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Original Articles

217 Development of an Internet of things-based treatment adherence program among older adults with mild cognitive impairment using Intervention Mapping: A developmental study
Jinhee Shin, Eunhee Cho, Gwang Suk Kim, Heejung Kim, Byoung Seok Ye, Chang-Gi Park

237 Nurses' perceptions of gerontological nurse practitioner programme curricula: A qualitative descriptive study
Jongsun Park, Hyejin Kim

248 Health-related quality of life for older patients with chronic low back pain: A structural equation modeling study
Suin Lee, Eun-Ju Lee

262 Assessing the implementation of a nursing home-based physical and mental training: Utilizing the Reach, Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM) framework: A qualitative descriptive study
Erindra Budi Cahyanto, Achmad Arman Subijanto, Agus Kristiyanto, Sumardiyono

271 The impact of Long COVID, work stress related to infectious diseases, fatigue, and coping on burnout among care providers in nursing home: A cross-sectional correlation study
Hyunjoo Lee, Youngja Seo, Jihye Kim, Hye Young Song, Jinhee Park, Youngran Yang

284 지역사회 허약노인이 인지하는 건강한 노화: 혼종모형 개념분석
서지수, 류아현, 송라윤

297 고혈압 노인을 위한 노인복지관 중심 통합 복약관리 프로그램의 개발 및 효과: 횡단적 단면연구
문희정, 정덕유

309 만성질환 노인을 돌보는 간호사의 공유적 의사결정 역할 인식: 질적 서술적 연구
박명화, 김진주, 정지혜, Doan Thi Thu Thao

320 지역사회 거주 노인의 낙상 영향요인: 2020년 노인실태조사 자료 이용: 2차 자료 분석연구
이장란
Original Articles

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Jinhee Shin, Eunhee Cho, Gwang Suk Kim, Heejung Kim, Byoung Seok Ye, Chang-Gi Park

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Erindra Budi Cahyanto, Achmad Arman Subijanto, Agus Kristiyanto, Sumardiyo

271 The impact of Long COVID, work stress related to infectious diseases, fatigue, and coping on burnout among care providers in nursing home: A cross-sectional correlation study
Hyunju Lee, Youngja Seo, Jihee Kim, Hye Young Song, Jinhee Park, Youngran Yang

284 Healthy aging of frail older adults in the community: A hybrid concept analysis
Ji Su Seo, A-Hyun Ryu, Rhayun Song

297 Development and effectiveness of an integrated medication management program centered on senior welfare centers for older adults with hypertension: A cross-sectional study
Heuijeong Moon, Dukyoo Jung

309 The role of nurses in shared decision-making about caring for older adults with chronic disease: A qualitative descriptive study
Myonghwa Park, Jinju Kim, Jihee Jung, Doan Thi Thu Thao

320 Factors influencing falls in the community-dwelling elderly: Data from the 2020 national survey of older people: A secondary analysis study
Chang Kwan Lee
Development of an Internet of things-based treatment adherence program among older adults with mild cognitive impairment using Intervention Mapping: A developmental study

Jinhee Shin¹, Eunhee Cho², Gwang Suk Kim², Heejung Kim³, Byoung Seok Ye⁴, Chang-Gi Park⁵

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Purpose: Dementia and altered cognitive function are highly prevalent among older adults with mild cognitive impairment (MCI); hence, prevention is necessary before it develops into dementia. Treatment adherence—medication adherence and physical activity—is essential to prevent and delay dementia; however, comprehensive interventions to promote it in this population are lacking. This study aimed to develop a program for treatment adherence utilizing an Internet of Things (IoT) device.

Methods: The six-step mapping protocol was used to develop the IoT-based treatment adherence intervention (ITAI). The intervention was based on a literature review, expert opinions, and input from older adults with MCI.

Results: In Step 1, a needs assessment was conducted to gain insights into health problems and their underlying determinants. In Steps 2 and 3, performance objectives were identified for behavior change and selected theoretical and evidence-based methods were linked to the intervention outcomes. In Step 4, the ITAI was designed with components and materials consistent with the identified change goals and methods, and specific intervention components were developed. In Step 5, implementation plans and solutions to barriers to its application were identified. In Step 6, the plan to evaluate intervention effectiveness was outlined.

