female nurses of reproductive age, ranging from 20 to 45 years old at the time of baseline data collection (the first survey). A total of 20,613 nurses from hospitals across Korea participated in the initial survey. Subsequent follow-up surveys have been conducted regularly to examine factors affecting women’s health and to track their progression into middle age. The first wave of the KNHS took place between 2013 and 2015, the second wave between 2016 and 2018, and the third wave between 2019 and 2021. The fourth wave began in 2022 and is currently in its second year. Starting with the fourth wave, the participant pool has been expanded to include nurses in their 20s. An online survey system was developed to administer the KNHS. Whenever a new survey is created, participants in the baseline data collection process are sent a text message encouraging them to participate in the follow-up surveys. The nurses voluntarily participate by using a link to the questionnaire homepage provided in the text message.

The main variables included in the first wave of the KNHS were demographics, weight, height, health behaviors, illness, medication, family history, pregnancy, mood, employment, occupational exposure, and subjective perception of current health. Follow-up surveys introduced additional variables alongside the content from the first wave. To date, a total of 11 surveys have been developed and completed as part of the KNHS, and a 12th survey is currently under development. Moreover, since 2014, pregnant nurses have had the opportunity to answer separate survey questions focusing on early pregnancy and post-pregnancy [1].

In 2016, during the first year of the second wave, 2,000 nurses who had participated in the baseline survey underwent anthropometric measurements (e.g., waist circumference), had their blood
pressure evaluated, and provided blood samples and toenail clippings, which were analyzed in conjunction with the questionnaire data [3]. Additionally, for 500 of these 2,000 participants, serum anti-Müllerian hormone (AMH) levels were measured from blood samples to investigate ovarian function [4].

Key findings on women’s reproductive health

Over 30 papers have been published using KNHS data in the fields of women’s health, physical and psychological health, health behaviors (including eating habits), and the nursing workforce. To date, eight of these papers have specifically addressed issues related to women’s health. Upon analysis of the data collected from the KNHS, the prevalence of diseases such as breast and gynecological cancers was found to be quite low. This is likely because the KNHS initially targeted relatively young women of reproductive age. In addition to gynecological cancer, several other problems related to women’s health have been identified within the KNHS, including issues pertaining to menstruation, hormone levels, postpartum health, and uterine leiomyoma.

Issues related to menstruation included the use of menstrual sanitary products, menstrual cycles, and menstrual distress. A study on the use of menstrual sanitary products was conducted in response to societal concerns about hazardous materials in these products [5]. Questionnaires were incorporated into survey 7 to identify and analyze patterns of sanitary product usage. Analysis of survey 7 data (n = 8,658) revealed that the majority of participants used disposable menstrual pads (89%), and respondents expressed anxiety regarding safety issues. A study examining factors contributing to the length and regularity of menstrual cycles in 12,851 participants from survey 3 found that 21% experienced irregular menstrual cycles. Notably, frequent shift work among childless nurses was associated with irregular cycles, and women who reported prolonged standing or frequent heavy lifting during work also often experienced irregular cycles [6]. These findings align with the results of a study investigating the relationship between occupational characteristics and irregular menstrual cycles in female workers, based on data collected from the Korea National Health and Nutrition Examination Survey V (2010–2012) [7], as well as findings on the relationships of menstrual function with work schedule and physically demanding work, based on analysis of data from the US NHS3 [8]. Another study explored the associations between depressive symptoms and menstrual distress [9]. Surveys conducted between 2018 and 2019 (n = 6,878) indicated that depressive symptoms increased menstrual distress in the premenstrual and menstrual phases by 1.60 times and 1.65 times, respectively. Given the evidence suggesting that improved working environment may be related to women’s reproductive health, it will be important to further investigate these effects using data from the KNHS.

Research on women’s hormone levels has focused on AMH and polycystic ovary syndrome (PCOS) in relation to health and well-being. In one study, researchers specifically analyzed data from 448 individuals who participated in surveys 3 and 5 of the KNHS and underwent AMH blood testing. The results revealed that body mass index (BMI), total cholesterol level, and low-density lipoprotein level were negatively correlated with AMH, while high-density lipoprotein level demonstrated a positive correlation with AMH [4]. These findings suggest that weight gain, BMI, and changes in lipid profile may be associated with women’s reproductive health. Consequently, it is essential for Korean women to maintain a healthy weight and manage their lipid profiles by adopting better lifestyle habits. Another study examined 11,866 participants from survey 3 and found that the prevalence of PCOS was 7.1%. Additionally, BMI was linked to menstrual irregularity, facial acne, and hirsutism in the group with PCOS [10].

Researchers conducted a comparison of postpartum depression in women from Korea and the United States [11]. Data from the KNHS (n = 1,244) and the NHS3 (n = 2,742) revealed that a higher percentage of Korean women exhibited clinical symptoms of postpartum depression (45.9%) compared to their United States counterparts (3.4%). However, for both groups, the presence of prior depressive symptoms and poor sleep satisfaction were identified as predictors of postpartum depression.

Two studies have been published on uterine leiomyoma. One study examined the association between weight change and uterine leiomyoma in 5,338 pregnant participants from survey 1. The results showed that 4.1% of participants (n = 210) had been diagnosed with uterine leiomyoma, and weight gain after the age of 18 years was significantly correlated with an increased risk of uterine leiomyoma [12]. Another study employed a longitudinal analysis to explore the relationships of menstrual and reproductive factors with the risk of uterine leiomyoma in premenopausal women [13]. That study included 7,360 women who participated in the survey between 2014 and 2016 and underwent follow-up in 2021. The analysis utilized Cox proportional hazards models and found that age at menarche, menstrual cycle length, parity, and age at first birth were inversely associated with the risk of developing uterine leiomyoma.
Conclusion

The KNHS is the first large-scale cohort study of working women of reproductive age in Korea. Its purpose is to investigate factors affecting the general health and reproductive health of women, an area not explored in previous studies. The data for the KNHS have been collected over 10 years, primarily from healthy women. As the participants age, the prevalence of chronic diseases and other health issues is expected to increase. By analyzing the accumulated data on lifestyles and work environment influences, valuable insights into health and disease can be uncovered. The data collected from the KNHS can contribute to the development of health indicators and health improvement policies by elucidating the causes of diseases, including gynecological cancer, in Korean women. Additionally, the work intensity of Korean nurses is much higher than in other developed countries. The nurse-to-patient ratio in intensive care units in Korea is 1:2.48 in large tertiary hospitals and 1:4.20 in hospitals with 300 to 499 beds, whereas the ratio is at least 1:1 in England [14]. Therefore, it is important to explore how the work characteristics of female nurses affect their health, and the KNHS is expected to provide important data to support legislation and policies aimed at improving nurses’ work environments.

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References


ORCID

Chiyoung Cha, https://orcid.org/0000-0003-0115-1348
Heeja Jung, https://orcid.org/0000-0003-4899-1555

Authors’ contributions

All work was done by Jung HJ and Cha CY.

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Data availability

Please contact the corresponding author for data availability.


Implementing alternative estimation methods to test the construct validity of Likert-scale instruments

Chang Gi Park
Department of Population Health Nursing Science, College of Nursing, University of Illinois Chicago, Chicago, IL, USA

Introduction

A manuscript recently published in *Nursing Research* [1] suggested using polychoric correlations and polychoric confirmatory factor analysis (CFA) for unbiased assessments of construct validity in Likert-scale instruments, rather than Pearson correlations and Pearson correlation-based CFA. An editorial in the most recent issue of *Psychological Test Adoption and Development* also recommended the weighted least square mean and variance-adjusted (WLSMV) method for CFA-based validity testing [2]. Using polychoric correlation for CFA involves applying CFA estimation methods to ordinal item variables. However, relatively few nursing studies have used this estimation method to test the construct validity of ordinal variables.

As a general recommendation, the maximum likelihood (ML) method can be used for instruments with 5 to 7 item categories, as seen in the Likert scales commonly employed in nursing research [3]. The frequent application of strict cutoff rules for model fit indices to evaluate construct validity based on CFA estimation results may lead to an underestimation of the study instrument and modification of the CFA model by removing items or introducing connected item residual terms.

Therefore, better assessment methods of the construct validity of Likert scales are needed, and alternative estimation methods are recommended to avoid incorrect parameter estimates, such as factor loading coefficients, standard errors, and model fit statistics [4]. In this context, the purpose of this paper is to explain the necessity of alternative estimation methods and to present how those methods can be applied using affordable, accessible, and appropriate structural equation modeling (SEM) programs.

Current practice for testing Likert-scale item validity

Construct validity testing for Likert-scale instruments has been conducted using the ML estimation method for CFA, with the assumptions of multivariate normality and an interval scale. For the Likert scale, ordinal item variables with 4 or 5 categories have commonly been treated as continuous variables, allowing the application of the ML estimation method. However, for 2 or 3 categories, alternative estimation methods other than ML must be applied [5]. At that time, the limited availability of software supporting alternative estimation methods posed a significant barrier, preventing
nursing researchers from applying non-ML estimation methods for Likert-scale instrument evaluation using CFA [5]. Finney and DiStefano [6] recommended using ordinal CFA estimation methods such as WLSMV, regardless of the number of categories, if Mplus software (Muthén & Muthén, Los Angeles, CA, USA) was available. They also suggested employing the ML estimation method for Likert-scale variables with more than five categories. Additionally, the ML estimation method was recommended for five-category scales with a small, symmetrically distributed sample [3].

However, although the ML method has been recommended for the CFA model with five to seven categories, the estimation results may still exhibit biases [3,7]. For five categories, a downward bias of factor loading coefficients and associated standard errors were observed in a simulation study [7]. Furthermore, the ML method with five or more categories still demonstrated a relative 10% bias in estimated coefficients [3]. Similar biases were detected with additional categories; for example, ML estimation with a 7-point Likert scale still yielded biased estimates [8]. Thus, these studies support the use of non-ML methods for ordinal variables, regardless of the number of categories.

The application of ML for categorical variables can potentially yield inaccurate statistics, including standardized factor loading coefficients, standard errors, and global model fit statistics (e.g., the Tucker-Lewis index [TLI] or comparative fit index [CFI]) [9,10]. When the study sample size is small, the bias may be more severe. Consequently, for instrument revision, it is important to avoid unnecessary changes based solely on a single statistical criterion, as this may lead to a misleading evaluation of the instrument.

The weighted least square mean and variance-adjusted estimation method for Likert-scale item validity testing

As the most highly recommended alternative CFA estimation method, the WLSMV estimation method is specifically designed for ordinal item data using Likert-scale instruments. This method provides more accurate statistics for construct validity testing than the ML-based estimation method [2]. The WLSMV estimation method for ordinal scale data was first introduced by Muthén et al. [11] and has since been used as a default method for models with categorical variables. The WLSMV is a robust version of diagonally weighted least squares (DWLS) and it provides valid estimates of adjusted fit statistics (Satterthwhite, Satorra-Bentler, Scaled and Shifted or bootstrapped), and standard errors (robust and bootstrap). Another recommendation for Likert-scale item analysis is to apply the WLSMV method, regardless of whether the number of categories is < 5 or ≥ 5, if Mplus software is available [6].

Applications in nursing journals

A brief PubMed search for studies applying the WLSMV estimation method to validate Likert-scale instruments published in international nursing journals identified 13 papers. The WLSMV method was applied for the validity and reliability testing of the 6-Item State Anxiety Scale [12] and Self-Care of Heart Failure Index Score [13,14]. Since then, 10 more studies have been published [15-24]. These manuscripts used Mplus software to apply the WLSMV estimation method for the validity evaluation of Likert-scale instruments, most likely because nursing researchers had limited access to WLSMV-capable SEM software.

Does the weighted least square mean and variance-adjusted method need more samples than maximum likelihood?

According to previous studies, the recommended sample sizes for WLSMV estimation are not significantly different from those for ML estimation. For instance, one study stated, “The sample size for the WLSMV estimate was not allowed to be larger than the sample size for the ML estimate.” [9]. Some studies have supported a sample size of over 200 for WLSMV [3,10], while others have recommended a sample size of 200 to 500 [25]. Based on this brief review of the required sample size for WLSMV, it appears that the recommended sample sizes are quite similar to the typical sample sizes for CFA using the ML estimation method. As a result, it is advisable to use WLSMV for construct validity tests if the study sample size is sufficient for the ML method.

Structural equation modeling software for the weighted least square mean and variance-adjusted method

The Mplus program includes the WLSMV estimation method for ordinal data. The estimator option is defined as “ESTIMATOR = WLSMV,” which is contingent upon specifying “CATEGORICAL = ordinal variable name list.”

For nurse researchers who are unable to utilize Mplus due to financial constraints, the freely available R software with WLSMV estimation capability is now the ideal choice. The R package...
“lavaan” incorporates the WLSMV estimation method. The lavaan syntax for CFA, including the estimator option and the ordinal scale option, can be defined as follows:

cfa(..., estimator = "WLSMV", ordered = TRUE)

When all variables are categorical, ordered = TRUE will automatically apply the WLSMV method without defining the estimator as WLSMV.

For those who do not use the R package or cannot afford commercial SEM software such as Mplus or Lisrel for CFA estimation, there are now two software programs, namely JASP and jamovi, that enable nurse researchers to run the R-based SEM package lavaan through a menu selection method similar to the SPSS menu-based interface. The JASP program can be downloaded from https://jasp-stats.org/. The current version of JASP is 0.17.2 and includes an SEM module capable of running the lavaan program. However, JASP only supports the DWLS estimation method, even though the original lavaan program also offers WLSMV as a robust DWLS estimation method. Due to this limitation, the JASP DWLS estimation method cannot provide robust DWLS results. Therefore, to utilize WLSMV estimation, the lavaan program must be employed.

The latest version of the jamovi package now includes SEMLj, which offers the ability to utilize all CFA estimation method options available in the lavaan program. You can download the jamovi program from https://www.jamovi.org/. The current version is 2.3.21. The SEMLj module is an interface between jamovi and the R package lavaan [26]. Estimation method options for ordinal item scales are incorporated within the program. The “automatic” (default) option enables the lavaan program to choose the estimation method. However, it is essential to confirm the automatic selection of the estimation method for ordinal item variables. https://semlj.github.io/index.html presents examples and easy-to-follow instructions. Both lavaan CFA with the WLSMV option and jamovi SEMLj WLSMV yield the same estimation results as Mplus WLSMV. The ULMS method, a lesser-known alternative, is also available in the lavaan program, and jamovi SEMLj can access this function as well.

A few critics have objected to the use of identical cutoff points for various estimation methods, as the current recommendations for these cutoff points were derived from a simulation study that employed the ML estimation method with multivariate normality assumptions [27-29]. However, only a few possible alternatives have been explored.

Comparisons of the maximum likelihood and the weighted least square mean and variance- adjusted methods with a sample dataset

To illustrate the differences in CFA results estimated by ML and WLSMV methods, a manuscript with accessible raw data published in a nursing journal was chosen. The study aimed to assess the psychometric properties of the 24-item, 5-point Likert scale Arabic version of the Irish Assertiveness Scale among Saudi undergraduate nursing students and interns [30]. The initial four-factor CFA model with 23 items was estimated using the ML method. The authors noted that the fit indices, including root mean square error of approximation (RMSEA), CFI, TLI, and standardized root mean square residual (SRMR), were insufficiently satisfactory to accept. To improve the model fit statistics, a revised CFA model excluding three items was reestimated. However, the model fit indices of the revised model did not meet the minimum recommended cutoff points. The final model, which included four correlated item residual terms, reported CFI = 0.89, TLI = 0.86, RMSEA = 0.06, and SRMR = 0.08.

To compare the results of CFA differences using the WLSMV method, we accessed the study data provided online. This time, we estimated the CFA models with Mplus version 8.8 using both ML and WLSMV methods. The initial CFA model using the ML method displayed poor fit indices with RMSEA = 0.065, CFI = 0.833, TLI = 0.811, and SRMR = 0.064. However, the model fit statistics for the CFA model using WLSMV showed improvement with RMSEA = 0.066, CFI = 0.915, TLI = 0.904, and SRMR = 0.072. Since the model fit indices using WLSMV already met the recommended cutoff points, it might not be necessary to revise the CFA model solely due to poor model fit statistics. Nevertheless, the standardized factor loading coefficients of the three removed items were below 0.3. Based on the recommended cutoff point of 0.3, these three items could be removed.

For the CFA model with 20 items using the ML estimation method, the indices were RMSEA = 0.071, CFI = 0.849, TLI = 0.825, and SRMR = 0.06; however, with WLSMV, the indices were RMSEA = 0.075, CFI = 0.92, TLI = 0.907, and SRMR = 0.067. Since the model fit indices surpassed the commonly recommended cutoff points it may not be necessary to modify the CFA model with 20 items with correlated item errors.

As illustrated in this example, the CFA estimation method for the Likert scale is crucial for determining construct validity with greater accuracy. Employing the appropriate estimation method
for construct validity tests can help avoid unnecessary instrument revisions and inaccurate validity test outcomes when the model fit statistics of CFA results do not surpass the recommended cutoff points.

## Conclusion and recommendations

Nurse researchers have commonly been advised to use the ML estimation method for Likert scale construct validity tests, under the assumption that treating the ordinal scale as an interval scale would not cause significant estimation issues. CFA results, including model fit indices, factor loading coefficients, instrument evaluations, and modifications, have been based on this practice. However, it has been suggested that alternative estimation methods, other than ML, should be considered for CFA estimation of ordinal scales, rather than solely relying on ML for Likert-scale assessments of nursing instruments. Despite the potential for underestimation of factor loading coefficients and standard errors, as well as model fit indices due to the use of the ML estimation method instead of the WLSMV method for ordinal scales, the lack of SEM software enabling the availability, accessibility, and adaptability of alternative estimation methods has severely limited the application of non-ML estimation methods in nursing research. These limitations could lead to undervalued nursing instruments and unnecessary modifications.

Construct validity testing of Likert-scale instruments is common in nursing research, and the previously indicated limitations of SEM software accessibility for nursing researchers should no longer hinder the application of the ordinal CFA WLSMV method, which is available in the R program. As presented in this manuscript, interface-based software, such as jamovi and JASP version 0.12.2 (JASP Team, 2020) now facilitate accurate evaluations of nursing instruments.

Understanding the different estimation methods, the availability of affordable software, and the appropriate use of these methods is important, since properly selecting an estimation method can avoid unnecessary instrument modifications to improve reliability and construct validity.

The choice of the CFA estimation method also influences the reliability test results for Likert-scale instruments. The composite reliability coefficient, an alternative to Cronbach’s alpha, has been recommended based on CFA estimation results. It is crucial to recognize that if the CFA estimation methods impact the estimated loading coefficient size and standard error, the recommended WLSMV estimation method for the Likert scale will also affect the estimated composite reliability coefficients. The WLSMV method was employed to assess the reliability of the 4-point ordinal scale Self-Care of Heart Failure Index Score using CFA [13,14]. The ordinal reliability coefficient, which utilizes polychoric correlations, should be considered an essential reliability test method for nursing researchers [31].

Currently, SEM software offering alternative estimation methods for the Likert scale is available and even freely accessible to nursing researchers. Utilizing these available estimation methods can enhance psychometric evaluation in nursing research. Moreover, the application of alternative estimation methods has the potential to enhance the quality of instrument development.

## ORCID

Chang Gi Park, https://orcid.org/0000-0003-3366-4279

## Authors’ contributions

All work was done by Park CG.

## Conflict of interest

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## Data availability

Please contact the corresponding author for data availability.

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## References


Health-related quality of life in female patients with rheumatoid arthritis: a structural equation model

Bukyung Kim¹, Mi-Hae Sung²

¹College of Nursing, Inje University, Busan, Korea
²Institute of Health Science, College of Nursing, Inje University, Busan, Korea

Purpose: This study aimed to construct a structural equation model to explain and predict factors affecting the health-related quality of life (QoL) in female rheumatoid arthritis (RA) patients based on the health-related QoL model by Ferrans et al. (2005) and a literature review.

Methods: Patients (N=243) who were either registered members of an internet cafe composed of patients with RA or rheumatology outpatients at two tertiary general hospitals in Busan, Korea, were recruited via convenience sampling. Data were collected from July 2 to September 9, 2021, and the survey was conducted using a web-based questionnaire. The data were analyzed by SPSS and AMOS 26.0.

Results: The goodness-of-fit statistics of the final model exhibited good results ($\chi^2$/degree of freedom=2.68, Turker-Lewis index=.94, comparative fit index=.96, standardized root mean-square residual=.04, root mean-square error of approximation=.08), and 11 out of 14 paths of the model were supported. The squared multiple correlation, which reflected the explanatory power of the environmental characteristics, symptoms, functional status, and perceived health status on health-related QoL, was 80%. In the hypothesis model, 10 paths had significant direct effects, 6 paths had significant indirect effects, and 12 paths had significant total (direct and indirect) effects.

Conclusion: Considering that factors directly affecting the health-related QoL of female patients with RA were social support, symptoms (fatigue and depression), resilience, and perceived health status, and that resilience was the most influential factor, clinicians can encourage resilience. Hence, to improve the health-related QoL of female patients with RA, continuing management is necessary, using various intervention methods that focus on enhancing resilience from the early stage to the end of treatment for RA.

Keywords: Health-related quality of life; Psychological resilience; Rheumatoid arthritis; Self-efficacy; Social support
Introduction

루마티스 관절염(rheumatoid arthritis)은 관절 활막의 지속적 염증반응으로 인한 관절의 불안정한 상태이다. 류마티스 관절염은 전세계적으로 성인 인구의 0.3%–1.0%에서 발생하며, 우리나라에서는 전 인구의 약 1.0%를 차지하고 여성의 유병률이 남성보다 약 3배 정도 높으며 주로 40–70세 사이에 발생하게 나타난다. 류마티스 관절염 환자들은 통증, 부종, 조조강직, 기형 등의 관절장애를 동반하며, 이로 인해 일상생활에서 중요한 제약을 받는다. 특히 류마티스 관절염 환자 중 여성에 비해 주관적인 통증과 우울이 더 심하게 나타나며, 이런 다양한 신체적·심리적 증상들은 여성 류마티스 관절염 환자의 건강관련 삶의 질을 저하하는 직접적인 요인이다. 증상은 류마티스 관절염의 진단과 관리의 요점이 되는데, 류마티스 관절염 환자의 증상과 기능상태는 건강관련 삶의 질에 주요한 영향을 미친다. 류마티스 관절염 환자들의 삶의 질에 대한 이해와 관리가 더욱 필요하다.

Summary statement

What is already known about this topic?
Individual characteristics, environmental characteristics, symptoms, functional status, and perceived health status affect the health-related quality of life (QoL) of female patients with rheumatoid arthritis (RA).

What this paper adds
Social support, symptoms (fatigue and depression), resilience, and perceived health status were predictors of QoL and resilience was the most influential. Also, self-efficacy was an important factor in affecting health-related quality of life by alleviating symptoms and improving coping ability in patients with rheumatoid arthritis.

Implications for practice, education, and/or policy
Findings support the need for a strategic plan for improving self-efficacy, social support, resilience, and perceived health status in women with RA.


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**Figure 1. Hypothetical model of this study.**

[Diagram: Characteristics of the individual (Biological function, Symptoms, Functional status, General health perceptions, Overall quality of life) and Characteristics of the environment (Social support, Self-efficacy, Symptoms, Resilience, Perceived health status, Health-related quality of life)]

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본 연구에서 사용한 모든 도구들은 사용 전 도구 개발자 및 번안자에게 도구 사용에 대해 허락을 받은 후 구조화된 설문지를 사용하였다.

건강관련 삶의 질

자기효능감

사회적 지지
Zimet 등[28]이 개발한 사회적 지지 다차원 척도(Multidimensional Scale of Perceived Social Support)를 Shin과 Lee[29]가 번역한 도구를 사용하였다. 이 도구는 가족 지지(4개 문항), 친구 지지(4개 문항), 의미 있는 타인에 의한 특별 지지(4개 문항)의 3가지 하위 영역으로, 총 12개 문항이 각각 ‘전혀 그렇지 않다’ 1점에서 ‘매우 그렇다’ 5점의 5점 Likert 척도로 이루어져 있다. 점수 범위는 12~60점으로 점수가 높을수록 사회적 지지 정도가 높음을 의미한다. 개발 당시 도구[28]의 신뢰도는 Cronbach’s α= .85였으며, Shin과 Lee[29]의 연구에서는 .89였고, 본 연구에서는 전체 .95, 가족 지지는 .92, 친구 지지는 .93. 의미 있는 타인에 의한 특별 지지는 .92였다.

피로
Schwartz 등[30]이 개발한 fatigue Assessment Inventory를 토대로 Chang[31]이 개발한 다차원 피로 척도(Multidimensional Fatigue Scale)를 사용하였다. 이 도구는 전반적 피로도(8개 문항), 일상생활

Methods

Ethics statement: This study was approved by the Institutional Review Board of Inje University (2021-04-023-002). Informed consent was obtained from the participants.
기능장애(6개 문항), 상황적 피로(5개 문항)의 총 19문항으로 구성되어 있다. '전혀 그렇지 않다' 1점에서 '매우 그렇다' 5점의 5점 Likert 척도로, 점수 범위는 19~95점으로 점수가 높음수록 피로 정도가 높을 것을 의미한다. 개발 당시 도구[31]의 신뢰도는 Cronbach’s α=.88이었으며, 본 연구에서는 .95였다.

우울
Radloff [32]가 개발하고 Eaton 등[33]이 개정한 Center for Epidemiologic Studies Depression Scale-Revised(CESD-R)를 Lee 등[34]이 국내 실정에 맞게 변한한 한국판 역학연구 우울척도 개정판(Korean version of CESD-R)을 사용하였다. 이 도구는 총 20개 문항으로 구성되어 있으며, 5점 Likert 척도로 최근 일주일간의 우울 관련 증상을 얼마나 자주 느껴지는지에 대해서 '1일 미만' 0점에서 '2주간 거친 매일' 4점으로 이루어져 있다. 본 연구에서 통계분석을 위해 1~5점 척도로 변형하여 사용하였으며, 점수가 높음수록 우울 정도가 높은 것임을 의미한다. 개발 당시 도구[33]의 신뢰도는 Cronbach’s α=.85~.90이었으며, Lee 등[34]의 연구에서는 .98이었다. 타당도 분석 결과 3개(1, 11, 18번 문항)의 요인 부하량이 .50 미만으로 낮아 이를 제외한 총 17개의 문항을 최종 분석에 사용하였고, 본 연구에서의 Cronbach’s α=.94이었으며 총 점수 범위는 17~85점이었다.

극복력

지각된 건강상태

자료 수집
자료 수집 기간은 2021년 7월 2일부터 9월 9일까지였으며, 연구자는 루마티스 질환 환우회 인터넷 카페(다음 카페, 루마티스를 이기는 사람들, https://cafe.daum.net/rheumatism)의 여성 루마티스 관절염 환자와 해당 상급 종합병원의 루마티스 내과를 방문한 환자 중 연구대상자의 선정기준에 적합한 대상자를 편의적 표적하였다. 루마티스 질환 환우회 인터넷 카페의 운영자에게 메일을 통해 연구에 관여하여 설명하고, 자료 제시에 대한 동의를 얻은 이후 대상자에게 인터넷 설문지의 양식을 사용하였다. 대상자가 설문에 응용하거나 응용하는 경우 모집공고문에 제시된 설문지 링크를 클릭하여 설문 참여 페이지로 넘어가게 하여 연구에 대한 설명과 동의를 받은 후 자가보고 형식의 설문 조사를 실시하였다. 또한, 해당 상급 종합병원의 부서장에게 허락을 받고 진행하였으며, 루마티스 내과 외래에 대기 중인 환자 중 외래 간호사가 선정기준에 맞는 대상자에게 참여를 유도하였다. 참여 의사를 받은 대상자들 설문지 작성이 가능한 개별적인 공간으로 안내하여 연구자가 선정기준에 적합한 대상자에게 연구에 대한 설명을 하고 동의를 받은 후, 자료를 수집하였다. 도구 이용에 일반적 특성 및 질병 관련 특성과 관련한 연령, 결혼상태, 교육수준, 경제상태, 종교, 평생연령, 루마티스 관절염의 재발 및 병명 유무, 루마티스 관절염으로 인한 수술 여부, 루마티스 관절염과 관련된 약물 복용 여부 등을 조사하였다. 설문 작성에 약 15분 내외가 소요되었으며, 연구에 참여한 모든 대상자에게 소정의 답례품을 제공하였다.

자료 분석 방법
수집된 자료는 IBM SPSS ver. 28.0과 AMOS 26.0(IBM Corp., Armonk, NY, USA)을 이용하여 다음과 같이 분석하였다.
- 대상자의 특정 및 측정변수의 수치적 통계는 빈도, 평균, 표준편차 및 백분율 등의 기술통계를 사용하여 분석하였다.
- 대상자의 일반적 특성 및 질병 관련 특성에 따른 산의 집단은 independent t-test와 분산분석(analysis of variance)으로 분석하였으며, 사후 검정으로는 Scheffe post hoc test로 검정하였다.
- 대상자의 자기효능감, 사회적 지지, 증상, 극복력, 지각된 건강상태, 건강관련 삶의 질 간의 상관관계 분석은 Pearson correlation coefficient로 분석하였다.
- 측정 모형의 타당성을 평가하기 위해 확인적 요인 분석(confirmatory factor analysis)을 시행하였다.
- 건강관련 삶의 질에 영향을 미치는 요인 간의 간접 경로계수를 산출하기 위해 공분산 구조분석으로 하였으며, 다변량 정의는 가정하는 최대우도방법(maximum likelihood)을 사용하였다.
- 건강관련 삶의 질 가설적 모형에 대한 적합도 검정은 chi-square ($\chi^2$), degrees of freedom (df), Turker-Lewis index (TLI), comparative fit index (CFI), standardized root mean-squared residual (SRMR), root mean-square error of approximation (RMSEA)을
Results

대상자의 특성 중 연령은 평균 47.24세로 50세 이상이 41.2% (100명)로 가장 많았고, 결혼상태는 기혼인 군이 74.1% (180명)로 가장 많았다. 대상자의 교육수준은 대졸인 군이 62.6% (152명)로 가장 많았고, 경제상태는 '중'으로 응답한 군이 68.7% (167명)로 가장 많았다. 종교는 '무'로 응답한 군이 54.3% (132명)이었다. 대상자의 체질량지수는 평균 22.51kg/m²이었고 정상인 군이 53.9% (131명)로 가장 많으며, 류마티스 관절염의 기간은 10년 이상이 41.2% (100명)로 가장 많았다. 류마티스 관절염 외 다른 질병 유무는 '무'로 응답한 군이 85.6% (208명)로 가장 많았다. 류마티스 관련 약물 복용여부에서 '유'로 응답한 군이 97.1% (236명)로 가장 많았다.

대상자의 건강관련 삶의 질 차이를 보이는 특성은 교육수준 (F=6.38, p=.002), 경제상태 (F=20.17, p<.001), 류마티스 관절염의 다른 질병 유무 (t=–2.12, p=.034), 류마티스 관련 약물 복용 여부 (t=–2.81, p=.005)였다. 교육수준이 '대학원 졸업'인 경우가 '고등학교 졸업' 이하인 경우와 '대학교 졸업' 수준보다 건강관련 삶의 질이 높았으며, 경제상태가 '하'인 경우보다 '중'인 경우가, '중'인 경우보다 '상'인 경우가 건강관련 삶의 질 정도가 높았다. 또한

Table 1. Differences in health-related quality of life according to participants’ characteristics (N=243)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Categories</th>
<th>n (%)</th>
<th>Item</th>
<th>t or F</th>
<th>p (Scheffé)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (year)</td>
<td>≤ 39</td>
<td>62 (25.5)</td>
<td>81.06±15.20</td>
<td>1.12</td>
<td>.328</td>
</tr>
<tr>
<td></td>
<td>40–49</td>
<td>81 (33.3)</td>
<td>81.37±16.68</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>≥ 50</td>
<td>100 (41.2)</td>
<td>78.23±14.55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td>Single</td>
<td>45 (18.5)</td>
<td>80.77±14.24</td>
<td>1.93</td>
<td>.125</td>
</tr>
<tr>
<td></td>
<td>Married</td>
<td>180 (74.1)</td>
<td>80.32±15.48</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Separated</td>
<td>14 (5.8)</td>
<td>71.14±15.80</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bereaved</td>
<td>4 (1.6)</td>
<td>87.50±21.79</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education level</td>
<td>≤ High school</td>
<td>66 (27.2)</td>
<td>77.39±13.67</td>
<td>6.38</td>
<td>.002</td>
</tr>
<tr>
<td></td>
<td>Bachelor</td>
<td>152 (62.6)</td>
<td>79.50±15.45</td>
<td></td>
<td>(c &gt; a,b)</td>
</tr>
<tr>
<td></td>
<td>≥ Master</td>
<td>25 (10.3)</td>
<td>89.88±16.73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economic status</td>
<td>High</td>
<td>20 (8.2)</td>
<td>93.80±17.18</td>
<td>20.17</td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td>Middle</td>
<td>167 (68.7)</td>
<td>81.26±14.21</td>
<td></td>
<td>(a &gt; b &gt; c)</td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>56 (23.0)</td>
<td>71.28±13.74</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Religion</td>
<td>Yes</td>
<td>111 (45.7)</td>
<td>79.66±14.74</td>
<td>–0.30</td>
<td>.759</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>132 (54.3)</td>
<td>80.28±16.09</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body mass index (kg/m²)</td>
<td>Underweight (&lt; 18.5)</td>
<td>25 (10.3)</td>
<td>79.72±13.34</td>
<td>2.00</td>
<td>.114</td>
</tr>
<tr>
<td></td>
<td>Normal (18.5–22.9)</td>
<td>131 (53.9)</td>
<td>82.10±16.10</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Overweight (23.0–24.9)</td>
<td>51 (21.0)</td>
<td>77.13±14.77</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Obese (≥ 25.0)</td>
<td>36 (14.8)</td>
<td>76.58±14.66</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time elapsed since receiving the diagnosis (year)</td>
<td>&lt;5</td>
<td>90 (37.0)</td>
<td>80.71±15.20</td>
<td>2.00</td>
<td>.136</td>
</tr>
<tr>
<td></td>
<td>5–9</td>
<td>59 (24.3)</td>
<td>82.61±16.33</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>≥ 10</td>
<td>94 (38.7)</td>
<td>77.68±14.98</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comorbidity</td>
<td>Yes</td>
<td>114 (46.9)</td>
<td>77.77±16.18</td>
<td>–2.12</td>
<td>.034</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>129 (53.1)</td>
<td>81.96±14.58</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surgery related to RA</td>
<td>Yes</td>
<td>35 (14.4)</td>
<td>77.77±15.95</td>
<td>–0.92</td>
<td>.358</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>208 (85.6)</td>
<td>80.37±15.38</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taking medications related to RA</td>
<td>Yes</td>
<td>236 (97.1)</td>
<td>79.52±15.26</td>
<td>–2.81</td>
<td>.005</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>7 (2.9)</td>
<td>96.00±14.34</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

RA: Rheumatoid arthritis.
류마티스 관절염 외 다른 질병을 가지고 있지 않은 사람이 류마티스 관절염 외 다른 질병을 가지고 있는 사람보다 건강관련 삶의 질 정도가 높았으며, 류마티스 관련 약물을 복용하지 않는 사람이 복용하는 사람보다 건강관련 삶의 질 정도가 높았다(Table 1).

연구변수의 서술적 통계 및 다중공선성 분석
자기효능감 점수는 40점 만점에 평균 26.58점으로, 사회적 지지 점수는 60점 만점에 평균 44.81점이었다. 증상을 확인한 피로 점수는 12–60점 만점에 평균 26.58점이었으며, 우울 점수는 17–85점 만점에 평균 70.39점이었다. 극복력 점수는 130점 만점에 평균 8.00점이었다(Table 2). 본 연구 변수의 일반성 정규성을 겸점한 경로, 체계적이 에도 3, 체도 8을 넘지 않아 단일 변수 제거를 만족하였다(Table 2). 본 연구에서의 공차한계 값은 모두 0.7 이상, 분산추출지수와 표본 크기의 0.8 이상이, 개념 신뢰도(composite construct reliability)가 기준 값인 0.7 이상, 분산추출지수와 표본 크기의 0.8 이상이 확보되었다(Table 2).

모형의 타당성 검증
가설 모형의 검증
가설 모형의 적합도 검정
가설 모형의 적합도를 확인한 결과, $\chi^2 = 109.99$ ($df = 41, p < .001$).

Table 2. Descriptive statistics and multicollinearity of the research variables (N=243)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Categories</th>
<th>Item</th>
<th>Possible range</th>
<th>Skewness</th>
<th>Kurtosis</th>
<th>Tolerance</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-efficacy</td>
<td>Total</td>
<td>26.58 ± 6.62</td>
<td>8–40</td>
<td>-0.49</td>
<td>-0.26</td>
<td>0.41</td>
<td>2.40</td>
</tr>
<tr>
<td>Social support</td>
<td>Total</td>
<td>44.81 ± 9.63</td>
<td>12–60</td>
<td>-0.44</td>
<td>-0.11</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Family</td>
<td>15.36 ± 3.57</td>
<td>4–20</td>
<td>-0.59</td>
<td>-0.25</td>
<td>0.35</td>
<td>2.83</td>
</tr>
<tr>
<td></td>
<td>Friends</td>
<td>14.10 ± 3.79</td>
<td>4–20</td>
<td>-0.37</td>
<td>-0.34</td>
<td>0.43</td>
<td>2.29</td>
</tr>
<tr>
<td></td>
<td>Significant other</td>
<td>15.35 ± 3.45</td>
<td>4–20</td>
<td>-0.60</td>
<td>0.01</td>
<td>0.26</td>
<td>3.76</td>
</tr>
<tr>
<td>Sympoms</td>
<td>Total</td>
<td>99.95 ± 22.90</td>
<td>36–180</td>
<td>0.66</td>
<td>0.81</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Fatigue</td>
<td>70.39 ± 13.31</td>
<td>19–95</td>
<td>-0.45</td>
<td>0.27</td>
<td>0.70</td>
<td>1.41</td>
</tr>
<tr>
<td></td>
<td>Depression</td>
<td>29.55 ± 13.12</td>
<td>17–85</td>
<td>1.75</td>
<td>3.41</td>
<td>0.51</td>
<td>1.95</td>
</tr>
<tr>
<td>Resilience</td>
<td>Total</td>
<td>80.38 ± 13.27</td>
<td>23–115</td>
<td>-0.24</td>
<td>0.25</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Personal competence</td>
<td>57.19 ± 9.38</td>
<td>16–80</td>
<td>-0.20</td>
<td>0.19</td>
<td>0.29</td>
<td>3.41</td>
</tr>
<tr>
<td></td>
<td>Acceptance of self and life</td>
<td>23.90 ± 4.50</td>
<td>7–35</td>
<td>-0.22</td>
<td>0.69</td>
<td>0.37</td>
<td>2.70</td>
</tr>
<tr>
<td>Perceived health status</td>
<td>Total</td>
<td>7.92 ± 2.51</td>
<td>3–15</td>
<td>0.22</td>
<td>-0.55</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>1°</td>
<td>2.79 ± 0.95</td>
<td>1–5</td>
<td>0.19</td>
<td>-0.56</td>
<td>0.33</td>
<td>3.01</td>
</tr>
<tr>
<td></td>
<td>2°</td>
<td>2.98 ± 1.05</td>
<td>1–5</td>
<td>0.07</td>
<td>-0.88</td>
<td>0.45</td>
<td>2.18</td>
</tr>
<tr>
<td></td>
<td>3°</td>
<td>2.16 ± 0.90</td>
<td>1–5</td>
<td>0.51</td>
<td>-0.27</td>
<td>0.48</td>
<td>2.05</td>
</tr>
<tr>
<td>Health-related quality of life</td>
<td>Total</td>
<td>80.00 ± 15.46</td>
<td>26–130</td>
<td>0.07</td>
<td>-0.03</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

VIF: Variance inflation factor.
1Indicates each item of perceived health status.
이므로 적합도 판단 시에 **χ**²값에 의존하기보다 다른 적합지수도 함께 고려하여야 한다. 본 연구에서 **χ**²/df는 2–5, TLI는 .90 이상, CFI는 .90 이상, SRMR는 .10 이하, RMSEA는 .10 이하로 모두 좋은 적합도 기준에 부합하여 본 연구의 가설적 모형은 매우 적합한 것으로 나타났다.

가설 모형의 모수 추정
가설 모형의 모수 추정치 및 통계적 유의성을 검증한 결과, 14개의 경로 중 11개가 통계적으로 유의하였다(**Figure 2, Table 5**). 자기효능감과 증상의 경로계수는 -.43 (**p = .001**), 사회적 지지와 증상의 경로계수는 -.20 (**p = .005**)로 유의한 결과로 나타났다. 증상에 대한 자기효능감과 사회적 지지의 설명력은 31%였으며, 자기효능감과 극복력의 경로계수는 .51 (**p = .001**), 사회적 지지와 극복력의 경로계수는 .30 (**p = .001**), 증상과 극복력의 경로계수는 -.18 (**p = .006**)로 유의한 결과로 나타났다. 극복력에 대한 자기효능감, 사회적 지지, 증상의 설명력은 67%였다. 자기효능감과 자기적 건강상태의 경로계수는 .20 (**p = .045**)로 유의한 반면, 사회적 지지와 자기적 건강상태의 경로계수는 .03 (**p = .751**)로 유의하지 않았다. 증상과 자기적 건강상태의 경로계수는 -.38 (**p = .001**)로 유의한 반면, 극복력과 자기적 건강상태의 경로계수는 -.01 (**p = .955**)로 유의하지 않았다. 극복력이 자기적 건강상태에 대해 통계적으로 유의한 것으로 나타났다. 극복력과 증상의 경로계수는 -.18 (**p = .004**), 증상이 자기적 건강상태에 대해 통계적으로 유의한 것으로 나타났다. 자기적 건강상태에 영향을 미치는 직속효과의 경우 증상의 설명력은 80%였다.

가설 모형의 효과 분석
가설적 모형의 잔여 변수 간의 직접효과, 간접효과 및 총 효과는 **Table 5**에 제시하였다. 증상에 영향을 미치는 직접효과의 경우 자기효능감(β = .43, **p = .008**), 사회적 지지(β = -.20, **p = .009**)가 통계적으로 유의한 것으로 나타났다. 극복력에 영향을 미치는 직접효과를 살펴보면 자기효능감(β = .51, **p = .012**), 사회적 지지(β = -.30, **p = .004**), 증상(β = -.18, **p = .008**)이 통계적으로 유의한 것으로 나타났다. 자기적 건강상태에 영향을 미치는 직접효과의 경우 증상의 설명력은 31%였다. 사회적 지지와 증상의 경로계수는 -.20 (**p = .005**), 자기적 건강상태와 증상의 경로계수는 -.18 (**p = .006**)로 유의한 결과로 나타났다. 자기적 건강상태와 사회적 지지의 경로계수는 -.01 (**p = .955**)로 유의하지 않았다. 자기적 건강상태에 대한 자기효능감의 설명력은 31%였다. 자기적 건강상태와 사회적 지지의 경로계수는 -.18 (**p = .006**)로 유의한 결과로 나타났다. 사회적 지지와 자기적 건강상태의 경로계수는 -.01 (**p = .955**)로 유의하지 않았다. 자기적 건강상태의 설명력은 80%였다.