Conclusion: The Intervention Mapping provided a systematic procedure for developing an ITAI for older adults with MCI and preparing a randomized controlled trial. Utilizing Intervention Mapping is useful as ITAI systematically processes treatment adherence for MCI using the IoT and is acceptable and valid. ITAI is expected to increase medication adherence and physical activity in older adults with MCI.

Keywords: Cognitive dysfunction; Treatment adherence and compliance; Internet of things; Methods; Aged

INTRODUCTION

1. Background

Mild cognitive impairment (MCI) is a transitional stage between normal aging and dementia, characterized by subjective memory impairment, maintenance of normal cognitive function, and active daily living [1]. MCI increases the risk of dementia and cognitive function change, but it is reversible. Hence, prevention is necessary to avoid its development into dementia. The prevalence of MCI is increasing worldwide, and one out of five Korean older adults (20.2%) suffer from MCI...
The annual morbidity of dementia is 1%~2% and 10%~15% in normal older adults and those with MCI, respectively [2]. Hypertension, diabetes, hyperlipidemia, and atherosclerosis increase the risk of cognitive decline. Diabetes accelerates age-related cognitive decline [3], and increases the risk of dementia among older adults. Diabetes can also lead to complications in the central nervous system and cognitive function processes [3]. Additionally, decreased cerebral blood flow due to aging disrupts mechanisms regulating the brain and enhanced by hypertension. Furthermore, the severity of atherosclerosis in the arteries likely associates hypertension with cognitive decline [4]. People with MCI have a higher prevalence of hypertension, diabetes, and stroke [5]. According to the dementia prevention guidelines, the early detection of chronic diseases, treatment and management of chronic diseases, and regular exercise can prevent dementia [6]. Therefore, people with MCI need chronic disease treatment and regular exercise to reduce and prevent dementia. To manage chronic diseases, it is necessary to understand and follow experts’ instructions on drug use, diet, and exercise therapy [7]. Treatment adherence consists of taking medication and complying with a specialist’s prescription for chronic disease management [8]. Compliance with medication is essential for treatment adherence. Non-adherence to medication is a major barrier to safe and cost-effective health care delivery among providers. Medications and dosages are key factors in successful healthcare delivery, yet adherence in older adults remains low [9]. Cognitive decline in older adults is a risk factor for medication non-adherence [10]. It also affects instrumental daily activities, including medication use and treatment adherence [11]. For this reason, medication adherence intervention was implemented to solve the problem of medication non-adherence in older adults with MCI [12]. As with previous interventions, it helped people with MCI with medication adherence [12,13]. The mechanism of action associated with physical activity improves cognitive function, stimulates nerve growth, and encourages survival [14]. Physical activity decreases the risk of cerebrovascular diseases by reducing cardiovascular risk factors such as hypertension and hyperlipidemia [15]. Older adults with MCI have lower exercise levels than those with normal cognitive function [5]. A physical activity intervention study revealed that participants who adhered to medication reported improved cognitive function and decreased risk of cerebrovascular and cardiovascular diseases [16], suggesting that both regular physical activity and medication adherence are important in preventing cognitive decline.

The fourth industrial revolution brought in healthcare innovation through the development of information technology and biotechnology, with diseases being prevented using the Internet of things (IoT) platforms, and wearable devices and customized healthcare services showing significant growth [17]. The IoT indicates that each object connects to the Internet and enables communication through technology [17]. Research using the IoT has been conducted on individual interventions to provide educational information tailored to patients’ needs and technology-based reminders for patients and medical institutions [18]. Healthcare provider interventions are being developed based on IoT devices [19]. Notably, technology-based interventions improve patient outcomes, costs, and treatment effectiveness. Furthermore, technology-based interventions are employed for early recognition of inadequate performance; reducing complications; and alerting, rewarding, and providing feedback on the patient’s progress. A systematic review reports that regular visit strategies (telehealth, home monitoring, and telephonic counseling) have been widely employed to enhance medication adherence [20]. Interventions using periodic visits to improve medication are being challenged because sustained adherence could not be achieved. Considering that individuals with MCI experience memory deterioration, medication adherence intervention strategies are required to ensure continued use. For people with MCI, exercise not only prevents and delays dementia but also assists in managing chronic diseases [21]. However, a well-developed integrated approach for physical activity among older adults with MCI that ensures medication adherence, prevents and delays dementia and manages chronic diseases is unavailable. Technology-based exercises and physical activity rates record, and information and aid supervision are necessary strategies to support care managers’ and patients’ decisions when developing target programs.