### Table 3. Factor loading in confirmatory factor analysis (N=243)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Categories</th>
<th>β</th>
<th>SE</th>
<th>CCR</th>
<th>AVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-efficacy</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Social support</td>
<td>Family</td>
<td>.81</td>
<td>.27</td>
<td>.90</td>
<td>.75</td>
</tr>
<tr>
<td></td>
<td>Friends</td>
<td>.76</td>
<td>.38</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Significant other</td>
<td>.95</td>
<td>.07</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Symptoms</td>
<td>Fatigue</td>
<td>.54</td>
<td>.34</td>
<td>.83</td>
<td>.73</td>
</tr>
<tr>
<td></td>
<td>Depression</td>
<td>.92</td>
<td>.09</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resilience</td>
<td>Personal competence</td>
<td>.86</td>
<td>.09</td>
<td>.75</td>
<td>.60</td>
</tr>
<tr>
<td></td>
<td>Acceptance of self and life</td>
<td>.89</td>
<td>.09</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived health status</td>
<td>1†</td>
<td>.94</td>
<td>.10</td>
<td>.86</td>
<td>.67</td>
</tr>
<tr>
<td></td>
<td>2†</td>
<td>.76</td>
<td>.46</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3†</td>
<td>.72</td>
<td>.39</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

AVE: Average variance extracted; CCR: composite construct reliability.
† Indicates each item of perceived health status.

### Table 4. Correlations between research variables (N=243)

<table>
<thead>
<tr>
<th>Research variable</th>
<th>V1</th>
<th>V2</th>
<th>V3</th>
<th>V4</th>
<th>V5</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V2</td>
<td>.50 ( &lt; .001)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V3</td>
<td>-.47 ( &lt; .001)</td>
<td>-.34 ( &lt; .001)</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V4</td>
<td>.68 ( &lt; .001)</td>
<td>.57 ( &lt; .001)</td>
<td>-.45 ( &lt; .001)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>V5</td>
<td>.39 ( &lt; .001)</td>
<td>.26 ( &lt; .001)</td>
<td>-.46 ( &lt; .001)</td>
<td>.36 ( &lt; .001)</td>
<td>1</td>
</tr>
<tr>
<td>V6</td>
<td>.65 ( &lt; .001)</td>
<td>.65 ( &lt; .001)</td>
<td>-.58 ( &lt; .001)</td>
<td>.75 ( &lt; .001)</td>
<td>.55 ( &lt; .001)</td>
</tr>
</tbody>
</table>

Table 5. Standardized direct, indirect, and total effects of the hypothetical model (N=243)

<table>
<thead>
<tr>
<th>Endogenous variable</th>
<th>Exogenous variable</th>
<th>SE</th>
<th>CR (p)</th>
<th>SMC</th>
<th>Direct effect</th>
<th>Indirect effect</th>
<th>Total effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptom</td>
<td>← Self-efficacy</td>
<td>.06</td>
<td>-6.38 (.001)</td>
<td>.31</td>
<td>-0.43 (0.008)</td>
<td>-0.43 (0.008)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>← Social support</td>
<td>.06</td>
<td>-2.83 (0.005)</td>
<td></td>
<td>-0.20 (0.009)</td>
<td>-0.20 (0.009)</td>
<td></td>
</tr>
<tr>
<td>Resilience</td>
<td>← Self-efficacy</td>
<td>.04</td>
<td>8.42 (.001)</td>
<td>.67</td>
<td>0.51 (0.012)</td>
<td>0.08 (0.004)</td>
<td>0.58 (0.010)</td>
</tr>
<tr>
<td></td>
<td>← Social support</td>
<td>.04</td>
<td>5.13 (.001)</td>
<td></td>
<td>0.30 (0.004)</td>
<td>0.04 (0.002)</td>
<td>0.33 (0.007)</td>
</tr>
<tr>
<td></td>
<td>← Symptoms</td>
<td>.05</td>
<td>-2.76 (0.006)</td>
<td></td>
<td>-0.18 (0.008)</td>
<td>-0.18 (0.008)</td>
<td></td>
</tr>
<tr>
<td>Perceived health status</td>
<td>← Self-efficacy</td>
<td>.08</td>
<td>2.00 (0.045)</td>
<td>.28</td>
<td>0.20 (0.051)</td>
<td>0.16 (0.046)</td>
<td>0.36 (0.009)</td>
</tr>
<tr>
<td></td>
<td>← Social support</td>
<td>.07</td>
<td>.032 (.751)</td>
<td></td>
<td>0.03 (.715)</td>
<td>0.07 (1.147)</td>
<td>0.10 (1.172)</td>
</tr>
<tr>
<td></td>
<td>← Symptoms</td>
<td>.09</td>
<td>-3.69 (.001)</td>
<td></td>
<td>-0.38 (0.008)</td>
<td>0.001 (0.866)</td>
<td>-0.38 (0.012)</td>
</tr>
<tr>
<td></td>
<td>← Resilience</td>
<td>.15</td>
<td>-0.06 (0.955)</td>
<td></td>
<td>-0.01 (9.23)</td>
<td>-0.01 (9.23)</td>
<td></td>
</tr>
<tr>
<td>Health-related quality of life</td>
<td>← Self-efficacy</td>
<td>.04</td>
<td>-0.57 (0.569)</td>
<td>.80</td>
<td>-0.03 (6.28)</td>
<td>0.46 (0.019)</td>
<td>0.43 (0.012)</td>
</tr>
<tr>
<td></td>
<td>← Social support</td>
<td>.04</td>
<td>4.87 (.001)</td>
<td></td>
<td>0.23 (0.025)</td>
<td>0.23 (0.009)</td>
<td>0.46 (0.012)</td>
</tr>
<tr>
<td></td>
<td>← Symptoms</td>
<td>.05</td>
<td>-3.66 (.001)</td>
<td></td>
<td>-0.23 (0.009)</td>
<td>-0.18 (0.009)</td>
<td>-0.41 (0.011)</td>
</tr>
<tr>
<td></td>
<td>← Resilience</td>
<td>.09</td>
<td>6.13 (.001)</td>
<td></td>
<td>0.47 (0.009)</td>
<td>-0.002 (0.943)</td>
<td>0.46 (0.007)</td>
</tr>
<tr>
<td></td>
<td>← Perceived health status</td>
<td>.04</td>
<td>5.34 (.001)</td>
<td></td>
<td>0.24 (0.006)</td>
<td>-0.002 (0.943)</td>
<td>0.24 (0.006)</td>
</tr>
</tbody>
</table>

CR: Critical ratio; SMC: squared multiple correlation.
いま、健康関連QoLを従属変数として、β = -38, p = .008)が有意に影響を及ぼすことが示唆された。これらは、健康関連QoLに直接影響を与える因子として、自尊心、社会的支援、回復力の順に影響が大きかった。健康関連QoLの直接効果として、回復力（β = .47, p = .009）、自己一定感（β = .37, p = .006）、総合的なQoL（β = .34, p = .006）が有意に影響を与えた。自尊心と社会的支援は、健康関連QoLに間接的に影響を与える因子として、回復力（β = .25, p = .025）、自己一定感（β = .20, p = .009）を媒介する関係を示した。

Discussion

本研究の目的は、女性リウマチ関節炎患者の健康関連QoLの変動を説明し、予測するために仮説的モデルを構築することである。対象者の健康関連QoLへの直接効果として、回復力（β = .47, p = .009）、自己一定感（β = .37, p = .006）、総合的なQoL（β = .34, p = .006）が有意に影響を与えた。また、対象者の健康関連QoLへの間接効果として、回復力（β = .25, p = .025）、自己一定感（β = .20, p = .009）が媒介する関係を示した。

本研究において、社会的支援が最も重要であることが示された。社会的支援は、自尊心、健康状態、症状（疲労、うつ）、社会的支援の順に健康関連QoLを直接的に影響を与えることが示された。また、社会的支援が媒介する回復力、自己一定感の影響もあり、これらは健康関連QoLに間接的に影響を与えることが示された。

結論として、リウマチ関節炎患者の健康関連QoLを向上させるためには、社会的支援の向上が必要である。また、回復力、自己一定感の向上も重要であるが、これらは社会的支援の向上を介して健康関連QoLに影響を与える。よって、これらの要素を考慮した支援策の開発が求められる。
가 있다.

**Conflict of interest**
The authors declared no conflict of interest.

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None.

**Data availability**
Please contact the corresponding author for data availability.

**Acknowledgments**
None.

**References**
31. Chang SJ. Standardization of collection and measurement of health statistics data. Seoul: The Korean Society for Preven-


Middle-aged women's experiences of physical activity for managing menopausal symptoms: a phenomenological study

Hee Jung Cho, Sukhee Ahn
College of Nursing, Chungnam National University, Daejeon, Korea

Purpose: The purpose of this study was to comprehensively understand and describe the meaning of physical activity for managing menopausal symptoms in middle-aged women.

Methods: This study targeted middle-aged women with menopausal symptoms who participated in regular exercise at least three times a week for more than 12 weeks. Nine participants were individually interviewed via in-depth face-to-face interviews, and participatory observation was also employed. Colaizzi's phenomenological qualitative research method was applied for analysis.

Results: Participants were asked, "What does it mean to participate in physical activity at this time of your life?" Fourteen codes, six themes, and three theme clusters were derived for the meaning of physical activity for managing menopausal symptoms these middle-aged women. The six themes were "reviving the exhausted body and mind," "being free from the yoke of pain," "being settled in life," "finding oneself and becoming altruistic," "striving while anticipating change," and "equipping the body and mind." The three theme clusters were "overcoming my past pain," "taking the initiative for today's life," and "moving towards new change."

Conclusion: The narratives revealed that physical activity allowed women to overcome menopausal symptoms, the burden of relationships, and stress, thereby enabling them to make positive changes in their lives and have expectations for the future. Thus, physical activity was a positive force in a healthy menopausal transition for women with menopausal symptoms. The findings of this study can be used to encourage physical activity in peri-menopausal women and to develop physical activity programs for managing menopausal symptoms.

Keywords: Menopause; Middle aged; Physical activity; Qualitative research; Women

Introduction

Physical activity is closely related to daily life and brings many health benefits, such as improving cardiovascular health and reducing the risk of chronic diseases. However, physical activity is also crucial for the management of menopausal symptoms. The purpose of this study was to comprehensively understand and describe the meaning of physical activity for managing menopausal symptoms in middle-aged women. This study targeted middle-aged women with menopausal symptoms who participated in regular exercise at least three times a week for more than 12 weeks. Nine participants were individually interviewed via in-depth face-to-face interviews, and participatory observation was also employed. The data was analyzed using Colaizzi's phenomenological qualitative research method.

Results:

Participants were asked, "What does it mean to participate in physical activity at this time of your life?" Fourteen codes, six themes, and three theme clusters were derived for the meaning of physical activity for managing menopausal symptoms these middle-aged women. The six themes were "reviving the exhausted body and mind," "being free from the yoke of pain," "being settled in life," "finding oneself and becoming altruistic," "striving while anticipating change," and "equipping the body and mind." The three theme clusters were "overcoming my past pain," "taking the initiative for today's life," and "moving towards new change."

Conclusion:

The narratives revealed that physical activity allowed women to overcome menopausal symptoms, the burden of relationships, and stress, thereby enabling them to make positive changes in their lives and have expectations for the future. Thus, physical activity was a positive force in a healthy menopausal transition for women with menopausal symptoms. The findings of this study can be used to encourage physical activity in peri-menopausal women and to develop physical activity programs for managing menopausal symptoms.
선하고 요실금 증상과 우울 완화에 효과가 있는 것으로 나타났다 [3, 4]. 그러나 현재 한국 중년 여성의 신체활동 참여도는 많이 낮은 반면 여가 활동량은 상대적으로 적은 것으로 조사되고 있다 [5]. 이에 한국 보건복지부는 신체활동 지침을 통해 한국 성인은 근력운동을 일주일에 2회 이상 수행하고, 일주일에 150분 이상의 중강도 유산소 신체활동 또는 일주일에 75분 이상의 고강도 신체활동을 수행할 것을 권장하고 있으며 [6], 이를 통해 본인의 자각 강도를 휴식할 때의 자각 강도인 1에서부터 본인이 수행할 수 있는 가장 높은 강도인 10까지 정하여 제시함으로써 실생활에서 누구나 쉽게 신체활동에 적용할 수 있도록 하고 있다.

폐경은 중년 여성이 경험하는 정상적인 생의 과정에 속하지만 여성의 삶에서 생리적·정신적·사회적 위기로 작용할 수 있다. 이에 병태학적 당뇨병, 만성비 등의 다양한 폐경증상과 함께 성인의 감염과 태도의 변화, 관계의 변화 등 다양한 변화를 경험하게 된다 [7]. 그리고 이것은 폐경 여성의 삶에 직접적으로 부정적인 영향을 미치며 노화에 대한 불안감을 높이는 요인이 된다 [8, 9]. 현재 한국 여성의 평균 폐경 나이는 49.9세로 보고되며 [10], 일반적으로 폐경증상은 폐경 4~6년 전에 시작되어 몇 년간 계속되는데 [11], 이 기간 동안 폐경증상은 지속적으로 여성의 삶의 질을 떨어뜨리는 원인이 될 뿐만 아니라 그로 인해 본인의 만족도를 떨어뜨리고, 감정적 반응을 일으키는 요인 중 하나이다 [12]. 현재 한국 여성의 평균 폐경 나이는 49.9세로 보고되고 있으며 [13], 일반적으로 폐경증상은 폐경 4~6년 전에 시작되어 몇 년간 계속되는데 [14], 이 기간 동안 폐경증상은 지속적으로 여성의 삶의 질을 떨어뜨리는 원인이 될 뿐만 아니라 그로 인해 본인의 만족도를 떨어뜨리고, 감정적 반응을 일으키는 요인 중 하나이다 [15].

Therefore, the essential meaning of physical activity for menopausal symptom management was to overcome the past pain, take the initiative for today's life, and move towards new change. Implications for practice, education, and/or policy Physical activity not only helped women to overcome menopausal symptoms during peri-menopause, but also enabled a sense of initiative and expectation for the future. Physical activity programs for menopausal symptom management should be widely implemented, and local support systems for menopausal women should be activated.
Methods

Ethics statement: This study was approved by the Institutional Review Board of Chungnam National University (202205-SB-057-01). Informed consent was obtained from the participants.

Methods

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Results

Ethics statement: This study was approved by the Institutional Review Board of Chungnam National University (202205-SB-057-01). Informed consent was obtained from the participants.

Table 1. Characteristics of participants (N=9)

<table>
<thead>
<tr>
<th>ID</th>
<th>Age (year)</th>
<th>Age at menopause (year)</th>
<th>Occupation</th>
<th>Menopausal symptoms</th>
<th>Type</th>
<th>Duration</th>
<th>Frequency of &gt; 50 min/week</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>58</td>
<td>48</td>
<td>Housewife</td>
<td>Hot flashes, sleep disorder, digestive disorder, stress</td>
<td>Zumba</td>
<td>1 year</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Swimming</td>
<td>10 years</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>56</td>
<td>50</td>
<td>Social worker</td>
<td>Hot flashes, depression, stuffy in the chest, sleep disorder, fatigue</td>
<td>Valley</td>
<td>2 years</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Yoga</td>
<td>2 years</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>52</td>
<td>49</td>
<td>Housewife</td>
<td>Hot flashes of the sole, frozen shoulder, palpitations during sleep</td>
<td>Yoga</td>
<td>2 years</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>59</td>
<td>50</td>
<td>Housewife</td>
<td>Dry skin, lumbar pain, emotional ups and downs, frozen shoulder</td>
<td>Zumba</td>
<td>1 year</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Yoga</td>
<td>1 year</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Golf</td>
<td>1 year</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>57</td>
<td>53</td>
<td>Sales position</td>
<td>Hot flashes, sleep disorder</td>
<td>Yoga</td>
<td>4 months</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>55</td>
<td>54</td>
<td>Self-employment</td>
<td>Vaginal drying, cystitis, emotional ups and downs</td>
<td>Aerobics</td>
<td>2 years</td>
<td>5</td>
</tr>
<tr>
<td>7</td>
<td>59</td>
<td>55</td>
<td>Hairdresser</td>
<td>Vaginal pain, diminished sexual desire, irritability</td>
<td>Aerobics</td>
<td>8 years</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>55</td>
<td>54</td>
<td>Company staff</td>
<td>Depression, irritability, cold sweats</td>
<td>Zumba</td>
<td>3 years</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Yoga</td>
<td>3 years</td>
<td>3</td>
</tr>
<tr>
<td>9</td>
<td>52</td>
<td>50</td>
<td>Housewife</td>
<td>Hot flashes, depression, sleep disorder, headache</td>
<td>Yoga</td>
<td>4 years</td>
<td>3</td>
</tr>
</tbody>
</table>
고 정확한 결과를 도출하기 위해 노력하였다. 또한 연구자들은 자료 수집과 분석, 결과 도출과 마찬가지로 최종기술에 이르기까지 자료의 의미에 대한 정확한 이해를 위해 함께 논의하며 고심하였다.

자료수집을 담당한 본 연구자는 GX 프로그램에 회원으로 등록하여 각 프로그램에 자유롭게 참여하며 그들을 가까이에서 관찰하였으며 참여자들을 더 깊이 있게 이해하기 위하여 평소 신뢰 관계 형성을 위한 노력하였다. 또한, 현재 콜레스테롤 수준을 관리하기 위해, 주로, 정보 교환을 통해 평소 신뢰 관계 형성을 위한 노력하였다. 

자료 수집
본 연구를 위한 자료수집은 2022년 9월 11일에 6개월 동안 심층 면담과 참여관찰을 통하여 수행하였다. 심층 면담을 위한 주요 질문은 “신체활동 참여는 귀하에게 어떤 의미가 되는가?”였으며, “귀하의 폐경증상 관리에 대한 신체활동 경험에 대해 자유롭게 말씀해 주시겠어요?”로 시작하여, “신체활동 참여는 귀하의 삶에 어떠한 영향을 주었나요?”를 추가하면서, 참여자의 경험을 자유롭게 끌어내고자 하여 최대한 질문 수를 줄이고 상황에 따라 자연스럽게 질문을 이어가는 형식으로 하였다. 본 연구자는 적절하고 충분한 자료를 수집하기 위하여 센터의 회원으로 가입한 후 참여자들과 함께 GX 프로그램에 참석하여 참여자들을 관찰함으로써 그들의 경험을 좀 더 깊이 있게 이해하고자 노력하였다. 또한 본 연구자는 요가와 줌바댄스 프로그램에 참여하면서 참여자들이 폐경증상 경험과 관련된 경험을 가장 적절한 대상자 선정에 참고하였으며, 신체활동에 참여하는 동안 참여자들의 행동 뿐만 아니라 얼굴 표정과 태도 및 신체활동 후 주고받는 대화를 관찰하여 자료분석에 반영하였다. 면담을 시작하기 전, 면담자와 본 연구자의 서면을 통해, 사회적 공간을 설정한 후, 참여자와 함께 GX 프로그램에 참여한 후, 참여자와의 초기 면담을 진행하였다. 본 연구자는 본 연구의 취지에 맞게, 참여자의 의견을 존중하고자 노력하였으며, 본 연구의 결과가 참여자들의 경험을 잘 나타나고 있는지를 확인하였다. 둘째, 적용성 (applicability)을 위하여 포화에 이르기까지 충분한 자료를 수집하였고, 분석된 연구의 결과를 심층적으로 기술함으로써 참여자들의 신체활동 경험에 대한 최대한의 객관성을 전달하고자 노력하였다. 일관성 (consistency)을 위하여, 참여자들의 경험과 dataset의 일관성을 유지하기 위해, 본 연구의 결과가, 참여자들의 폐경증상 관리에 대한 신체활동 경험에 대한 최대한의 객관성을 전달하고자 노력하였다. 셋째, 일관성 (consistency)을 위하여, 미리 준비된 면담을 위한 질문을 중심으로 심층 면담을 진행하고 본 연구의 자료 분석 기법인 Colaizzi [23]의
타인과의 관계에 집착하던 것에서 자유로워지고, 그동안 쌓였던 스트레스를 풀어내면서 고통의 굴레에서 벗어나게 되었고 그러한 고통을 지나간 과거로 인식하고 있었다. 이는 참여자들이 신체활동을 통하여 그동안 참여자들은 옥죄고 있었던 고통을 극복하게 되었다는 것을 의미한다.

주제 1: 소진된 몸과 마음 살리기

참여자들은 폐경증상으로 인해 몸과 마음의 건강상태가 일상 생활을 유지하기 힘들 정도로 나빠졌다고 하였다. 온몸을 타고 뜨겁게 달아오르는 열감으로 수면장애를 경험하기도 하였고, 직장생활 뿐만 아니라 일상생활이 어려울 정도로 우울감과 무력감으로 시달렸다고 하였다. 따라서 참여자들이 신체활동을 선택한 것은 남은 인생을 살아내기 위한 마지막 몸부림이라고 하였다. 참여자들은 대부분 두 가지 이상의 폐경증상으로 고통받았었는데, 각자 자기에게 맞는 신체활동을 찾아 꾸준히 참여하게 되면서 조금씩 그 증상이 상당히 개선되었을 뿐만 아니라, 남아 있는 증상에 대해서도 스스로 자신을 조절할 수 있겠다는 자신감이 생겼다고 하였다.

"관리하면 본전이고 관리를 안 하면 완전히 그냥 바닥을 치는 거지. 운동 안 하면 몸도 완전 바닥이고 직장생활도 유지가 안 되니까. 지금 이 나이에는 운동 안 하면 직장을 그만둬야 할지도 모르겠어요." (참여자 2)

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"폐경 후 연구관계, 진단관계, 구강관계 등 다 같이 왔죠. 내 핫 터 안에서 냅다가 내가 나는는데... 고통이 말도 못해, 오만 약 다 쓰고 뭐.

Table 2. Codes, themes, and theme clusters of the meaning of physical activity for menopausal symptom management

<table>
<thead>
<tr>
<th>Code</th>
<th>Theme</th>
<th>Theme cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td>Living with an exhausted body</td>
<td>Reviving the exhausted body and mind</td>
<td>Overcoming my past pain</td>
</tr>
<tr>
<td>A gradual improvement in menopausal symptoms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Free from the obsession with relationships</td>
<td>Being free from the yoke of pain</td>
<td></td>
</tr>
<tr>
<td>Relieving accumulated stress</td>
<td>Being settled in life</td>
<td>Taking the initiative for today's life</td>
</tr>
<tr>
<td>Finding the right one</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In love with fun</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Being the center of life</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time for only me</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recovered emotions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broadened mind</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A desire to be young</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Losing weight in a hurry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aging healthy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preparing for old age</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Cho HJ and Ahn S • Physical activity for managing menopausal symptoms

Results

폐경증상 관리를 위한 중년 여성의 신체활동 참여 경험이의 의미는 14개의 코드, 6개의 주제, 3개의 주제묶음으로 도출되었다(Table 2). 한편으로도 도출된 3개의 주제묶음인 ‘과거의 고통에서 벗어나기’, ‘오늘의 삶에서 주도권 잡기’, ‘새로운 변화를 기대하며 나아가기’에 대한 의미 있는 진술은 다음과 같다.

주제 묶음 1. 과거의 고통에서 벗어나기

이 주제묶음에는 ‘소진된 몸과 마음 살리기’, ‘고통의 굴레에서 벗어나기’가 포함되었다. 참여자들은 폐경증상으로 인해 몸과 마음이 소진된 상태에서 남은 삶을 살아내기 위해 신체활동에 참여하였고, 관계에 대한 집착과 스트레스 등으로 인한 고통에서 벗어나는 경험을 한 것으로 나타났다. 참여자들은 폐경증상이 조금씩 나아지고, 태인과의 관계에 집착하던 것에서 자유로워지고, 그동안 쌓였던 스트레스를 풀어내면서 고통의 굴레에서 벗어나게 되었고 그러한 고통을 지나간 과거로 인식하고 있었다. 이는 참여자들이 신체활동을 통하여 그동안 참여자들을 옥죄고 있었던 고통을 극복하게 되었다는 것을 의미한다.

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참여자들은 폐경증상으로 인해 몸과 마음의 건강상태가 일상생활을 유지하기 힘들 정도로 나빠졌다고 하였다. 온몸을 타고 뜨겁게 달아오르는 열감으로 수면장애를 경험하기도 하였고, 직장생활 뿐만 아니라 일상생활이 어려울 정도로 우울감과 무력감으로 시달렸다고 하였다. 따라서 참여자들이 신체활동을 선택한 것은 남은 인생을 살아내기 위한 마지막 몸부림이라고 하였다. 참여자들은 대부분 두 가지 이상의 폐경증상으로 인해 고통받았었는데, 각자 자기에게 맞는 신체활동을 찾아 꾸준히 참여하게 되면서 조금씩 그 증상이 상당히 개선되었을 뿐만 아니라, 남아 있는 증상에 대해서도 스스로 자신을 조절할 수 있겠다는 자신감이 생겼다고 하였다.

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"폐경 후 연구관계, 진단관계, 구강관계 등 다 같이 왔죠. 내 핫터 안에서 냅다가 나는는데... 고통이 말도 못해, 오만 약 다 쓰고 뭐.
그런데 좋아지는 거 아니야. 내 몸 자체에 호르몬 밸런스 때문에 그건 아닌 거야. 운동 안 하면 어깨도 결리고 목도 쑤셔" (참여자 4)

"불면증이 와서 밤을 끼เลย 나는 거는 허다하고, 몸이 활발 타 오를 때는 순간적으로 온몸에 비 오듯이 땀이 나서 방금 샤워하고 나왔는데도 수건으로 닦고 있는데 그 자리에서 바로 땀이 올라와요. 운동하면 잠도 더 잘 자고 운동으로 열을 빼고 나면 좀 나아요." (참여자 9)

주제 2: 고통의 굴레에서 벗어나기

참여자들은 신체활동에 참여하면서 다른 사람보다는 자신에게 더 집중하게 되었고, 자연스럽게 집안과 남편에 대한 집착의 굴레에서 서서히 벗어나게 되었다고 하였다. 그동안 누군가의 머느리이자 아내로 또 엄마로 섭섭하게 살아왔지만 늘 다른 사람에게 집착하는 듯한 사람이 살던 스스로 감정에 잠긴듯한 느낌을 받았는데, 생전 처음으로 이제는 삶의 일부이자 필수가 되었고 가끔 참여하지 못할 때에는 불안을 느끼기도 하지만, 오히려 이러한 감정은 신체활동을 자극하는 데 도움이 되었다고 하였다. 참여자들은 신체활동 참여를 이성의 모든 선택에서 가장 우선 순위에 두고 있었는데, 시간을 맞추기 어려울 때도 센터에 와서 사라리도 하고 가면 신체활동 참여를 한 것과 같은 기쁨이 느껴지며 마음에 위안이 되었다고 하였다.

"나는 요가가 좋아. 기구의 도움을 받지 않고 내 몸만을 앞으로 할 수 있으니까. 내 성격이 몸을 좌우하는 데 힘이 많고, 음악에 맞춰서 편기를 하는 거 나와는 안 맞아. 요가 소리로 나서 심장이 평평거리고 매우 편하다는 거 같아요." (참여자 3)

"요가보다는 나는 줌바가 좋아. 몸을 흔들어야 좋아… 스트레스 받지 않고 해야 해. 자기한테 맞는 거를 찾으면 돼." (참여자 4)

" 너무 행복해. 운동 안 해도 몸이 편한 거 같아. 운동에 완전 정신이 지. 거의 한 달을 이렇게 해보니까 거의 중독된 것처럼 이제 안 하면 불편하고 계속해야 한다는 생각이 들어요." (참여자 8)

"음악을 들으면서 하니 신나잖아요. 나에게 맞아요. 에어로빅은 이제 나 타리에 허락하는 건 하고 그 다음은 걱정이 없어요. 운동이 나의 삶의 일부가 된 것 같아요. 이제 운동 안 하면 절대 미칠 것 같아. 무슨 과도인 거 같아요." (참여자 6)

"빨리 해야 내가 운동 같을 수 있으니까… 대충 하고 오는 거지. 저녁 11시에 끝나도 여기 와서 삼계침 잡아가니가 운동하고 생각하지, 잡아 여기 오는 거야. 도접을 박는 거야." (참여자 5)

"나는 어떤 것보다도 운동이 우선이야. 운동을 오전에 하고 12시에 이용시켜도 여기 와서 쌓기 하고 8시까지 일하지. 기본 시간들은 잦아. 나는 이 건 아름다운 건 우승 순위로 건강을 위해서 오전은 운동에 다 투자해." (참여자 7)

주제 4: 자기를 찾고 이타심이 생김

이 주제 묶음에서는 ‘살 속에 자리잡음, ‘자기를 찾고 이타심이 생김’이라는 주제가 포함되었다. 참여자들은 자기에게 잘 맞는 신체활동을 발견하고 그 썰매에 놓리게 되면서 신체활동 참여하는 것을 중심으로 수 년간 경험하였고, 또한 참여자들은 운동으로 자신의 변화를 주목하면서 그동안 마무리했던 생활 속 변화를 깨닫게 되었고, 마음의 폭이 넓어지면서 다른 사람을 이해하고 용서하는 마음의 여유가 생겼다고 하였다. 이로써 참여자들은 조금씩 자신이 삶에 대한 주도권을 회복해 가지고 있는 것으로 나타났다.

주제 3: 삶 속에 자리 잡음

참여자들은 그동안 여러 번의 실패와 어려움을 겪지면서 각자에게 잘 맞는 신체활동을 찾게 되었는데 이제는 몸 상태에 따라 스스로 활동량을 조절할 수 있을 뿐만 아니라 무엇을 어떻게 해야 할지에 대한 고민을 더 이상 하지 않고 생활이 변화가 심화되었다고 하였다. 또한 참여자들은 신체활동 참여가 다른 사람들과의 갈등을 대신으로 해소하는 데 도움이 된다고 하였다. 참여자들은 신체활동 참여를 일상의 모든 선택에서 가장 우선 순위에 두고 있었는데, 시간을 맞추기 어려울 때도 센터에 사라리도 하고 가면 신체활동 참여를 한 것과 같은 기쁨이 느껴지며 마음에 위안이 되었다고 하였다.

"나는 요가가 좋아. 기구의 도움을 받지 않고 내 몸만을 앞으로 할 수 있으니까. 내 성격이 몸을 좌우하는 데 힘이 많고, 음악에 맞춰서 편기를 하는 거 나와는 안 맞아. 요가 소리로 나서 심장이 평평거리고 매우 편하다는 거 같아요." (참여자 3)

"요가보다는 나는 줌바가 좋아. 몸을 흔들어야 좋아… 스트레스 받지 않고 해야 해. 자기한테 맞는 거를 찾으면 돼." (참여자 4)

" 너무 행복해. 운동 안 해도 몸이 편한 거 같아. 운동에 완전 정신이 지. 거의 한 달을 이렇게 해보니까 거의 중독된 것처럼 이제 안 하면 불편하고 계속해야 한다는 생각이 들어요." (참여자 8)

"음악을 들으면서 하니 신나잖아요. 나에게 맞아요. 에어로빅은 이제 나 타리에 허락하는 건 하고 그 다음은 걱정이 없어요. 운동이 나의 삶의 일부가 된 것 같아요. 이제 운동 안 하면 절대 미칠 것 같아. 무슨 과도인 거 같아요." (참여자 6)

"빨리 해야 내가 운동 같을 수 있으니까… 대충 하고 오는 거지. 저녁 11시에 끝나도 여기 와서 삼계침 잡아가니가 운동하고 생각하지, 잡아 여기 오는 거야. 도접을 박는 거야." (참여자 5)

"나는 어떤 것보다도 운동이 우선이야. 운동을 오전에 하고 12시에 이용시켜도 여기 와서 쌓기 하고 8시까지 일하지. 기본 시간들은 잦아. 나는 이 건 아름다운 건 우승 순위로 건강을 위해서 오전은 운동에 다 투자해." (참여자 7)

주제 묶음 2. 오늘의 삶에서 주도권 잡기

이 주제 묶음에는 ‘살 속에 자리잡음, ‘자기를 찾고 이타심이 생김’이라는 주제가 포함되었다. 참여자들은 자기에게 잘 맞는 신체활동을 발견하고 그 썰매에 놓리게 되면서 신체활동 참여하는 것을 중심으로 수 년간 경험하였고, 또한 참여자들은 운동으로 자신의 변화를 주목하면서 그동안 마무리했던 생활 속 변화를 깨닫게 되었고, 마음의 폭이 넓어지면서 다른 사람을 이해하고 용서하는 마음의 여유가 생겼다. 이로써 참여자들은 조금씩 자신이 삶에 대한 주도권을 회복해 가지고 있는 것으로 나타났다.

주제 2: 고통의 굴레에서 벗어나기

참여자들은 신체활동에 참여하면서 다른 사람보다는 자신에게 더 집중하게 되었고, 자연스럽게 집안과 남편에 대한 집착의 굴레에서 서서히 벗어나게 되었다고 하였다. 그동안 누군가의 머느리이자 아내로 또 엄마로 섭섭하게 살아왔지만 늘 다른 사람에게 집착하는 듯한 사람이 살던 스스로 감정에 잠긴듯한 느낌을 받았는데, 생전 처음으로 이제는 삶의 일부이자 필수가 되었고 가끔 참여하지 못할 때에는 불안을 느끼기도 하지만, 오히려 이러한 감정은 신체활동을 자극하는 데 도움이 된다고 하였다. 참여자들은 신체활동 참여를 일상의 모든 선택에서 가장 우선 순위에 두고 있었는데, 시간을 맞추기 어려울 때도 센터에 사라리도 하고 가면 신체활동 참여를 한 것과 같은 기쁨이 느껴지며 마음에 위안이 되었다고 하였다.

"나는 요가가 좋아. 기구의 도움을 받지 않고 내 몸만을 앞으로 할 수 있으니까. 내 성격이 몸을 좌우하는 데 힘이 많고, 음악에 맞쳐서 편기를 하는 거 나와는 안 맞아. 요가 소리로 나서 심장이 평평거리고 매우 편하다는 거 같아요." (참여자 3)

"요가보다는 나는 줌바가 좋아. 몸을 흔들어야 좋아… 스트레스 받지 않고 해야 해. 자기한테 맞는 거를 찾으면 돼." (참여자 4)

" 너무 행복해. 운동 안 해도 몸이 편한 거 같아. 운동에 완전 정신이 지. 거의 한 달을 이렇게 해보니까 거의 중독된 것처럼 이제 안 하면 불편하고 계속해야 한다는 생각이 들어요." (참여자 8)

"음악을 들으면서 하니 신나잖아요. 나에게 맞아요. 에어로빅은 이제 나 타리에 허락하는 건 하고 그 다음은 걱정이 없어요. 운동이 나의 삶의 일부가 된 것 같아요. 이제 운동 안 하면 절대 미칠 것 같아. 무슨 과도인 거 같아요." (참여자 6)

"빨리 해야 내가 운동 같을 수 있으니까… 대충 하고 오는 거지. 저녁 11시에 끝나도 여기 와서 삼계침 잡아가니가 운동하고 생각하지, 잡아 여기 오는 거야. 도접을 박는 거야." (참여자 5)

"나는 어떤 것보다도 운동이 우선이야. 운동을 오전에 하고 12시에 이용시켜도 여기 와서 쌓기 하고 8시까지 일하지. 기본 시간들은 잦아. 나는 이 건 아름다운 건 우승 순위로 건강을 위해서 오전은 운동에 다 투자해." (참여자 7)
할 수 있겠다는 자신감을 회복하게 되었다고 하였다. 참여자들은 그 동안 무기력했던 몸과 마음이 살아나 인생을 즐길 수 있는 기쁨을 되찾게 되었는데, 점점 우울한 감정이 사라지고 건강과 생명감을 느껴 왔고, 신체활동에 참여하기 위해 오는 거리의 풍경도 매번 다르고 새롭게 느껴지는 것으로 나타났다. 또한 그동안 다른 사람과의 관계에서 많이 영향받았다는 것을 깨닫게 되었고 이는 해방의 폭이 넓어지게 된 것을 의미한다.

"누구를 보여주기 위한 것도 아니고, 어느 날 폐경이 오고 몸이 안 좋아지면서 운동을 하게 되었는데, 그러면서 나를 객관적으로 보게 되었고 오히려 나를 찾고 사랑하게 된 거지." (참여자 3)

"나는 운동할 때 나를 제대로 볼 수 있는 공간이 필요해. 다른 사람이나 다른 사람들과의 관계에서 속이 많이 좁았었다는 것을 깨닫게 되었고 이제는 폐경을 겪어야 하는 같은 여자로서 시어머니에 대한 측은지심도 생기고 늘 여기저기 아프다시피 했던 젊음의 심정도 이해하게 되었습니다. 또한 그동안 신체활동에 규칙적으로 참여한 이후 몸이 회복되면서 점차적으로 마음의 폭이 넓어져 기뻐하는 것을 느꼈습니다.

주제 5: 변화를 기대하며 노력하기

참여자들은 늘어가는 자신의 모습이 계속 신경 쓰이고 따르는 불안을 느끼고 있었습니다. 또 젊어진 여자들은 보다 유연한 부럽기도 하고 자신도 젊음을 위해 더 열심히 노력하고 싶다고 하였습니다. 그러므로 참여자들이 지금 할 수 있는 최선은 신체활동에 더 열심히 참여하는 것이라고 하였습니다. 또한 참여자들은 폐경이 되면서 싱싱한 삶을 향하게 되며, 신체 활동에 참여하는 것에 더 열심히 참여하게 하였습니다. 더 늙게 되기 전에 운동을 하고 싶다고 생각한 사람들은 덜더러 운동을 하기 위해 신체활동에 더 열심히 참여들에게 됐다고 하였다.

주제 6: 몸과 마음 갖추기

참여자들에게 신체활동이란 곧 경건을 의미한다고 하였다. 참여자들은 더 곱고 우아하게 나이 들어고 싶다고 하였습니다. 그리고 제발 아프지 않고 건강한 삶을 살고 싶은 모습으로 죽을 수 있기를 희망하고 있었으며, 건강하신 나이 들기 위하여 더 열심히 신체활동에 참여한다고 하였다. 참여자들은 노년을 태우하여 보빨을 듯다는 생각으로 열심히 신체활동에 참여하고 있으며, 나아가 들이-fetch 할 수 있는 신체활동을 더 배우고 있다고 하였다. 그리고 자기에게 가장 잘 맞는 신체활동을 인생의 선물이요 평생의 친구 같은 존재로 여긴다고 하였다.

"죽을 때 좋게 죽을 수 있게. 얼굴에 그 사람의 인생이 보인다고 하잖아요. 곱게 늙어야 한다고 생각해요. 고하게 기울어도 아프지 않고, 조금씩 많이 좋아지고 있어. 예전보다."

"운동은 곧 경건이지. 미를 떠나서 이 나이에 안 아프면 어디 가도 신체적인 조건이 되면 일할 수 있고, 경제적인 걸 맞을 수 있으니까요."
'나는 운동도 노년 대비로 하는 거야. 한 번 배워 놓으면 나만 채 들고 나가면 혼자 할 수도 있는 거고, 친구들과 오래 걸을 수 있는 운동이니까 나에 머리도 할 수 있어.' (참여자 4)

"운동은 인생의 보험이야. 인생의 선물이고 친구 같은 존재야. 요기는 내 인생의 마지막까지 가져갈 최후의 운동이니까. 아마 평생 먹어도 할 수 있어." (참여자 5)

이상과 같은 분석 결과를 통합한 폐경증상 관리를 위한 중년 여성의 신체활동 경험에 대한 최종 진술은 다음과 같다. 중년의 여성은 폐경증상으로 인해 소진된 몸과 마음을 회복하기 위해서 절박한 심정으로 신체활동을 선택했다. 신체활동에 참여하면서 몸과 마음이 점차 회복되기 시작했고, 그동안 자신을 옮아매고 있었던 남편에 대한 집착과 계속해서 쌓이는 스트레스의 굴레에서 벗어나는 경험을 했다. 시행착오를 거쳐 자기에게 가장 잘 맞는 신체활동을 찾아내면서 그 재미에 몰져들게 되었고, 점차 성장의 증상이 바뀌고 새로운 삶관이 삶 속에 자리 잡았다. 또한 오로지 자신에게 치중하는 시간을 가지면서 대인 성장을 통해 있는 그대로의 자신을 사는 것이 되었고, 다른 사람을 이해하는 마음의 폭이 넓어지고 위축되었던 감정이 살아나는 등 자기 자신을 찾고 오늘의 삶을 주도적으로 살아가게 되었다. 동시에 성취감을 다가오는 노화를 운동으로 느끼면서 안간힘을 다해 신체활동에 매달렸다. 또한 건강하게 잘 살아남아서는 노년에도 지속할 신체활동을 미리 준비하면서, 몸과 마음을 갖추어 나가고 있었다. 본 연구에서 참여자들은 폐경에 대해서는 자연스러운 노화의 과정으로 받아들이고 있었으나, 수면장애로 인해 인생을 의미하게 보았다. 또한 선행연구에서도 이미 보고한 바와 같이[17] 참여자들은 폐경이 되면서 집에 있을 때에도 우울감과 무력감이 더 심해지는 것을 경험했지만, 신체활동에 참여하면서 우울 중단이 많이 감소되었고, 몸과 마음의 힘을 찾게 된 것으로 나타났다. 특별히 주목할 것은 신체활동에 참여하여도 폐경증상이 완전히 없어지는 것은 아니지만 폐경증상이 그보다는 감소하였고, 남아 있는 증상도 신체활동에 참여함으로서 충분히 조절할 수 있다는 점인데, 이는 참여자들이 폐경증상을 잊고 만큼 신체활동의 재미에 몰입하고 자신의 인생을 스스로 통제할 수 있겠다는 자신감이 폐경증상의 조절에 미친 것으로 생각된다.

둘째, 폐경증상 관리에 중간 여성의 신체활동 경험은 오늘의 삶에 푹 빠져 있는 것이다. 이는 본 연구의 참여자들이 스스로 자기 삶의 주도권을 잡고 변화하고자 하는 노력이 현재의 정체성과 신체활동을 통한 물질적 경험에 힘을 얻는 경험으로, 신체활동을 통해 중년 여성들이 정체성을 되찾고, 자신의 삶에 주인이 되는 새로운 경험을 하고[22], 능동적으로 자신의 삶을 새롭게 향상하고 주체적으로 재구성해 나가는 경험을 하는 것으로 보고하고 있다[25]. 신체활동을 통해 폐경기에 여성이 자신감을 건축하고 삶의 질을 증가시키는 것을 알 수 있다.

본 연구에서 폐경증상 관리에 중간 여성의 신체활동 경험은, '과거의 고통에서 벗어날 수 있다', '오늘의 삶에서 주도권을 잡을 수 있다', '신체활동이 그 중요성을 인지하게 되었다'의 다섯가지 경험을 통해 본 연구에서 선택하였다. 이들은 모두 신체활동을 통해 이러한 과거의 경험에 대해 해방되었다. 신체활동에 참여하게 되면서 자기 자신들에 대해有更好的 경험을 하게 되었고, 그들은 쌓였던 스트레스를 신체활동을 통해 해소하는 것으로 나타났다. 이것은 신체활동을 통해 돌봄의 대상을 '나'에서 '나'로 전환하여 타인보다 자신에게 더 관심을 기울이게 되고[25], 건강과 스트레스가 완화되는 경험에 대한 보고[20]와 유사하다고 할 수 있다. 또한 신체활동은 폐경증상이 있는 여성의 삶의 질 개선에 미치는 면에 대해[26], 본 연구의 참여자 중 폐경이 되면서 돌봄공급을 진행한 참여자는 신체활동을 통해 돌봄공급으로 인한 만성통증이 개선되어 삶의 질이 올라간 것으로 확인되었고, 그 외 당뇨를 진단받은 참여자는 정상 혈당 수치를 유지하고 있는 것으로 확인되었다. 본 연구의 참여자들은 소득과 관계없이 가장 먼저 신체활동 프로그램에 등록하였고 신체활동 참여자를 보였는데[5], 본 연구의 참여자들에서는 폐경증상의 고통에서 벗어나 남은 삶을 잘 살아내는 것이 가장 긴급할 목록을 시사하는 부분이다.