The provision of healthcare through the convergence of the IoT and information and communication technology is recently adopted in managing chronic diseases because of their role in promoting treatment adherence through reminders. Smart health devices are developed and released to aid treatment methods for older adults with MCI [12,22]. IoT also allows immediate institutionalization of interventions by identifying the state and providing prompts for care and to medication adherence leading to desired treatment adherence, and these technologies can help patients with MCI adhere to treatment. This paper describes the methods used and outcomes
obtained from developing and refining a theory- and evidence-based program to facilitate the IoT-based treatment adherence intervention (ITAI). The study aimed to develop an ITAI program to improve treatment adherence (medication adherence and physical activity) using Intervention Mapping steps (development of an intervention) among older adults with MCI.

**METHODS**

**Ethic statement:** The study was approved by the Institutional Review Board (IRB) of Yonsei University Health System prior to conducting the study (IRB No. 4-2019-1317).

1. Developing the ITAI

The development of the ITAI followed the Intervention Mapping protocol comprising six steps. The Intervention Mapping protocol is a systematic outline for the development, implementation, and evaluation of intervention for health behavior change [23]. It is considered useful for constructing programs grounded in both theory and empirical data. The Intervention Mapping facilitates the effective development of behavioral change interventions, and many healthcare programs have successfully used it for various interventions [24]. Table 1 shows the six steps of Intervention Mapping and their purpose and methods. The implementation as conducted in each step is presented below.

Step 1 required obtaining insight into the health problems and underlying determinants of older adults with MCI. We developed a complex intervention focused on behavioral support for MCI. Moreover, we first sought to understand the kind of support needed by an individual for their problem. Through this step, we gained insight into the health problems and underlying determinants of treatment adherence among older adults with MCI. To identify training and methods for providing them with the necessary support, we reviewed literature on the health problems associated with MCI. We searched PubMed and Cumulative Index to Nursing and Allied Health Literature (CINHAL) for English articles, and Korean studies Information Service System (KISS), KoreaMed, and Research Information Sharing Service (RISS) databases for Korean arti-

<table>
<thead>
<tr>
<th>Table 1. The Intervention Mapping Steps Process of the ITAI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Steps</strong></td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>1 Needs assessment</td>
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<td>2 Formulation of the change objectives</td>
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<td>3 Selection of the theory-based methods and practical strategies</td>
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<td></td>
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<td>4 Producing program components and materials</td>
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<td>5 Planning program adoption and implementation</td>
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<tr>
<td>6 Planning for evaluation</td>
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</table>

ITAI=Internet of things-based treatment adherence intervention; MCI=Mild cognitive impairment.
cles published until August 2020.

The literature review search terms were “mild cognitive impairment OR mild cognition impairment OR mild impairment of cognition OR mild impairment of cognitive function OR cognitive decline” AND “medication adherence OR medication compliance” AND “activity or activities OR walk OR walking OR exercise” AND “program OR programs OR intervention OR interventions OR treatment OR treatments.” The following criteria were used to select studies for analysis: (1) research published in English and Korea, (2) experimental or quasi-experimental studies, (3) research conducted for older adults with MCI, and (4) research with medication adherence and physical activity program. Finally, we analyzed 16 of 237 studies after excluding those irrelevant to the topic (Table 2, Appendix 1) [12,13,25-38].

In Step 2, we formulated the outcomes for health behavior change, dividing them into broad and specific performance objectives. We conducted a comprehensive literature review on medication adherence and physical activity among older adults with MCI in Step 1; based on this, overall behavioral goals and specific interventions for older adults with MCI were finalized.