본 연구에서 참여자들은 폐경에 대해서는 자연스러운 노화의 과정으로 받아들이고 있었으나, 수면장애로 인해 인생을 의미하게 보았다. 또한 선행연구에서도 이미 보고한 바와 같이[17] 참여자들은 폐경이 되면서 집에 있을 때에도 우울감과 무력감이 더 심해지는 것을 경험했지만, 신체활동에 참여하면서 우울 중단이 많이 감소되었고, 몸과 마음의 힘을 찾게 된 것으로 나타났다. 특별히 주목할 것은 신체활동에 참여하여도 폐경증상이 완전히 없어지는 것은 아니지만 폐경증상이 그보다는 감소하였고, 남아 있는 증상도 신체활동에 참여함으로써 충분히 조절할 수 있다는 점인데, 이는 참여자들이 폐경증상을 잊고 만큼 신체활동의 재미에 몰입하고 자신의 인생을 스스로 통제할 수 있겠다는 자신감이 폐경증상의 조절에 미친 것으로 생각된다.

본 연구에서 참여자들은 폐경에 대해서는 자연스러운 노화의 과정으로 받아들이고 있었으나, 수면장애로 인해 인생을 의미하게 보았다. 또한 선�行연구에서도 이미 보고한 바와 같이[17] 참여자들은 폐경이 되면서 집에 있을 때에도 우울감과 무력감이 더 심해지는 것을 경험했지만, 신체활동에 참여하면서 우울 중단이 많이 감소되었고, 몸과 마음의 힘을 찾게 된 것으로 나타났다. 특별히 주목할 것은 신체활동에 참여하여도 폐경증상이 완전히 없어지는 것은 아니지만 폐경증상이 그보다는 감소하였고, 남아 있는 증상도 신체활동에 참여함으로써 충분히 조절할 수 있다는 점인데, 이는 참여자들이 폐경증상을 잊고 만큼 신체활동의 재미에 몰입하고 자신의 인생을 스스로 통제할 수 있겠다는 자신감이 폐경증상의 조절에 미친 것으로 생각된다.

Discussion

본 연구에서 폐경증상 관리에 중간 여성의 신체활동 경험은, '과거의 고통에서 벗어날 수 있다', '오늘의 삶에서 주도권을 잡을 수 있다', '새로운 변화를 기대하며 나아가기'의 본질적 의미가 있는 것으로 확인되었다. 본 연구의 결과를 다음과 같이 논의하고자 한다.

첫째, 폐경증상 관리에 중간 여성의 신체활동 경험은 과거의 고통에서 벗어나기이다. 본 연구의 참여자들은 과거의 고통을 극복하고자 하는 노력이 현재의 정체성과 신체활동을 통해 이루어졌다. 이는 신체활동을 통해 이러한 과거의 경험에 대해 해방됨으로써 참여자들에게는 이미 지나간 과거로 인식되었음을 의미한다. 그리고 선행연구에서 보고한 폐경증상에 대한 신체활동의 효과를[17-19] 본 연구의 참여자들에게 경험하는 것으로 확인되었다. 참여자들은 과거에 집중하게 되면서 다른 사람들에 대한 집착에서 벗어난 경험을 하게 되었고, 그들은 쌓였던 스트레스를 신체활동을 통해 해소하는 것으로 나타났다. 이것은 신체활동을 통해 돌봄의 대상을 '나'에서 '나'로 전환하여 타인보다 자신에게 더 관심을 기울이게 되고[25], 건강과 스트레스가 완화되는 경험에 대한 보고[20]와 유사하다고 할 수 있다. 또한 신체활동은 폐경증상이 있는 여성의 삶의 질 개선에 미치는 면에 대해[26], 본 연구의 참여자 중 폐경이 되면서 돌봄공급을 진행한 참여자는 신체활동을 통해 돌봄공급으로 인한 만성통증이 개선되어 삶의 질이 올라간 것으로 확인되었고, 그 외 당뇨를 진단받은 참여자는 정상 혈당 수치를 유지하고 있는 것으로 확인되었다. 본 연구의 참여자들은 스스로의 삶을 주도적으로 삶의 질 개선에 협조하는 경험을 하는 것으로 확인되었다.

둘째, 폐경증상 관리에 중간 여성의 신체활동 경험은 오늘의 삶에서 주도권을 잡는 것이다. 이는 본 연구의 참여자들이 스스로 자기 삶의 주도권을 잡고 변화하고자 하는 노력이 현재의 정체성과 신체활동을 통해 이루어졌다. 이는 선행연구에서도 신체활동을 통해 중년 여성들이 정체성을 되찾는 경험을 하고[21], 참여자들에게 일상의 모든 영역에서 가장 우선적인 선박은 신체활동에 참여하는 것이었는데, 그들에게 신체활동 시간은 깊은 자기성찰을 통해 그들의 삶을 주도적으로 이끌어갈 수 있도록 해 줄 수 있는 기회가 되었다. 이는 신체활동을 통해 중년 여성들이 정체성을 되찾는 경험을 하고[22], 스스로의 삶을 새롭게 기획하고 주체적으로 재구성해 나가는 경험을 하는 것으로 보고하고 있다[25]. 신체활동을 통해 폐경기 여성이 자신감을 건축하고 삶의 질 개선을 위해 노력하는 것을 알 수 있다.

또한 폐경기 여성은 마음의 상황이 직접적인 삶의 증상으로 표현되기 심하고 몸과 마음이 통합되는 느낌을 자주 경험한다는 보고와 같이[27] 본 연구의 참여자들은 폐경증상으로 인해 몸과 마음의 통합에 소진되고 무력화되는 경험을 하였는데, 그들은 신체활동에 푹 빠져 참여하면서 몸의 변화뿐만 아니라 마음이 안정되는 경험을 하게 되었다.
의심하고 있었고 계속해서 긍정적인 삶의 변화를 이끌어내고자 노력하는 것으로 확인되었다. 또한 운동 관련 지각된 유익성이 높을수록 운동 수행 정도는 높고[30], 참여 만족은 운동 지속에 영향을 주게 되는데[31]. 폐경기에 해당하는 본 연구의 참여자들의 경우에는 폐경증상의 많은 부분이 신체활동을 통해 개선될 뿐만 아니라 재미와 함께 건강이 점점 더 좋아질 것이라는 긍정적 기대감이 신체활동을 지속하게 하는 것으로 보였다.

이상과 같이 폐경기 여성은 신체활동을 통하여 폐경증상, 관계, 스트레스 등을 극복하고 삶에서 긍정적인 변화를 경험하며 앞으로의 삶에 대한 기대감을 갖게 된다. 본 연구는 폐경증상 관리를 위한 신체활동의 실제 경험을 확인함으로써 참여자들의 관점에서 그들의 경험을 이해할 수 있는 데 의의가 있다. 본 연구가 폐경기 여성의 관점과 경험을 좀 더 깊이 이해하고 폐경관리를 위한 신체활동 참여를 높일 수 있는 향후 전략 개발의 실질적인 기초 자료로 제공될 수 있기를 기대한다. 또한 앞으로 폐경증상은 중증적으로 관리하도록 돕는 신체활동 프로그램이 보급되고, 폐경기 여성 만을 전담으로 하는 지역 시스템이 구축되어 활성화되어야 할 것이다. 아울러 본 연구에서는 시간의 경과에 따른 경험을 구체적으로 이해하기에는 제한이 있으므로 관련현상에 대한 이해의 폭을 넓혀서 위하여 추가 연구에는 종양 연구를 통해 폐경기 신체활동 경험의 구체적인 과정에 대해 좀 더 살펴볼 필요가 있다.

ORCID

Hee Jung Cho, https://orcid.org/0000-0001-7187-7393
Sukhee Ahn, https://orcid.org/0000-0002-1694-0027

Authors’ contributions

Conceptualization: Cho HJ, Ahn S; Formal analysis: Cho HJ; Writing-original draft: Cho HJ; Writing-review & editing: Cho HJ, Ahn S.

Conflict of interest

Sukhee Ahn has been president of the Korean Society of Women Health Nursing since 2022, and her term will continue until the end of 2023. The author is also statistical editor of Korean Journal of Women Health Nursing but was not involved in the review process. No other conflicts of interest are declared.

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References


Factors affecting the safe sexual behaviors of Korean young adults by gender: a structural equation model

Nalae Moon, Hyunjin Kang, Su Ji Heo, Ju Hee Kim

College of Nursing Science, Kyung Hee University, Seoul, Korea

Purpose: The aim of this study was to determine the factors that influence safe sexual behaviors of Korean young adults and identify differences by gender.

Methods: This study aimed to determine which factors affected safe sexual behaviors based on the Theory of Planned Behavior. Data from 437 Korean young adults (in their 20s and 30s) were collected via online survey between January 3 and January 28, 2022. The questionnaire included items on sexual body image, sexual role perception, sexual attitudes, sexual socialization, sexual communication, and safe sexual behaviors. Structural equation modeling was performed.

Results: According to the overall model fit of the hypothetical model, the final model was acceptable and explained 49% of safe sexual behaviors. Sexual attitudes (β = −.70, p < .001) and sexual communication (β = .53, p < .001) directly affected safe sexual behaviors, and sexual role perception (β = .42, p < .001) indirectly affected safe sexual behaviors in a combined model. There were gender differences in the path from sexual attitudes (β = −.94, p < .001) and sexual communication (β = .66, p < .001) to safe sexual behaviors and from sexual body image (β = .27, p < .001) to sexual communication.

Conclusion: Sexual attitudes and sexual communication were predictors of safe sexual behaviors, which differed by gender. Strategies that consider sexual attitudes, sexual communication, sexual role perception, and differences between men and women should be developed to improve the safe sexual behaviors of young adults.

Keywords: Attitude; Communication; Safe sex; Sex characteristics; Theory of Planned Behavior

Introduction

According to the World Health Organization and the Centers for Disease Control and Prevention news update in 2022 [1], more than 1 million people worldwide are newly diagnosed with sexually transmitted infections each day, with 45%, 52%, and 235% increases in gonorrhea (n = 677,769), syphilis (n = 133,945), and congenital syphilis (n = 2,148) cases, respectively, since the 2016 report [2]. Despite various campaigns and educational programs, condom use, which is the most effective way to prevent sexually transmitted infections, has not increased significantly over the past decade and awareness of condom use among young adults is lower than that among those in other age groups [2,3]. A study from the United States that analyzed trends in condom use from 2002 to 2017 identified condom use rates of 64.4% in 2002, 70.0% from 2006 to 2010, 65.6% from 2011 to 2015, and 67.1% from 2015 to 2017 in women aged 20 to 24 years old.

According to a recent national report in South Korea (hereafter Korea), there are changing trends in family structure among young adults aged 20 to 30 years old. The proportion of single-person households in Korea increased by more than 3.5 times in 2020 (31.7%) since 1990 (9.0%) [4]. Single-person
households made up 74.8% of the households of those in their 20s and 35.7% of the households of those in their 30s, compared to the 20% proportion of single-person households among those in their 40s and 50s [4]. In 2021, there were 192,507 marriages in Korea, indicating a decrease of about 10% compared to 2020. The number of marriages has steadily declined since 2011, falling below 200,000 for the first time in 2021.

While the legal marriage rate is falling, the perception of cohabitation and free sexual relationships among young adults is becoming more acceptable, with 68% of men and 62% of women in Korea viewing them favorably in 2022 [4]. In 2000, there were only 49 new human immunodeficiency virus (HIV)/acquired immunodeficiency syndrome (AIDS) patients in their 20s and 88 new patients in their 30s; however, in 2020, there were 150 new HIV/AIDS patients in their 20s and 208 new patients in their 30s. In 2020, 295 cases were registered among those in their 20s and 219 cases among those in their 30s, indicating an increasing trend [5].

Safe sexual behaviors refer to preventive sexual behaviors that can protect young adults from sexually transmitted infections resulting from risky sexual behaviors, including not using condoms during intercourse, having oral or anal sex, and having multiple sex partners [2]. Some predictors that influence safe sexual behaviors have been identified in previous studies [6-11].

Sexual body image perception is another factor associated with sexual behaviors. A high tendency regarding risky sexual behaviors was observed among men with a positive body image, while women with a positive body image tended to practice safer sexual behaviors [6].

Sexual role perception is also a factor associated with safe sexual behaviors. According to a study in the United States, female university students with more conventional perceptions about the role of men were less likely to use condoms, whereas female students who had more conventional perceptions about the role of women were more likely to use condoms [7].

Previous studies have found inconsistent associations between sexual attitudes and safe sexual behaviors. In the United States, Boone and Lefkowitz [8] found liberal sexual attitudes to be associated with risky sexual behaviors while drinking alcohol and not using a condom during intercourse with a sex partner. Conversely, in a Taiwanese study, the researchers found no association between sexual attitudes and safe sexual behaviors [9].

Sexual socialization refers to the attitudes of parents and peers toward individuals’ sexual behaviors that can influence one’s safe sexual behaviors [12,13]. According to a qualitative study of Latina mothers, sexual socialization through appropriate sex education by parents could promote safe sexual behaviors in their children [10].

Sexual communication between individuals and their parents or colleagues could also substantially influence safe sexual behaviors. A study conducted in the United States on sexually active university students found that when young adults had more sexual communication, they tended to report safer sexual behaviors. Self-efficacy regarding sexual communication was positively associated with actual sexual communication [11].

The Theory of Planned Behavior (TPB) developed by Ajzen explains how individuals decide to behave and what factors influence their intention to adopt certain health behaviors [14,15]. Three factors influence one’s intentions regarding health behaviors: attitudes, subjective norms, and perceived behavioral con-
trol [14,15]. Attitudes refer to one’s personal disposition toward a health behavior and to an individual’s specific evaluation, whether favorable or not, toward that health behavior. Subjective norms refer to the subjective feeling of pressure from society regarding whether to perform certain health behaviors. This influences how we view others’ specific behaviors and our perception of others’ attitudes [16]. Perceived behavioral control refers to an individual’s perception of their ability to control a specific health behavior. This tends to depend on the perception of certain internal factors, such as social resources and support from others [15,16].

Many studies have applied the TPB model to predict the safe sexual behaviors of young adults [17-21]. For example, a 2022 study from China used the TPB to identify the association between safe sexual behaviors and sexual knowledge in college students [18]. The group with a higher score for sexual knowledge, attitudes, and safe sexual behavioral intentions showed safer sexual behaviors. In the study, the factors that affected safe sexual behaviors were sexual attitudes, subjective norms, sexual socialization, and perceived behavioral control. In addition, a study from Taiwan on female adolescents (aged 15 to 24 years) also applied the TPB model and confirmed that better sexual communication can affect safe sex behaviors by promoting the intention to use condoms [17].

However, since the TPB mainly focuses on cognitive aspects of human behavior and explains a series of processes about how individuals change their health behaviors, the existing basic TPB model is limited in its ability to identify sufficient evidence regarding the factors associated with sexual behaviors [22]. First, the basic TPB model does not consider various environmental factors such as cultural background or self-body image conception when predicting individuals’ attitudes, subjective norms, and perceived behavioral control. Second, the basic TPB does not account for the possibility of moderating effects or interactions according to specific factors or the characteristics of the target population (such as sex, age, socioeconomic status, and others).

According to a previous study that used the TPB model to identify factors associated with contraception-related behaviors among unmarried young adults in Korea, there are significant differences between men and women in terms of exposure to sexual content and the intention to use contraception. In the study, male participants tended to be influenced directly when exposed to sexual content through various pathways. For the female participants, the intention to use contraception was mediated by their attitudes toward contraception [22]. Another study identified gender differences when predicting safer sexual behaviors among university students in Korea using the TPB model. Communication was found to have a direct effect on female students regarding safer sexual behaviors, while it showed no significant effect on male students [23].

Therefore, given the effect of demographic characteristics and environmental factors on sexual attitudes, subjective norms, and behavioral control, sexual body image and stereotypes regarding gender roles were added as external variables in our study. Furthermore, we specifically examined the direct and indirect effects of these five factors on safe sexual behaviors by expanding the TPB model, which revealed differences between men and women. Based on this context, the hypotheses of this study were as follows.

- **Hypothesis 1**: Based on the TPB, sexual attitudes, sexual socialization, and sexual communication would be associated with safe sexual behaviors in young adults.
- **Hypothesis 2**: Sexual body image perception and sexual role perception would act as exogenous variables in the expanded TPB.
- **Hypothesis 3**: Gender differences exist in the path toward safe sexual behaviors in young adults.

**Methods**

**Ethics statement**: This study was performed after obtaining approval from the Institutional Review Board Committee of Kyung Hee University (KHSIRB-21-245). All the study participants provided written informed consent.

**Study design**

This study employed structural equation modeling to identify the factors that affect safe sexual behaviors among Korean men and women of reproductive age. After constructing a theoretical model about safe sexual behaviors based on Ajzen’s TPB model, data were collected from young adults to verify the suitability and hypothesis of the model (Figure 1) [14]. This study followed the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) reporting guidelines (http://www.strobe-statement.org).

**Participants**

Men and women of reproductive age from Korea were recruited based on the following inclusion criteria: (1) unmarried adults in their 20s and 30s who had sex within the last 6 months, (2) whose parents were still alive at the time of data collection (for purposes of the larger study), and (3) who understood the pur-
pose of this study and had no difficulty understanding the questionnaire. The exclusion criteria were as follows: (1) adults who were homosexual or unsure of their sexual orientation, and (2) currently receiving treatment for sexual and reproductive health disorders.

Based on the cohorts included in previous studies [24-26], we aimed to include 200 men and 200 women in this study, and a total of 444 adults (222 men and 222 women) were recruited given a possible dropout rate of 10% [9]. Due to incomplete input and errors in the data collection process, we excluded data from seven participants. Data from 437 respondents were used in the final analysis.

Measurements
The following instruments were piloted with 40 adults (20 men and 20 women) to verify and improve the applicability of the and to reduce ambiguity due to cultural differences. In this process, two items dealing with asking partners about taking drugs via intravenous injection just before sex and anal sex, both of which are uncommon in Korean culture, were deleted. A total of 85 items were ultimately used in this study. The original version of all scales were translated and back-translated by a bilingual native speaker, and the items were modified for the Korean cultural context. Next, content validity index was evaluated by nursing professors who had experience conducting similar research, and the content validity index of all of the items was verified as being .80 or higher.

Safe sexual behaviors
Safe sexual behaviors in this study were assessed using the Safe Sex Behavior Questionnaire (SSBQ) developed by Dilorio et al. [27]. This 24-item tool was designed to measure the frequency with which recommended practices were used to reduce the risk of exposure to and transmission of sexually transmitted infections. It contains 15 positive and nine negative items across five sub-factors: risky behaviors, assertiveness, condom use, avoidance of bodily fluids, and avoidance of anal sex. Each item is rated on a 4-point scale from 1 (never) to 4 (always), and a higher total score (possible range, 24–96 points) indicates more frequent adoption of safe sexual behaviors. Cronbach’s α was .88 upon the tool’s development [27] and .80 in this study.

Sexual attitudes
Sexual attitudes in this study were measured using the Brief Sexual Attitude Scale (BSAS) developed by Hendrick et al. [28]. This 23-item tool was designed to assess multidimensional attitudes toward sex and consists of four subscales: permissiveness (10 items), birth control (three items), communication (five items), and instrumentality (five items). Each item is rated on a 5-point Likert scale from 0 (strongly agree) to 4 (strongly disagree). The total score is calculated (possible range: 0–92 points), and lower scores indicate greater permissiveness in sex. Cronbach’s α was .89 upon the tool’s development [28] and .88 in this study.
Sexual socialization

Sexual socialization was measured by the Sexual Socialization Instrument (SSI) developed by Lottes and Kuriloff [29]. This 20-item tool measures the influence of peers and parents on young adults regarding sexual permissiveness. The SSI consists of two subscales: parental and peer sexual socialization. Each item is rated on a 5-point Likert scale from 1 (strongly agree) to 5 (strongly disagree). A higher total score (possible range: 20–100 points) indicates a more permissive attitude among parents and peers according to the respondents. Cronbach’s α was .90 upon the tool’s development [29] and .79 in this study.

Sexual communication

Sexual communication was measured by the Dyadic Sexual Communication Scale (DSCS) developed by Catania [30]. The DSCS is a 13-item scale that measures a subject’s perception of sexual communication with their partners. Items are rated on a 6-point Likert-type scale from 1 (strongly disagree) to 6 (strongly agree). The total possible score ranges from 13 to 78 points. Cronbach’s α was .85 upon the tool’s development [30] and .82 in this study.

Sexual body image perception

Perceived individual body image was measured by the Sexual Body Image Worry (SBIW) scale [31]. The SBIW consists of five items that measure body image concerns rated on a 5-point scale from 0 (not concerned at all) to 4 (very concerned), with a higher total score (possible range: 0 to 20 points) indicating greater concern about one’s sexual body image. Cronbach’s α was .87 upon the tool’s development [31] and .87 in this study.

Sexual role perception

The Double Standard Scale (DSS) developed by Caron et al. [32] was used to measure beliefs regarding traditional sexual double standards. This 10-item tool uses a 5-point Likert scale ranging from 1 (strongly agree) to 5 (strongly disagree). A lower total score (possible range: 10–50) indicates greater adherence to traditional sexual double standards. Cronbach’s α was .86 upon the tool’s development [32] and .89 in this study.

Data collection

Data were collected between January 3 and January 28, 2022, using an online survey platform because of the sensitivity of the contents and the coronavirus disease 2019 pandemic. A study recruitment banner was posted on Social Network Service (e.g. Instagram, Facebook) and potential participants could access the online survey through the link or QR code for voluntary participation. The survey took approximately 20 to 30 minutes for completion and a e-coupon valued at 20 US dollars was provided as compensation.

Data analysis

Descriptive statistics were used to analyze the general characteristics and measurement variables. The correlation between variables was analyzed using Pearson correlation coefficients. In addition, we used a structural equation model to identify the paths and effects of the variables that affected safe sexual behaviors. All statistical analyses were formed using SPSS and AMOS (version 24.0; IBM Corp., Armonk, NY, USA).

To confirm the construct validity of the measurement variables, exploratory factor analysis was performed to determine whether each item was classified in the same dimension for each measurement variable. Inappropriate items with factor loadings of less than 0.7 were removed. A total of 85 items out of an initial 95 were ultimately used for the final analysis after deleting 10 items: three items from the SSBQ (no. 15 [“I engage in anal intercourse”], no. 16 [“I ask my potential sexual partners about their history of IV drug use”], and no. 23 [“I engage in anal intercourse without using a condom”]), three items from the BSAS (no. 1 [“I do not need to be committed to the person to have sex with him/her”], no. 18 [“Sex is usually an intensive, almost overwhelming experience”], and no. 23 [“Sex is primarily a bodily function, like eating”]), one item from the DSCS (no. 1 [“My partner rarely responds when I want to talk about our sex life”]), and three items from the SSI (no. 6 [“According to my parents, having sexual intercourse is an important part of my becoming an adult”], no. 15 [“My friends suggest dates to each me who are known to be sexually open”], and no. 16 [“My parents encourage me to have sex with people before I get married.”]). The Cronbach’s α values of these measurements ranged from 0.79 to 0.89 in this study (Supplementary Table 1).

The chi-square statistic (degrees of freedom), goodness-of-fit index (GFI), adjusted GFI (AGFI), normed fit index (NFI), Tucker-Lewis index (TLI), comparative fit index (CFI), root mean residual (RMR), and root mean square error of approximation (RMSEA) were used to evaluate the fit for the hypothetical model. A moderation effect analysis was performed to analyze the differences between men and women. The cutoff value for the GFI, AGFI, NFI, TLI, and CFI was 0.90, and the RMR and RMSEA were set at 0.1 [24].

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Results

Participants’ characteristics and measurement variables

Table 1 shows the general characteristics of the study sample according to gender. The highest proportion of both men (n = 116, 64.4%) and women (n = 64, 35.6%) were 30–39 years of age. A total of 52 men (51.5%) had a high school education, whereas 169 women (50.3%) had a college-level education or higher. Most of the men were employed (n = 156, 50.2%) and resided in a metropolitan area (n = 169, 52.2%), while most of the women were students (n = 63, 50%) and resided in non-metropolitan areas (n = 63, 50%).

The mean scores (and standard deviations) for each variable were as follows. The BSAS score was statistically significantly higher among men (13.43 ± 4.18) than among women (10.35 ± 2.83), as was the SSI score (men, 41.92 ± 8.16; women, 38.63 ± 7.77). The mean DSCS score between men (48.56 ± 5.79) and women (46.16 ± 5.43) was similar, as was the mean SBIW score (men, 16.23 ± 4.51; women, 15.09 ± 4.21). The mean DSS score was statistically significantly higher in men (34.84 ± 6.04) than women (30.68 ± 5.97), whereas the SSBQ score was higher among women (53.25 ± 7.93) than among men (49.24 ± 8.56) (Table 1).

Evaluation of normality and multicollinearity

Each variable was tested for normality and multicollinearity. The absolute value of skewness and kurtosis of all variables in both men and women groups did not exceed the critical value (1.96) at a significance level of 0.05, which means that the sample satisfied the assumption of normality. In order to test multicollinearity between measurement variables, the correlation coefficients between variables were calculated (Table 2). The correlation coefficients of the study variables ranged from 0.01 to 0.34, which indicates that there was no multicollinearity between the measured variables.
Figure 2. Path diagrams of the final models for men and women.
Evaluation of hypothetical models
According to the overall model fit of the hypothetical model, the \( \chi^2 \) (137.43; degrees of freedom = 5, \( p < .001 \)), GFI (0.90), AGFI (0.87), NFI (0.85), TLI (0.87), and CFI (0.89) values were acceptable, while the RMR (0.08) and RMSEA (0.06) values were borderline acceptable.

Direct, indirect, and total effects of variables
In the overall model, five out of nine paths were found to be statistically significant (Figure 2). There was a direct effect between sexual role perception and sexual attitudes (\( \beta = -.66, p < .001 \)). Sexual role perception also had a direct effect on sexual socialization (\( \beta = .27, p < .001 \)). Sexual body image had a direct effect on sexual communication (\( \beta = .24, p < .001 \)). The variables that had a direct effect on safe sexual behaviors were sexual attitudes (\( \beta = -.70, p < .001 \)) and communication (\( \beta = .53, p < .001 \)), while an indirect effect was found for sex role perception (\( \beta = .42, p < .001 \)), explaining 49.4% of variance in safe sexual behaviors (Table 3).

Comparison of paths according to sex
Figure 2 and Table 4 show the overall path toward safe sexual behaviors and gender differences. Three paths showed the same level of significance for both men and women (\( p < .05 \)). The paths between sexual body image and sexual attitudes were significant in both men and women models (men, \( \beta = -.18 \); women, \( \beta = -.21 \)). Sexual role perception had a significant effect on sexual attitudes (men, \( \beta = -.39 \); women, \( \beta = -.59 \)) and sexual socialization (men, \( \beta = .37 \); women, \( \beta = .20 \)).

In men, however, sexual body image had a significant effect on sexual communication (\( \beta = .27, p < .001 \)), whereas in women, it had no significant effect. Additionally, for women, sexual attitudes (\( \beta = -.94, p < .001 \)) and communication (\( \beta = .66, p < .001 \)) had a significant effect on safe sexual behaviors, but these factors

Table 3. Direct, indirect, and total effects in the model (N=437)

<table>
<thead>
<tr>
<th>Endogenous variable</th>
<th>Exogenous variables</th>
<th>SMC</th>
<th>Direct effect</th>
<th>Indirect effect</th>
<th>Total effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sexual attitudes</td>
<td>Sexual body image</td>
<td>0.23</td>
<td>(-.12 (.051))</td>
<td>-</td>
<td>(-.12 (.051))</td>
</tr>
<tr>
<td></td>
<td>Sexual role perception</td>
<td></td>
<td>(-.66 (&lt;.001))</td>
<td>-</td>
<td>(-.66 (&lt;.001))</td>
</tr>
<tr>
<td>Sexual socialization</td>
<td>Sexual body image</td>
<td>0.25</td>
<td>(.08 (.150))</td>
<td>-</td>
<td>(.08 (.150))</td>
</tr>
<tr>
<td></td>
<td>Sexual role perception</td>
<td></td>
<td>(.27 (&lt;.001))</td>
<td>-</td>
<td>(.27 (&lt;.001))</td>
</tr>
<tr>
<td>Sexual communication</td>
<td>Sexual body image</td>
<td>0.37</td>
<td>(.24 (&lt;.001))</td>
<td>-</td>
<td>(.24 (&lt;.001))</td>
</tr>
<tr>
<td></td>
<td>Sexual role perception</td>
<td></td>
<td>(.07 (.190))</td>
<td>-</td>
<td>(.07 (.190))</td>
</tr>
<tr>
<td>Safe sexual behaviors</td>
<td>Sexual body image</td>
<td>0.49</td>
<td>-</td>
<td>(.05 (.110))</td>
<td>(.05 (.110))</td>
</tr>
<tr>
<td></td>
<td>Sexual role perception</td>
<td></td>
<td>-</td>
<td>(.42 (&lt;.001))</td>
<td>(.42 (&lt;.001))</td>
</tr>
<tr>
<td></td>
<td>Sexual attitudes</td>
<td>(-.70 (&lt;.001))</td>
<td>-</td>
<td>(-.70 (&lt;.001))</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sexual socialization</td>
<td>(.04 (.640))</td>
<td>-</td>
<td>(.04 (.640))</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sexual communication</td>
<td>(.53 (&lt;.001))</td>
<td>-</td>
<td>(.53 (&lt;.001))</td>
<td></td>
</tr>
</tbody>
</table>

SMC, Squared multiple correlation; \( \beta \), standardized coefficient.

Table 4. Comparison of paths according to gender (N=437)

<table>
<thead>
<tr>
<th>Exogenous variables</th>
<th>Endogenous variables</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Standardized coefficient</td>
<td>CR (p)</td>
<td>Standardized coefficient</td>
</tr>
<tr>
<td>Sexual body image</td>
<td>Sexual attitudes</td>
<td>(-.18)</td>
<td>(-2.39 (.017))</td>
</tr>
<tr>
<td>Sexual role perception</td>
<td>Sexual attitudes</td>
<td>(-.39)</td>
<td>(-4.79 (&lt;.001))</td>
</tr>
<tr>
<td>Sexual body image</td>
<td>Sexual socialization</td>
<td>(.06)</td>
<td>(.79 (.428))</td>
</tr>
<tr>
<td>Sexual role perception</td>
<td>Sexual socialization</td>
<td>(.37)</td>
<td>(.53 (.&lt;.001))</td>
</tr>
<tr>
<td>Sexual body image</td>
<td>Sexual communication</td>
<td>(.27)</td>
<td>(.35 (.&lt;.001))</td>
</tr>
<tr>
<td>Sexual role perception</td>
<td>Sexual communication</td>
<td>(.10)</td>
<td>(.13 (.191))</td>
</tr>
<tr>
<td>Sexual attitudes</td>
<td>Safe sexual behaviors</td>
<td>(-.02)</td>
<td>(-0.19 (.852))</td>
</tr>
<tr>
<td>Sexual socialization</td>
<td>Safe sexual behaviors</td>
<td>(.29)</td>
<td>(1.88 (.061))</td>
</tr>
<tr>
<td>Sexual communication</td>
<td>Safe sexual behaviors</td>
<td>(.33)</td>
<td>(1.73 (.084))</td>
</tr>
</tbody>
</table>

CR, Critical ratio.
had no effect on men.

**Discussion**

Our study confirmed that sexual attitudes and communication directly affect safe sexual behaviors and that the perception of sexual roles indirectly affects safe sexual behaviors in young adults, explaining 49% of the safe sex model.

A study conducted in China reported that sexual attitudes had a mediating effect on knowledge of risky sex and sexual behaviors among university students [33]. Prior studies reported that individuals with negative sexual attitudes were less likely to use condoms during sex than those with positive sexual attitudes [7] and having a positive attitude toward implementing safe sexual behaviors was associated with actual safe sexual behaviors in women with economic decision-making autonomy [34]. However, Yang et al. [35] reported that an open attitude toward sexual partners tended to correspond to an open attitude toward premarital sex and homosexuality, which can increase the likelihood of adopting risky sexual behaviors. Furthermore, multiple previous studies reported no significant correlation between positive sexual attitudes and safe sexual behaviors [8,9,21]. Thus, this study provides empirical evidence that a more permissive attitude toward sex leads to safer sexual behaviors.

This study also demonstrated that sexual communication has a significant effect on safe sexual behaviors. These findings are consistent with those of previous studies of young adults [17], adolescents [36], and high school students [37] that found condom use to be more frequent among respondents who discussed sexual intercourse with their partners. In a previous meta-analysis and study, more communication between adolescents and their parents about sex had a significant effect on the use of condoms and other contraceptives [13,38]. Gause et al. [39] also found that infrequent sexual communication with a sexual partner regarding contraception and sexually transmitted infections was significantly associated with a lower probability of condom use in female adolescents. A meta-analysis that examined the relationship between sexual communication between partners and condom use also confirmed that sexual communication is an important factor in determining safe sexual behaviors [11].

This study also showed that the perception of sexual roles has a significant effect on sexual attitudes and communication. In other words, a lower degree of prejudice regarding sexual roles corresponded to a higher degree of generosity regarding the sexuality of one's partner and more frequent communication with one's sexual partners. This result is consistent with a study that observed differences in attitudes toward premarital intercourse and the perception of dyadic sexual roles by gender [40]. There were significant associations between sex role perception and sexual attitudes. Furthermore, female subjects with more traditional expectations regarding sexual roles were more likely to have a double standard regarding premarital sexual relationships [40]. In terms of the relationship between sexual role perception and communication with partners, our study was also consistent with a previous study from the United States [7] that reported that those with a less traditional perception of sexual roles were more likely to talk with their partners about sexual issues, and this kind of interaction made them more satisfied with their relationships.

This study also found that a better perception of one's sexual body image corresponded to better sexual communication with one's partner. This result is consistent with those of previous studies that found that a more positive self-body image corresponded to more positive determinants of sexual communication [41,42]. It also corresponds to the results of a past study that found a positive body image to be associated with better communication about sex with partners [43].

In this study, sexual socialization did not have a significant effect on safe sexual behaviors. According to a qualitative study of Latina mothers, sexual socialization through appropriate sex education by parents can promote safe sexual behaviors in their children [10]. One study from the United States observed no associations between communication with parents and condom use in adolescents [44]. Another controversial study observed that peer norms and peer socialization were marginally significant predictors of condom use among college students [8]. These differences between studies may be a result of differences in the ages of the study participants, which can affect the level of influence of peers and parents according to the subjects’ psychosocial development. Thus, further studies are needed to clarify the interplay between sexual socialization and safe sexual behaviors.

This study confirmed that there were differences between men and women in terms of factors that affect safe sexual behaviors. Men with a positive body image tended to be more comfortable communicating with their sexual partners whereas women with a positive body image were less comfortable, which is inconsistent with a recent study that reported that sexual self-esteem acted as a serial mediator in the relationship between sexual body image and sexual communication in Chinese women [45]. The authors of the previous study also emphasized that sexual communication with a partner can play a unique mediating role in building women's sexual body image through sexual functions.
such as arousal, orgasm, and lubrication. However, a study from Australia revealed that, among young and older adults, no association was observed between sexual body image and psychological interaction with one’s sexual partners in both men and women [46]. The conflicting results of these preceding studies suggest that there may be differences between Eastern and Western cultures in how sexual body image is interpreted. Since sexual behaviors are influenced by various factors, including gender, ethnicity, and cultural factors [47], further exploratory research in this area is recommended.

This study’s finding that sexual attitudes and communication were significant variables affecting the safe sexual behaviors of women but not in men aligns with those of multiple previous studies [48-51]. For example, a study from China showed a significant gap in sexual attitudes; in particular, male students were more likely to agree to premarital sex and one-night stands and have more than one sex partner, whereas young female students had a greater intention to use condoms [48]. Another study conducted in Europe also identified gender differences in condom use. Spanish and Portuguese female college students had more positive attitudes toward condom use than male college students and were more confident in communicating with their partners about condom use during sex as a measure for preventing HIV [50]. Another study of university students in the Mid-Atlantic United States found that female students had more positive sexual attitudes than male students [51].

The paths between sexual body image and sexual attitudes were significant in men and women models, respectively, compared to the overall model. This result is similar to that of a study from the United States that found that women with a more positive body image had more permissive and confident sexual attitudes [52]. Another study from the United Kingdom showed similar results among male and female undergraduate students, in which students with a more negative body image were more likely to have avoidant and hesitant sexual attitudes [53]. However, Gillen et al. [6] found that male individuals with a more positive body image were more likely to have sexual double standards. Overall, these findings indicate the substantial influence of sexual body image on the sexual attitudes of both men and women.

This study yielded further insights into safe sexual behaviors among young adults by constructing an extended TPB model that reflected the participants’ characteristics and cultural factors, leading to increased explanatory power. Another strength is that it confirmed the existence of gender differences in the factors that explain safe sexual behaviors. Nevertheless, the findings are still insufficient for explaining the causal relationships among these variables due to the study’s cross-sectional design. In future studies, a longitudinal design may help address this limitation.

In this study, we confirmed the existence of gender differences in predictors of safe sexual behaviors among Korean adults in their 20s to 30s. Men participants were more likely to be indirectly influenced by their perceived body image in the path toward sexual communication with their partners and safe sexual behaviors. Women participants, however, were more likely to be affected by interpersonal or social factors than men participants. Women participants were directly influenced by sexual attitudes and sexual communication formed in social relationships when undertaking safe sexual behaviors. Therefore, gender differences should be considered when examining factors that affect safe sexual behaviors. In addition, since students are exposed to sexual content through mass media, sex education should be provided that includes proper condom usage, a positive attitude toward contraception, and sufficient sexual communication between partners.

Supplementary materials

Further details on supplementary materials are presented online (available at https://doi.org/10.4069/kjwhn.2023.06.16).

ORCID

Nalae Moon, https://orcid.org/0000-0001-9518-6327
Hyunjin Kang, https://orcid.org/0000-0001-6451-3524
Su Ji Heo, https://orcid.org/0000-0001-8016-2795
Ju Hee Kim, https://orcid.org/0000-0001-6586-7244

Authors’ contributions

Conceptualization: Kim JH, Moon N, Kang H; Methodology: Kim JH; Data Collection: Kang H, Heo SJ; Validation: Kim JH, Moon N, Heo SJ; Investigation: Moon N, Kang H; Formal analysis; Resources; Data Curation; Visualization; Supervision: Kim J; Writing-Original draft: Moon N, Kim JH; Writing-review & editing: All authors.

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Research trends in the *Korean Journal of Women Health Nursing* from 2011 to 2021: a quantitative content analysis

Ju-Hee Nho, Sookkyoung Park

College of Nursing, Jeonbuk National University, Jeonju, Korea

**Purpose:** Topic modeling is a text mining technique that extracts concepts from textual data and uncovers semantic structures and potential knowledge frameworks within context. This study aimed to identify major keywords and network structures for each major topic to discern research trends in women’s health nursing published in the *Korean Journal of Women Health Nursing* (KJWHN) using text network analysis and topic modeling.

**Methods:** The study targeted papers with English abstracts among 373 articles published in KJWHN from January 2011 to December 2021. Text network analysis and topic modeling were employed, and the analysis consisted of five steps: (1) data collection, (2) word extraction and refinement, (3) extraction of keywords and creation of networks, (4) network centrality analysis and key topic selection, and (5) topic modeling.

**Results:** Six major keywords, each corresponding to a topic, were extracted through topic modeling analysis: “gynecologic neoplasms,” “menopausal health,” “health behavior,” “infertility,” “women’s health in transition,” and “nursing education for women.”

**Conclusion:** The latent topics from the target studies primarily focused on the health of women across all age groups. Research related to women's health is evolving with changing times and warrants further progress in the future. Future research on women's health nursing should explore various topics that reflect changes in social trends, and research methods should be diversified accordingly.

**Keywords:** Education; Health; Nursing; Research; Women

**Introduction**

Understanding research trends in a field is essential for its development [1]. This is particularly true in the field of women’s health nursing, which encompasses the unique area of reproductive health, including pregnancy and childbirth. These issues are not only relevant to women, but also have significant implications for the future of humanity [2]. Recent years have seen an increase in the number of women participating in economic activities, leading to social phenomena such as delayed marriage, non-marriage, and declining birth rates [3,4]. To address the low birthrate problem faced by South Korea (hereafter Korea), a national and institutional approach is required. Moreover, given the rapid changes in health levels experienced by women during life stages such as pregnancy, childbirth, and menopause [5], it is crucial to develop evidence-based health policies specifically tailored to women. Consequently, it is important to evaluate how the focus and subject matter of research related to women’s health have evolved and to prepare for the way forward.

The quantitative analysis of large data sets is imperative for identifying key research concepts, trends, and expanding research areas [1]. Traditional literature analysis methods have
Summary statement

- **What is already known about this topic?**
  Topic modeling enables the extraction of concepts from textual data to recognize semantic patterns and potential knowledge structures within a given context. Several research trend analyses utilizing topic modeling have been carried out, identifying studies related to menstruation, maternity care, sexual health, women’s health issues, and cancer in women.

- **What this paper adds**
  The topics extracted from the *Korean Journal of Women Health Nursing* for 2011-2021 were: “gynecologic neoplasms,” “menopausal health,” “health behavior,” “infertility,” “women’s health in transition,” and “nursing education for women.” These findings are slightly different from those of a research trend analysis conducted in 2010, which presented topics of pregnancy, childbirth, and sex education. This indicates that women’s health research during 2011-2021 was not confined to pregnancy and childbirth; instead, it encompassed the health of women across all age groups.

- **Implications for practice, education, and/or policy**
  Various health issues affecting middle-aged women, menopausal women, and women with gynecological cancer have been identified as key topics. Therefore, future studies should focus on these areas within the field. Specifically, research should take into account social changes and adopt more diverse research methods.

Methods

**Study design**
This study employed a descriptive research design to identify the main concepts and research topics in KJWHN, using quantitative content analysis of text networks and topic modeling.

**Research procedures**
The study targeted manuscripts with English abstracts among the 373 papers published in KJWHN from January 2011 to December 2021. The research process involved: (1) data collection, (2) word extraction and refinement, (3) keyword extraction and network creation, (4) network centrality analysis and key topic selection, and (5) topic modeling analysis.
Data collection
Data for this study were collected in February 2022 to identify research trends in KJWHN over the past decade, from January 1, 2011 to December 31, 2021. Full-text articles were accessed from the journal website (https://kjwhn.org/), and published papers with English abstracts were identified. Out of the 379 papers published during this period, 373 were analyzed, excluding six papers that did not have English abstracts available. The analyzed papers were organized by unique number, title, author, year of publication, abstract, and keywords using the MS Office Excel program (Microsoft, Redmond, WA, USA). Typographical errors and English spelling were checked using the spell-check function of the Excel program. Additionally, words such as “background,” “objectives,” “purpose,” “methods,” “results,” and “conclusion,” which are frequently used in standard abstracts, were removed.