In Step 3, a theoretical analysis was performed to identify effective health behaviors. A research framework was constructed based on the health belief model [39]. The performance strategy based on the health belief model was determined through the literature for health behavioral belief promotion education, self-efficacy improvement, cue to action trigger, cue to action trigger and reminder, and individualized coaching.

In Step 4, we designed the ITAI with components and materials consistent with the identified change goals and methods, described the components, and determined real-world applications. A discussion with six experts was conducted. Some of the experts had participated in the problem analysis in Step 1. To verify the validity of the expert group, the members were three nursing professors with expertise in health-related research and intervention program development, two gerontological nurse practitioners with more than 20 years of experience, and one neurologist.

In Step 5, after a week of pre-testing with participants with MCI, the research team met to discuss the implementation barriers and mitigation action plans.

In Step 6, we designed a randomized control trial pilot study to evaluate interventions. The program includes a nurse’s assessment of medication adherence and physical activity, weekly phone visits, and education. Major outcome measurement

<table>
<thead>
<tr>
<th>NO.</th>
<th>Author (year)</th>
<th>Design</th>
<th>Population</th>
<th>Intervention</th>
<th>Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Insel and Cole (2005) [13]</td>
<td>Before-after study</td>
<td>-27 community-dwelling adults self-administering one prescription medication</td>
<td>Use of medication monitoring system (MEMS) as reminder to take medication</td>
<td>-The cues were individually tailored (nurse-instituted individualized)</td>
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<td></td>
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<td>-Mean age 78 years, range 67-89 years</td>
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<td>-Provide cues to support remembering with MEMS</td>
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<td>2</td>
<td>Kamimura et al. (2012) [12]</td>
<td>Before-after study</td>
<td>-8 community-dwelling adults with a history of non-adherence</td>
<td>Use of an automatic pill dispenser as reminder to take medication</td>
<td>-Automatic pill dispenser with daily alarms</td>
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<td>-Age 81.2±6.2 years</td>
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<td>-Caregiver monitoring</td>
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<th>Outcomes measured</th>
<th>Results</th>
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<tr>
<td>3</td>
<td>Hawkins and Firek (2014) [25]</td>
<td>Before-after study</td>
<td>27 outpatients from a veteran administration clinic</td>
<td>Pictorial medication sheet with brief instruction on use</td>
<td>Optional alarmed pillbox</td>
<td>16–48 weeks</td>
<td>Medication adherence: at each monthly visit, pill counts</td>
<td>Improvement adherence pre- (79.74±16.98) to post intervention (84.74±10.00)</td>
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<td></td>
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<td>Age 65.3±8.2 years</td>
<td>An optional CADEX Pocket</td>
<td>Pictorial medication sheets and education</td>
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<td></td>
<td>Pill Box (ePill LLC) with 4 alarms daily</td>
<td>Optional CADEX Pocket Pill Box (ePill LLC) with four vibrating daily alarms</td>
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<td>- 30 day pill counts at visit</td>
<td>- 30 day pill counts at visit</td>
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<td>4</td>
<td>Smith et al. (2007) [26]</td>
<td>Randomized controlled trials (RCT)</td>
<td>Intervention group (n=8) - Control group (n=6)</td>
<td>Intervention group: video-monitoring phase and/or plain ordinary telephone service (POTS) monitoring phase and/or a standard unmonitored care phase (n=8)</td>
<td>Televideo monitoring equipment was installed in the homes: Telephone service (POTS) monitoring</td>
<td>12–24 weeks</td>
<td>Medication adherence: SAMR, i.e., ratio of the number of doses taken independently to the number of all prescribed doses during 1 week (pill count of the pill dispenser)</td>
<td>- Initial compliance rates (1 month into the phase) were 80% for video, 85% for phone, and 75% for controls - End-of-phase values of 81, 80, and 62%, for video, phone, and no monitoring respectively</td>