Word extraction and refinement
Our research team utilized NetMiner (version 4.3; Cyram, Seongnam, Korea) to conduct a semantic network analysis, extracting keywords from the titles, English abstracts, and key-words of articles. The keywords were derived from both the title and abstract, not solely from the author’s keywords. In order to extract and refine these keywords, the researchers repeatedly read and discussed words and abbreviations with the same meaning, refining them into a single word and unifying them with similar words. As a result, 56 similar words were identified. For instance, “breastfeeding” and “breast feeding,” which can differ in spacing, were unified as “breastfeeding.” Likewise, “self-efficacy” and “self efficacy” were unified as “self-efficacy.” When a combination of uppercase letters, lowercase letters, noun phrases, and abbreviations was used, a representative word was designated. For example, “quality of life,” “qol,” and “QOL” were designated as “QOL” to avoid redundancy.

Next, stop words such as pronouns and numbers were excluded using the automatic filtering function within the NetMiner program. General verbs and auxiliary verbs, such as “do,” “make,” “use,” “would,” “could,” and “should,” were excluded through discussion among researchers. Unnecessary nouns and other parts of speech, including “one,” “two,” “participants,” “subjects,” “level,” “group,” “data,” “research,” “test,” “year,” “design,” “day,” “example,” “effect,” “as,” “without,” “though,” and “all,” which were irrelevant for analyzing trends in women’s health nursing research, were also excluded. Additionally, words indicating logical relationships such as “only,” “before,” “toward,” “to,” and “with,” as well as adverbs and prepositions, were excluded. Consequently, a list of synonyms and negative words, which the researchers had discussed and agreed upon, was entered into the NetMiner dictionary. Among the words extracted from the 373 English abstracts, those with a frequency of 10 or more occurrences were selected as keywords. From this group, the top 25 words with the highest frequency of simple occurrences were chosen as keywords.

Extraction of keywords and creation of networks
Keyword network analysis identifies various characteristics by extracting significant words from the text, determining the connections between them, and reorganizing them into a visual network [12]. A network was created based on the co-occurrence relationships between words, using the total frequency (weight) of word pair co-occurrences. The window size was set to three, and the link frequency threshold was set to two in order to extract all relationships that appeared more than once. The direction was set to nondirectional, allowing for the formation of a network between keywords regardless of the order in which they appeared. Additionally, the “remove self-loop” option was set to “yes” to exclude identical keyword relationships.

Network centrality analysis and key topic selection
Our research team performed a centrality analysis to assess the impact of particular keywords on the entire network. This analysis focused on refined keywords and employed a mediation centrality approach to ascertain their positions within the network [13]. Furthermore, we conducted a word cloud analysis [14] to provide a visual representation of significant keywords at a glance. The word cloud was generated by considering documents with a term frequency-inverse document frequency (TF-IDF) of 0.1 or higher, specifically targeting refined keywords.

Topic modeling
Topics were extracted using the latent Dirichlet allocation (LDA) topic modeling technique after text preprocessing [12]. LDA is the most widely employed document generation model in text mining analysis [9]. To obtain meaningful results through topic modeling, the number of topics is crucial and must be determined by the researcher [9]. Consequently, this study focused on 4 to 8 topics, and multiple analyses were conducted. Furthermore, after setting the alpha (α) value to 0.1, the beta (β) value to 0.01, and the number of sampling repetitions to 1,000, the number of topics was compared and analyzed.

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Results

Word extraction and refinement
In total, 3,324 words were extracted and refined from the 373 article abstracts. The simple appearance frequencies of the extracted words were as follows, in descending order: “women” (1,001 instances), “health” (424 instances), “nursing” (322 instances), “care” (259 instances), “cancer” (254 instances), “birth” (240 instances), “education” (233 instances), “depression” (228 instances), “life” (223 instances), “pregnancy” (200 instances), “mother” (198 instances), “HPV” (195 instances), “stress” (186 instances), “quality” (184 instances), and “nurse” (179 instances) (Figure 1).

Keyword network connection structure and centrality analysis
A network connection structure consisting of 3,425 nodes and 12,589 links was confirmed by examining the relationships between words. The density of the analyzed network was 0.015, the average connection degree was 9.054, and the average connection distance was 4.587 (Figure 2). Next, according to the TF-IDF analysis, the top keywords with high importance were “women” (198 instances), “health” (197 instances), “nursing” (189 instances), and “care” (178 instances). “education” (was 178 instances), and “life” (was 171 instances) (Table 1). Degree and betweenness centrality were analyzed. The keywords with high degree centrality were “women,” “health,” “care,” “nursing,” and “pregnancy,” and those with high betweenness centrality were “women,” “intervention,” “stress,” “experience,” and “nursing” (Table 1). A word cloud analysis presenting these high-importance keywords is shown in Figure 3.

Topics and keywords identified through topic modeling
Six topics were identified and are presented in Table 2, along with their associated keywords and high allocation probabilities. Two researchers discussed and named the topics, taking into account the main keywords and connectivity for each topic extracted through topic modeling analysis. The six topics were named as follows: “gynecologic neoplasms,” “menopausal health,” “health behavior,” “infertility,” “women’s health in transition,” and “nursing education for women.” The proportions of each topic among the research papers were relatively even. Oncology-related research accounted for the highest proportion (33.3%), and education-related research exhibited the lowest proportion (10.7%) (Table 2). For the first topic (gynecologic neoplasms), the

![Figure 1. Top 25 keywords (term frequency).](https://example.com/figure1.png)

HPV: Human papillomavirus.
Figure 2. Network analysis by high-ranking co-occurrence between keywords.

Table 1. Top 25 keywords (TF-IDF) and centrality analysis results for keywords

<table>
<thead>
<tr>
<th>Rank</th>
<th>Keywords</th>
<th>TF-IDF</th>
<th>Keywords</th>
<th>Degree centrality</th>
<th>Keywords</th>
<th>Betweenness centrality</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Women</td>
<td>198</td>
<td>Women</td>
<td>0.454</td>
<td>Women</td>
<td>0.109</td>
</tr>
<tr>
<td>2</td>
<td>Health</td>
<td>197</td>
<td>Health</td>
<td>0.342</td>
<td>Intervention</td>
<td>0.099</td>
</tr>
<tr>
<td>3</td>
<td>Nursing</td>
<td>189</td>
<td>Care</td>
<td>0.305</td>
<td>Stress</td>
<td>0.093</td>
</tr>
<tr>
<td>4</td>
<td>Care</td>
<td>178</td>
<td>Nursing</td>
<td>0.295</td>
<td>Experience</td>
<td>0.093</td>
</tr>
<tr>
<td>5</td>
<td>Education</td>
<td>178</td>
<td>Pregnancy</td>
<td>0.293</td>
<td>Nursing</td>
<td>0.089</td>
</tr>
<tr>
<td>6</td>
<td>Life</td>
<td>171</td>
<td>Education</td>
<td>0.236</td>
<td>Health</td>
<td>0.089</td>
</tr>
<tr>
<td>7</td>
<td>Pregnancy</td>
<td>168</td>
<td>Life</td>
<td>0.195</td>
<td>Risk factors</td>
<td>0.084</td>
</tr>
<tr>
<td>8</td>
<td>Cancer</td>
<td>162</td>
<td>Breastfeeding</td>
<td>0.186</td>
<td>Education</td>
<td>0.084</td>
</tr>
<tr>
<td>9</td>
<td>Depression</td>
<td>157</td>
<td>Family</td>
<td>0.185</td>
<td>Physical activity</td>
<td>0.082</td>
</tr>
<tr>
<td>10</td>
<td>Student</td>
<td>155</td>
<td>Anxiety</td>
<td>0.185</td>
<td>Satisfaction</td>
<td>0.054</td>
</tr>
<tr>
<td>11</td>
<td>Stress</td>
<td>147</td>
<td>Cancer</td>
<td>0.175</td>
<td>Pregnancy</td>
<td>0.053</td>
</tr>
<tr>
<td>12</td>
<td>Exercise</td>
<td>143</td>
<td>Postpartum</td>
<td>0.170</td>
<td>Lifestyle</td>
<td>0.050</td>
</tr>
<tr>
<td>13</td>
<td>Mother</td>
<td>139</td>
<td>Depression</td>
<td>0.166</td>
<td>Welfare</td>
<td>0.043</td>
</tr>
<tr>
<td>14</td>
<td>Birth</td>
<td>121</td>
<td>Stress</td>
<td>0.161</td>
<td>Cancer</td>
<td>0.038</td>
</tr>
<tr>
<td>15</td>
<td>Fatigue</td>
<td>121</td>
<td>Infertility</td>
<td>0.159</td>
<td>Depression</td>
<td>0.038</td>
</tr>
<tr>
<td>16</td>
<td>Postpartum</td>
<td>120</td>
<td>Menopause</td>
<td>0.158</td>
<td>Body composition</td>
<td>0.033</td>
</tr>
<tr>
<td>17</td>
<td>Quality</td>
<td>118</td>
<td>Mother</td>
<td>0.157</td>
<td>Postpartum</td>
<td>0.031</td>
</tr>
<tr>
<td>18</td>
<td>Breastfeeding</td>
<td>114</td>
<td>Birth</td>
<td>0.151</td>
<td>Health promotion</td>
<td>0.031</td>
</tr>
<tr>
<td>19</td>
<td>Intervention</td>
<td>112</td>
<td>Body Composition</td>
<td>0.148</td>
<td>Self-efficacy</td>
<td>0.021</td>
</tr>
<tr>
<td>20</td>
<td>Infertility</td>
<td>113</td>
<td>Child</td>
<td>0.110</td>
<td>Anxiety</td>
<td>0.017</td>
</tr>
<tr>
<td>21</td>
<td>Infant</td>
<td>110</td>
<td>Obesity</td>
<td>0.101</td>
<td>Fitness</td>
<td>0.014</td>
</tr>
<tr>
<td>22</td>
<td>Fertility</td>
<td>106</td>
<td>Welfare</td>
<td>0.086</td>
<td>Infertility</td>
<td>0.012</td>
</tr>
<tr>
<td>23</td>
<td>Breastfeeding</td>
<td>98</td>
<td>Intervention</td>
<td>0.086</td>
<td>Breastfeeding</td>
<td>0.011</td>
</tr>
<tr>
<td>24</td>
<td>Attachment</td>
<td>96</td>
<td>Self-efficacy</td>
<td>0.075</td>
<td>Child</td>
<td>0.010</td>
</tr>
<tr>
<td>25</td>
<td>Self-efficacy</td>
<td>92</td>
<td>Breast</td>
<td>0.069</td>
<td>Breast</td>
<td>0.010</td>
</tr>
</tbody>
</table>

TF-IDF: Term frequency-inverse document frequency.
keywords were “permission,” “instrument,” “cm,” “tumor,” “modality,” “breast,” “survivor,” “education,” “mastectomy,” “indicator,” “chemotherapy,” “radiation,” “side effect,” “phase,” and “intrauterine.” The keywords that constituted the second topic (menopausal health) were “bone,” “obesity,” “mineral,” “height,” “menopause,” “dietary,” “cross,” “glucose,” “GDM,” “regularity,” “QOL,” “body composition,” “food,” “intake,” and “energy.” The keywords in the third topic (health behavior) were: “hygiene,” “drinking,”
among middle-aged Korean women. Their study reported that
Noh's analysis studies for women of all ages, our findings align with Lee
rect comparison is challenging due to the lack of text network
graphics of Korean women, sustained interest and research in
lems among menopausal women, as well as the aging demo
menopausal women's health is essential
midlife health significantly impacts health in later life, research on
postmenopausal women's health management. Given the impor
ance of health behavior and the fact that research has been con
ducted not only on pregnancy, childbirth, and diseases, but also
on women's lifestyle improvement and health promotion behav
ors, more studies on health promotion at midlife are also needed
for the future.
The next most frequently occurring topics were menopausal
health and health behavior. Menopausal women have been report
ed to be relatively vulnerable and often lacking in self-care [18].
As discussed earlier, the growing interest in middle-aged wom
en's health is expected to lead to continuing nursing studies on
postmenopausal women's health management. Given the impor
tance of health behavior and the fact that research has been con
ducted not only on pregnancy, childbirth, and diseases, but also
on women's lifestyle improvement and health promotion behav
iors, more studies on health promotion at midlife are also needed
for the future.
The next extracted category, infertility, likely reflects the recent
rise in infertility cases among Korean women [19]. Women ex
periencing infertility often face numerous physical and psycho
logical challenges, which can impact their quality of life [20].

Discussion

The degree centrality analysis, which measures influence through
the number of connections to peripheral keywords, revealed the
following terms: "women," "health," "care," "nursing," and "preg
nancy." This indicates that ongoing research is focused on im
proving women's health, nursing, treatment management, and
pregnancy-related health. Moreover, among the top 25 frequent
ly appearing keywords, "exercise" and "attachment" disappeared
from the ranking, while "menopause," "body composition," and
"obesity" emerged as new entries. This suggests that health issues
related to menopausal women have received increasing attention
over the past decade. A previous analysis of papers published in
KJWHN between 2013 and 2017 found that there were four
times more studies on menopausal women than on elderly wom
en [15]. Although our study’s timeframe overlapped with this
prior analysis, our overall findings were consistent when includ
ning the subsequent 5 years (2017–2021). Since menopausal and
midlife health significantly impacts health in later life, research on
menopausal women's health is essential [16]. Furthermore, given
the prevalence of various physical symptoms and health prob
lems among menopausal women, as well as the aging demo
graphics of Korean women, sustained interest and research in
this field are necessary.

"Obesity" was another top extracted keyword. Although a di
rect comparison is challenging due to the lack of text network
analysis studies for women of all ages, our findings align with Lee
and Noh’s [11] topic modeling analysis of health-related trends
among middle-aged Korean women. Their study reported that
obesity was the most frequently appearing keyword in the past
decade [11]. Obesity rates continue to rise in Korea, and women
are experiencing various health issues associated with it. Our
findings suggest that obesity research appears to be active in Ko
rea, and more studies may be needed to explore the relationships
and impacts of women's physical, mental, and social problems re
lated to obesity.

Keywords with high betweenness centrality serve as crucial
connectors, linking different groups of elements in the network
[13]. These keywords should be considered when exploring re
lated subjects. "Nursing" was present in four of the top 25 key
words ranked by frequency, and five keywords disappeared from
the previous betweenness centrality ranking ("care," "birth," "life,"
"mother," and "attachment"). These were replaced by "risk fac
tors," "physical activity," "satisfaction," "lifestyle," and "health pro
motion" as newly identified keywords. Similar findings were ob
served in the analysis of degree centrality and betweenness cen
trality. In other words, KJWHN’s main research topics have ex
panded to a wider spectrum of topics, covering not only preg
nancy, childbirth, and family, but also various women's health
problems that are not related to maternity. This implies that re
search on lifestyle factors and health promotion has increased.

The topic that appeared most frequently in KJWHN during
the selected period was gynecologic neoplasms, unlike what was
reported in a previous analysis of KJWHN articles from 2008 to
2018, where "sexual health" was the most common research topic
[1]. Considering our study period of 2011 to 2021, the number of
women with cancer in Korea has increased from 102,357 in
2010 to 117,334 in 2020, at an average annual rate of 10.9% [17].
Accordingly, research on women with cancer has also increased,
and this trend may be expected to continue in light of the increas
ing number of cancer survivors.

The next most frequently occurring topics were menopausal
health and health behavior. Menopausal women have been report
ed to be relatively vulnerable and often lacking in self-care [18].
As discussed earlier, the growing interest in middle-aged wom
en's health is expected to lead to continuing nursing studies on
postmenopausal women's health management. Given the impor
tance of health behavior and the fact that research has been con
ducted not only on pregnancy, childbirth, and diseases, but also
on women's lifestyle improvement and health promotion behav
iors, more studies on health promotion at midlife are also needed
for the future.
Given the ultra-low birth rate in Korea and its implications for infertility care [21], it is essential for future research to focus on preparing nurses to deliver improved care for women dealing with infertility.

In relation to the fifth extracted category, women’s health in transition women undergo various life transitions, such as pregnancy, childbirth, menopause, and aging, which affect their physical, social, and mental well-being [22]. Nurses must comprehend these transitional phases and identify strategic ways to improve women’s health. Consequently, future research may be needed on women’s transition processes, particularly focusing on health-promoting behaviors and adjustments during transitional periods.

The final extracted category was nursing education for women. Specifically, there has been a growing number of studies on this topic as various learning methods, such as simulation and virtual reality, are being employed to enhance the educational environment for women’s health [23]. This significant subject not only impacts women’s healthcare but also aligns with KJWHN’s aims and scope. As technological advances in learning will continue in the future, ongoing research on education in the field of women’s health nursing is essential.

This study had some limitations. The analysis only considered studies from the last decade with English abstracts, which may have influenced our findings. KJWHN publishes issue papers and statistical/methods papers in addition to original papers, necessitating careful interpretation. Another limitation is that some identified keywords were common concepts inherently related to the journal’s nature (e.g., women, health, nursing). Future analyses of research trends may consider excluding common keywords to focus on a more refined analysis and interpretation. Greater objectivity can be achieved in future research by repeating research methods with the totality of studies that have been published to date and enlisting experts to review the process of refining terms during network analysis. Despite these limitations, this study extracted potential topics based on text network and topic modeling analysis, classified research topics, and identified six major research topics from studies published in KJWHN. This is significant not only for presenting research trends in women’s health nursing, but also for considering research areas that warrant further attention in the future. By understanding the flow and characteristics of recent research, we were able to identify that women’s health-related research is changing to reflect social changes in Korea. Our findings will be meaningful in suggesting future directions for women’s health research.

**ORCID**
Ju-Hee Nho, https://orcid.org/0000-0002-5605-5605
Sookkyoung Park, https://orcid.org/0000-0002-4348-1604

**Authors’ contributions**
Conceptualization: Nho JH, Park SK; Formal analysis: Nho JH, Park SK; Writing–original draft: Nho JH; Writing–review & editing: Park SK.

**Conflict of interest**
Ju-Hee Nho has been the associate editor of the Korean Journal of Women Health Nursing since 2021. She was not involved in the review process of this manuscript. Otherwise, there is no conflict of interest to declare.

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**Data availability**
Please contact the corresponding author for data availability.

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None.

**References**


The effects of music therapy on labor pain, childbirth experience, and self-esteem during epidural labor analgesia in primiparas: a non-randomized experimental study

Seong Yeon An¹, Eun Ji Park¹, Yu Ri Moon¹, Bo Young Lee¹, Eunbyul Lee¹, Dong Yeon Kim², Seong Hee Jeong¹, Jin Kyung Kim¹

¹Delivery Room, The Catholic University of Korea, Seoul St. Mary’s Hospital, Seoul, Korea
²Nursing Innovation Unit, The Catholic University of Korea, Seoul St. Mary’s Hospital, Seoul, Korea
³Obstetrics Ward, The Catholic University of Korea, Seoul St. Mary’s Hospital, Seoul, Korea

Purpose: This non-randomized study was performed to evaluate the effects of music therapy on labor pain, the childbirth experience, and self-esteem in women during vaginal delivery.

Methods: In total, 136 primiparous women over 37 weeks of gestation receiving epidural analgesia during vaginal delivery were recruited via convenience sampling. To minimize diffusion effects, data from the control group (n=71) were collected first (April 2020 to March 2021), followed by data from the music group (n=65; April 2021 to May 2022). Participants in the music group listened to classical music during labor, while the control group was offered usual care (no music). Labor pain was measured using a numeric rating scale (NRS), and self-esteem and childbirth experience were collected using self-report questionnaires. Data were analyzed using the independent t-test, chi-square test and Cronbach’s α coefficients.

Results: The overall pain level (NRS) at baseline was 0 in both groups. Mothers in the music therapy group had lower levels of latent pain (t=1.95, p=.005), active pain (t=3.69, p<.001) and transition-phase pain (t=7.07, p<.001) than the control group. A significant difference was observed between the two groups, and the music therapy group expressed more positive perceptions of the childbirth experience (t=−1.36, p=.018). For self-esteem, the experimental group’s score was slightly higher, but without a statistically significant difference from the control group.

Conclusion: Using music therapy during labor decreased labor pain and improved the childbirth experience. Music therapy can be clinically recommended as a non-pharmacological, safe, and easy method for nursing care in labor.

Clinical trial number: KCT008561

Keywords: Labor pain; Music therapy; Parturition; Primiparity; Self concept

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Corresponding author:
Dong Yeon Kim
Nursing Innovation Unit, The Catholic University of Korea, Seoul St. Mary’s Hospital, 222 Banpodaero, Seocho-gu, Seoul 06591, Korea
Tel: +82-2-2258-9901
E-mail: vonma98@naver.com

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Introduction

간호 중재 중 음악요법은 심리적 접근을 이용하여 스트레스를 감소시키는 주요한 중재로 수술 후 통증, 만성 통증 및 암 통증, 분만과 관련하여 불안 및 교통, 혈압을 감소시키는 데 효과적이며[1-3], 진통제 투여량도 감소시키므로 안전하고 값싸한 비약물적 항불안제 할 수 있다[1-4]. 특히 태교음악은 임부가 아기에 대해 말을 걸고 음악을 들면서 임부와 태아에게 안정감과 편안함을 만드는 정서적인 지지를 말하며, 태어의 성장 정신적 안정을 도모한다[6]. 태교음악은 임부와 태아와의 상호작용면에서도 태아 애착에 중요한 요소이며[7], 다양한 스트레스 해소법이나 기본적전환, 임부에 대한 내적인 긴장을 해소할 수 있는 정서적 유익을 제공할 수 있다[3,8].


에 본 연구는 처음 분만을 경험하는 산부에게 진통 중 음악요법을 적용하여 분만통증, 분만경험, 자아존중감에 대한 효과를 규명하고 궁극적으로 초산부가 긍정적인 분만경험을 할 수 있도록 하고자 시도하였다. 본 연구의 목적은 진통 중 음악요법 간호중재가 초산부의 분만에 미치는 영향을 알아보고자 하며, 구체적인 목적은 다음과 같다.

1) 진통 중 음악요법 중재군과 대조군의 분만통증 차이를 확인한다.
2) 진통 중 음악요법 중재군과 대조군의 분만경험 차이를 확인한다.
3) 진통 중 음악요법 중재군과 대조군의 자아존중감 차이를 확인한다.

Methods

Ethics statement: This study was approved by the Institutional Review Board of The Catholic University of Korea (KC-19OESI0637). Informed written consent was obtained from the participants.

연구 설계
본 연구는 진통 중 음악요법을 받은 초산부 중재군과 대조군의 분만통증, 분만경험, 자아존중감을 비교하기 위한 비동등성 대조군 전후 시차설계 유사실험 연구로(Figure 1), TREND (Transparent Reporting of Evaluations with Nonrandomized Designs) guidelines에 따라 기술하였다[26].

연구 대상
2020년 4월 20일부터 2022년 5월 11일까지 2년에 걸쳐 서울에 소재한 가톨릭대학교 서울성모병원 분만실에 입원 중인 산부를 대상으로 하였다. 대상자 선정기준은 37주 이상의 자연분만을 하는 초산부 중 경막하 무통분만으로 분만하며 배우자가 분만에 참여하는 산부였으며, 37주 미만의 조산을 하거나 응급 분만으로 제왕절개하는 산부는 제외하였다. 표본의 크기는 G*power 3.1.9.4를 이용하여 독립 t검정으로 분석할 때 유의수준 .05, 효과크기 .50 [8], 검정력 .80으로 하여 산출하였다. 연구 대상자는 중재군 64명, 대조군 64명으로 총 128명이며, 산부의 특성상 분만과정 중 참여가 어렵거나 재왕절개 분만으로 변경될 가능성이 높아 탈락률을 30%로 고려하여 각각 90명 중 180명이 필요하였다. 자료 수집 중 태아콘란증(fetal distress)이나 태아 위장 부전으로 인한 응급 재왕절개로 39명이 탈락하였고, 연구 도중 산부가 연구 참여를 원치 않아 참여를 중단한 5명을 제외하고 136명의 자료를 수집하였다. 대조군은 71명, 음악요법 간호중재를 받은 중재군은 65명이었다(Figure 2).

연구 도구

분만통증
분만통증의 측정은 Farrar 등[27]의 민감도 .73과 특이도 .75의 신뢰성과 타당성이 있는 도구인 수치평가척도(numeric rating scale, NRS)로 측정하였다. 주관적인 측정방법으로 널리 사용되는 NRS는 0점 ‘전혀 통증이 없다’에서 10점 ‘매우 통증이 심하다’의 11포인트 척도이며, 환자가 자신의 통증을 정의된 척도로 평가하는 것으로 숫자가 높을수록 분만통증이 심한 것을 의미한다. 분만중점인 측정한 시기는 분만1기 잠재기(자궁경관 개대 2–3 cm 진행된 상태), 활동기(자궁경관 개대 4–7 cm 진행된 상태), 이행기(자궁경관 개대 8–10 cm 진행된 상태)에 각각 한 번씩 NRS 점수로 질문하여 산부의 주관적인 통증을 세 번 측정하였다.

분만경험
분만경험 측정도구는 원 저자인 Marut과 Mercer[28]가 산부의 분만경험을 측정하기 위해 개발한 척도(Perception of Birth Scale)를 Kim[29]이 번안한 도구를 이메일을 통해 도구 사용 승인을 받고 본 연구에 맞게 제왕절개 부분을 삭제하고 자연분만으로 문장을 수정하여 20가지 문항을 추출하였고, 평균 CVI값은 .86이하인 20문항을 추출하였고, 평균 CVI값은 .98이었다. 문항의 구성은 4점(‘매우 그렇지 않다’ 1점에서 ‘매우 그렇다’ 4점)으로 합산하며(가능점수 범위 20~80점) 점수가 높을수록 본만경험의 긍정적임을 의미한다. 선행연구[29]에서 신뢰도 Cronbach’s α값은 .80이었고 본 연구에서 도구의 신뢰도는 Cronbach’s α .86이었다.

자아존중감
자아존중감 측정도구는 Rosenberg[30]가 개발한 Rosenberg

<table>
<thead>
<tr>
<th>Group</th>
<th>Pretest</th>
<th>Intervention</th>
<th>Posttest</th>
<th>Pretest</th>
<th>Intervention</th>
<th>Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group</td>
<td>C₁</td>
<td>X₁</td>
<td>C₂</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental group</td>
<td>E₁</td>
<td>X₂</td>
<td>E₂</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 1. The study design. C₁, E₁: General characteristics, self-esteem; C₂, E₂: labor pain, childbirth experience, self-esteem; X₁: usual care (hospitalization manual, epidural labor analgesia, spouse’s participation in delivery); X₂: usual care, music therapy during labor.
Self-Esteem Scale (RSES) 검사를 Kwon [31]이 번안한 것을 이용하여 도구 사용허가를 받고 사용하였다. 10문항으로 구성된 도구는 자아존중감을 4점 척도(‘매우 그렇지 않다’ 1점에서 ‘매우 그렇다’ 4점)로 합산하며(가능 점수 범위, 10–40점) 점수가 높을수록 자아존중감이 높음을 의미한다. 선행연구[31]에서 신뢰도 Cronbach’s α값은 .90이었고 본 연구에서 도구의 신뢰도 Cronbach’s α값은 .73이었다.

일반적 특성
일반적 특성은 연령, 병실 종류, 재태연령, 회음부 열상 유무, 태교음악 경험 유무, 1분 아프가(Apgar) 점수, 5분 아프가 점수, 신생아 체중, 신생아 중환자실 입실 유무를 조사하였다.

연구 절차
서울에 소재한 가톨릭대학교 서울성모병원 분만실 게시판에 본 연구에 대해서 공지한 뒤, 스스로 참여를 원하는 산부에게 연구의 목적과 방법을 공동연구자가 설명하여 동의를 받아서 자원적으로 참여하였다. 실험군은 음악요법을 중재로 하였으며, 중재군은 음악요법을 중재하지 않았다. 공동연구자가 음악요법의 중재자로 산부의 자궁 수축이 시작되는 1기부터 태아가 만출되는 3기까지 약 8~10시간 음악요법을 제공하였다. 자연분만 후 4시간 이내에 자아존중감 10문항 2차 실질문 및 본문질문 20문항 설문지를 측정하였다. 사후 측정 및 분만이 완료된 후 두 군 모두에게 사례품(신생아용 유기농 손수건)을 제공하였다.

Figure 2. CONSORT flow diagram modified for a non-randomized trial design.
자료 분석 방법
수집된 자료는 IBM SPSS ver. 24.0 (IBM Corp., Armonk, NY, USA)을 이용하여 분석하였으며, 도구의 신뢰도는 Cronbach’s a 계수로, 대상자의 일반적 특성은 Shapiro-Wilk test를 시행하여 각각의 정규성을 평가한 후 비도, 백분율, 평균, 표준편차 등 시각적 통계 자료를 이용하여 분석하였다. 중재군과 대조군 간의 일반적 특성은 대상자의 일반적 특성은 Shapiro-Wilk test를 시행하여 각각의 정규성을 확인한 후 빈도, 백분율, 평균, 표준편차 등 서술적 통계 자료를 이용하여 분석하였다. 중재군과 대조군 간의 일반적 특성은 카이제곱 검정과 독립 t 검정을 이용하여 동질성 검사를 하였다. 중재군과 대조군 간의 음악요법 후 분만통증, 분만경험은 독립 t 검정으로 분석하였다. 음악요법 후 자아존중감은 중재군과 대조군 간의 차이 비교는 대응표본 t 검정(paired t-test)으로, 사후 정정을 진행하였다. 중재군과 대조군 간의 음악요법 후의 분만통증, 분만경험은 독립 t 검정으로 분석하였다. 음악요법 후 자아존중감은 전후 비교는 대응표본 t 검정(paired t-test)으로, 사후 정정을 진행하였다.

Results
대상자의 일반적 특성
연구에 참여한 산부인과의 평균 연령은 32.7 ± 3.3세로, 30–34세가 83명(61.0%)로 가장 많았고 35세 이상이 32명(23.5%)이었다. 진통 및 분만장소는 다인실에서 진통하다 분만장으로 옮겨서 분만한 산부가 75명(55.1%), labor, delivery, recovery (LDR) 병실에서 진통과 분만을 함께 한 산부는 61명(44.9%)이었다. 재태 연령은 39주가 60명(44.1%)으로 가장 많았으며 평균 39.25 ± 0.86주였다. 분만으로 인한 회음부 열상은 9명(6.6%)이었고, 분만 전 99명(72.8%)이 태교음악의 경험이 있다고 응답하였다. 신생아의 1분 아프가 평균 점수는 8.58 ± 1.13점, 5분 아프가 평균 점수는 9.65 ± 0.84점이었다. 신생아의 체중은 2.5~3.4kg이 112명(82.4%)으로 가장 많았고 평균 3.1 ± 0.3kg이었다. 신생아가 중환자실로 이송된 경우는 15명(11.0%)이었으며 중재군과 대조군의 일반적 특성을 비교한 결과 두군은 유의한 차이를 보이지 않아 동질성을 확인하였다(Table 1).

Table 1. General characteristics according to whether primiparous women received prenatal music therapy during labor (N=136)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Categories</th>
<th>Total (n=136)</th>
<th>Experimental group (n=65)</th>
<th>Control group (n=71)</th>
<th>χ² or t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (year)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 30</td>
<td></td>
<td>21 (15.5)</td>
<td>13 (20.0)</td>
<td>8 (11.3)</td>
<td>0.73</td>
<td>.469</td>
</tr>
<tr>
<td>≥ 30</td>
<td></td>
<td>83 (61.0)</td>
<td>38 (58.5)</td>
<td>45 (63.4)</td>
<td>2.02</td>
<td>.364</td>
</tr>
<tr>
<td>≥ 35</td>
<td></td>
<td>32 (23.5)</td>
<td>14 (21.5)</td>
<td>18 (25.3)</td>
<td>0.97</td>
<td>.326</td>
</tr>
<tr>
<td>Labor room</td>
<td>LDR room</td>
<td>61 (44.9)</td>
<td>32 (49.2)</td>
<td>29 (40.8)</td>
<td>0.97</td>
<td>.326</td>
</tr>
<tr>
<td>Multi-bed room</td>
<td></td>
<td>75 (55.1)</td>
<td>33 (50.8)</td>
<td>42 (59.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gestational age (week)</td>
<td>≤ 38</td>
<td>44 (32.4)</td>
<td>21 (32.3)</td>
<td>23 (32.4)</td>
<td>1.41</td>
<td>.161</td>
</tr>
<tr>
<td></td>
<td>39</td>
<td>60 (44.1)</td>
<td>26 (40.0)</td>
<td>34 (47.9)</td>
<td>1.40</td>
<td>.498</td>
</tr>
<tr>
<td></td>
<td>≥ 40</td>
<td>32 (23.5)</td>
<td>18 (27.7)</td>
<td>14 (19.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perineal laceration</td>
<td>Yes</td>
<td>9 (6.6)</td>
<td>6 (9.2)</td>
<td>3 (4.2)</td>
<td>.310†</td>
<td></td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>127 (93.4)</td>
<td>59 (90.8)</td>
<td>68 (95.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prenatal music experience</td>
<td>Yes</td>
<td>99 (72.8)</td>
<td>49 (75.4)</td>
<td>50 (70.4)</td>
<td>0.42</td>
<td>.516</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>37 (27.2)</td>
<td>16 (24.6)</td>
<td>21 (29.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apgar score, 1 minute</td>
<td>≤ 8</td>
<td>32 (23.5)</td>
<td>13 (20.0)</td>
<td>19 (26.8)</td>
<td>1.10</td>
<td>.268</td>
</tr>
<tr>
<td></td>
<td>≥ 9</td>
<td>104 (76.5)</td>
<td>52 (80.0)</td>
<td>52 (73.2)</td>
<td>0.86</td>
<td>.353</td>
</tr>
<tr>
<td>Apgar score, 5 minute</td>
<td>≤ 8</td>
<td>6 (4.4)</td>
<td>1 (1.5)</td>
<td>5 (7.0)</td>
<td>1.67</td>
<td>.096</td>
</tr>
<tr>
<td></td>
<td>≥ 9</td>
<td>130 (95.6)</td>
<td>64 (98.5)</td>
<td>66 (93.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight of infant (kg)</td>
<td>&lt; 2.5</td>
<td>4 (2.9)</td>
<td>3 (4.6)</td>
<td>1 (1.4)</td>
<td>1.22</td>
<td>.221</td>
</tr>
<tr>
<td></td>
<td>2.5–3.4</td>
<td>112 (82.4)</td>
<td>52 (80.0)</td>
<td>60 (84.5)</td>
<td>0.560†</td>
<td></td>
</tr>
<tr>
<td></td>
<td>≥ 3.5</td>
<td>20 (14.7)</td>
<td>10 (15.4)</td>
<td>10 (14.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Admission to NICU</td>
<td>Yes</td>
<td>15 (11.0)</td>
<td>5 (7.7)</td>
<td>10 (14.1)</td>
<td>1.41</td>
<td>.235</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>121 (89.0)</td>
<td>60 (92.3)</td>
<td>61 (85.9)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

LDR: Labor, delivery, recovery room; NICU: neonatal intensive care unit.
†Fisher’s exact test.
Table 2. Effects of prenatal music care on labor pain and childbirth experience (N=136)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Mean ± SD</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total (n=136)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental group (n=65)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control group (n=71)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Labor pain</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Latent phase</td>
<td>3.35 ± 1.86</td>
<td>3.03 ± 1.90</td>
<td>3.65 ± 1.79</td>
</tr>
<tr>
<td>Active phase</td>
<td>3.29 ± 1.89</td>
<td>2.71 ± 1.53</td>
<td>3.83 ± 2.03</td>
</tr>
<tr>
<td>Transition phase</td>
<td>4.04 ± 2.16</td>
<td>2.88 ± 1.49</td>
<td>5.10 ± 2.14</td>
</tr>
<tr>
<td>Childbirth experience</td>
<td>58.97 ± 7.72</td>
<td>59.91 ± 8.45</td>
<td>58.11 ± 6.94</td>
</tr>
</tbody>
</table>

Table 3. Effect of prenatal music care on self-esteem during primiparous women’s labor (N=136)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean ± SD</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Experimental group (n=65)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control group (n=71)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preintervention</td>
<td>32.43 ± 3.01</td>
<td>32.34 ± 3.22</td>
<td>0.17</td>
</tr>
<tr>
<td>Postintervention</td>
<td>32.63 ± 3.52</td>
<td>32.23 ± 3.37</td>
<td>0.69</td>
</tr>
<tr>
<td>Post–Pre</td>
<td>0.20 ± 2.43</td>
<td>-0.11 ± 2.35</td>
<td>0.18</td>
</tr>
</tbody>
</table>

음악요법이 자아존중감에 미치는 영향
초산부의 자아존중감에 미치는 영향을 비교하였을 때, 자아존중감은 잠재기에서 대조군은 3.83 ± 2.03점, 중재군은 3.03 ± 1.90점으로 중재군의 자아존중감이 대조군보다 점수가 낮았다(t=1.95, p=.005). 활동기에서의 자아존중감은 대조군은 3.83 ± 2.03점, 중재군은 2.71 ± 1.53점으로 중재군의 자아존중감이 대조군보다 유의하게 나빠졌다(t=3.69, p<.001). 이완기에서의 자아존중감은 대조군은 5.10 ± 2.14점, 중재군은 2.88 ± 1.49점으로 중재군이 유의하게 낮아졌다(t=7.07, p<.001). 전통 음악요법 종 후 자아존중감은 평균 58.97 ± 7.72점으로 대조군 58.11 ± 6.94점, 중재군 59.91 ± 8.45점으로 유의한 차이를 보여 중재군이 긍정적으로 인지함을 확인하였다(t=−1.36, p=.018) (Table 3).

Discussion
본 연구에서 음악요법은 자아존중감을 감소하는 데 잠재기, 활동기, 이완기 모두 효과적이었다. 선행연구에서 자아존중감에 미치는 영향을 비교하였다. 잠재기에서 자아존중감 점수는 대조군 32.34 ± 3.22점, 중재군 32.43 ± 3.01점으로 두 군간에 유의한 차이를 보이지 않았다. 활동기에서 자아존중감 점수는 대조군 32.34 ± 3.22점에서 32.23 ± 3.37점으로 0.11점 감소하였고, 중재군은 32.43 ± 3.01점에서 32.63 ± 3.52점으로 0.20점 증가하였다. 이완기에서 자아존중감 점수는 대조군 58.97 ± 7.72점, 중재군 59.91 ± 8.45점으로 유의한 차이를 보였고, 이완기 후 자아존중감 점수는 대조군 58.11 ± 6.94점, 중재군 59.91 ± 8.45점으로 두 군간에 유의한 차이가 없었다 (t=−1.36, p=.018) (Table 3).

음악요법이 자아존중감에 미치는 영향
초산부의 자아존중감에 미치는 영향을 비교하였을 때, 잠재기에서 대조군은 3.83 ± 2.03점, 중재군은 3.03 ± 1.90점으로 중재군의 자아존중감이 대조군보다 점수가 낮았다(t=1.95, p=.005). 활동기에서의 자아존중감은 대조군은 3.83 ± 2.03점, 중재군은 2.71 ± 1.53점으로 중재군의 자아존중감이 대조군보다 유의하게 낮았다(t=3.69, p<.001). 이완기에서의 자아존중감은 대조군은 5.10 ± 2.14점, 중재군은 2.88 ± 1.49점으로 중재군이 유의하게 낮아졌다(t=7.07, p<.001). 전통 음악요법 종 후 자아존중감은 평균 58.97 ± 7.72점으로 대조군 58.11 ± 6.94점, 중재군 59.91 ± 8.45점으로 유의한 차이를 보여 중재군이 긍정적으로 인지함을 확인하였다(t=−1.36, p=.018) (Table 2).
것으로 생각된다.

본 연구는 단일 기관의 분만실만을 대상으로 조사하여 산부의 지 역적인 분포가 고르지 못하므로 연구 결과를 일반화하는 데에는 제 한이 있다. 그러나 분만이 처음이라 불안과 두려움을 가진 초산부 에게 음악요법 간호중재가 심리적 안정과 지지간호를 제공함으로 서 분만통증에도 효과적이고 분만경험에도 긍정적인 효과를 보였 으로, 임상현장에서 적용적으로 반영하기를 기대한다. 음악요법 간호중재가 자아존중감과 분만경험에 미치는 영향에 대한 추가적 인 반복 연구나 고위험 신생아를 분만하는 산부를 대상으로 한 추 가 연구도 제언한다.

본 연구는 초산부의 자연분만 시 진통 중 음악요법 간호중재가 분만통증, 자아존중감, 분만경험에 미치는 영향을 조사하였다. 음 악요법은 분만 장기, 활동기와 이완기에서 피로에서 분만통 증을 감소시켰고, 분만경험에도 긍정적인 영향을 미쳤다. 자아존중 감에는 유의한 차이가 없었지만, 손쉽게 제공할 수 있는 지지간호 의 한 영역으로 특히 처음 분만을 경험하며 많은 불안을 경험할 수 있는 산부에게 적절했다. 간호실무 측면에서 음악요법을 제공하여 분만통증을 완화하고 긍정적인 분만경험을 통해 모아 건강에 기여 하는 근거를 마련하였다는 데 본 연구의 간호학적 의의가 있다.

ORCID

Seong Yeon An, https://orcid.org/0009-0007-4585-1019
Eun Ji Park, https://orcid.org/0009-0000-4504-7046
Yu Ri Moon, https://orcid.org/0009-0001-8817-7331
Bo Young Lee, https://orcid.org/0009-0003-4409-7617
Eunbyul Lee, https://orcid.org/0009-0003-9630-6695
Dong Yeon Kim, https://orcid.org/0000-0001-9500-5792
Seong Hee Jeong, https://orcid.org/0009-0001-7303-9489
Jin Kyung Kim, https://orcid.org/0009-0005-1037-0771

Authors' contributions

Conceptualization, Formal analysis: All authors; Writing-original draft: All authors ; Writing-review & editing: An SH, Kim DY.

Conflict of interest

The authors declared no conflict of interest.

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Corrigendum: Effect of pectoralis major myofascial release massage for breastfeeding mothers on breast pain, engorgement, and newborns' breast milk intake and sleeping patterns in Korea: a randomized controlled trial

Won-Ryung Choi1, Yeon-Suk Kim2, Ju-Ri Kim3, Myung-Haeng Hur4

1Sanbon Branch of Mamslibe, Gunpo, Korea
2Department of Nursing, Chung Cheong University, Cheongju, Korea
3Department of Nursing, Kyung Min University, Uijeongbu, Korea
4College of Nursing, Eulji University, Uijeongbu, Korea

https://doi.org/10.4069/kjwhn.2023.03.15.e1

This corrigendum is for correcting a reference that was mistakenly reported in the above article.

https://doi.org/10.1186/s13006-023-00542-8

The corrected reference is as below. The authors apologize for any inconvenience that this may have caused.

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.

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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:

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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.

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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/). and present keywords in alphabetical order.

Summary Statement
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• 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.

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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).

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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>20</td>
<td>10</td>
<td>Invited</td>
</tr>
<tr>
<td>Editorials</td>
<td>None</td>
<td>2,500</td>
<td>10</td>
<td>5</td>
<td>Invited</td>
</tr>
<tr>
<td>Letter to the editor</td>
<td>None</td>
<td>1,000</td>
<td>10</td>
<td>3</td>
<td>Unsolicited</td>
</tr>
<tr>
<td>In reply</td>
<td>None</td>
<td>1,000</td>
<td>10</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.

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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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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3. 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.

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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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☐ 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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