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<td>Control group: only POTS and/or unmonitored care as match controls to video participants that could not serve as their own control in all 3 phases (n=6)</td>
<td>Video monitoring</td>
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<td>- Visited once per month by the study coordinator</td>
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<td>5</td>
<td>Vervloet et al. (2014) [27]</td>
<td>RCT</td>
<td>Diabetes type 2 patients - Short message service (SMS) group (n=56)</td>
<td>Real time medication monitoring system offers real time at a central database + SMS reminders</td>
<td>Realtime medication monitoring dispenser</td>
<td>24 weeks</td>
<td>Pharmacy refill data, pill counts</td>
<td>- SMS group (79.5% vs. 64.5%, +16.3%) - Non-SMS group reached 73.1% (+7.3%)</td>
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<td>Non-SMS group (n=48)</td>
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<td>Real time SMS reminders</td>
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<td>Control group (n=57)</td>
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</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Marek et al. (2013) [28]</td>
<td>RCT</td>
<td>Older adults Medicare-certified self-managing medications (N=414)</td>
<td>Pharmacy screens medication-dispensing machine or a medplanner visited the participants at least every 2 weeks</td>
<td>-Advanced practice nurse reviewed all medications identified -Received a medplanner (nurse care coordination) -Provided prompts for medication administration as well as feedback on missed doses -Medication-dispensing system with alarm -The nurse creates a treatment plan specific to each participant’s clinical condition -Nurse visits every 2 weeks -The care plans included monitoring of specific signs and symptoms related to medical diagnoses, medications, and other individualized problem areas</td>
<td>12–48 weeks</td>
<td>Health status outcomes: Geriatric Depression Scale, MMSE, Physical Performance Test, Mental Component Summary, SF-36 Physical Component Summary</td>
<td>The time by group interactions were significant for outcome variables</td>
</tr>
<tr>
<td>7</td>
<td>Suzuki et al. (2013) [29]</td>
<td>RCT</td>
<td>-Exercise group (n=50) -Control group (n=50)</td>
<td>Aerobic exercise, strength training, balance, dual tasking 2x90 min/wk</td>
<td>Aerobic strength</td>
<td>24 weeks</td>
<td>MMSE, logical memory scores</td>
<td>MMSE, logical memory scores improved in the exercise group</td>
</tr>
<tr>
<td>8</td>
<td>Lam et al. (2011) [30]</td>
<td>RCT</td>
<td>-Tai Chi group (n=171) -Control group (n=218)</td>
<td>Tai Chi exercise: ≥3x30 min/wk -Control group: stretching ≥3x30 min/wk, group intervention</td>
<td>Tai Chi exercise</td>
<td>12 weeks</td>
<td>Memory Inventory for the Chinese, cognitive subscale (Alzheimer’s Disease Assessment Scale [ADAS-Cog]), Clinical Dementia Rating (CDR), Neuropsychiatric Inventory, The Berg Balance Scale (BBS)</td>
<td>Improvements in attention and the CDR scores in the exercise group</td>
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(Continued to the next page)
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</tr>
</thead>
</table>
- Control group (n=10) | - High-intensity exercise: treadmill, stationary bicycle, elliptical trainer, 4x45–60 min/wk  
- Control: stretching 4x45–60 min/wk, group intervention | High-intensity exercise | 24 weeks | Symbol digit verbal fluency, Stroop and task switching, Story Recall | Improved for women in the exercise group  
Delayed recall: no difference |
| 10  | Lautenschlager et al. (2008) [32] | RCT    | - Physical activity group (n=85)  
- Control group (n=85) | - Physical activity program: walking, strength training 3x50 min/wk  
- Usual care control educational material individual intervention | Walking, strength | 24 weeks | Scale–Cognitive subscale (ADAS-Cog) scores | Intervention group improved ADAS-Cog |
| 11  | Shin (2011) [33] | Non-equivalent control group pre-post test | - Exercise group (n=17)  
- Control group (n=17) | Swiss Ball exercise program: performed 2 times/wk | Swiss ball exercise | 12 weeks | One Legged Stand (OLS), Timed Up & Go (TUG), Sit-To-Stand (STS), Active Daily Living (ADL) | Improvement OLS, TUG, STS, ADL |
| 12  | van Uffelen et al. (2008) [34] | RCT    | - Group 1 (n=77)  
- Group 2 (n=75)  
- Group 3 (n=78)  
- Group 4 (n=74) | - Group 1: aerobic walking, 2x60 min/wk and vitamin B supplementation  
- Group 2: placebo activity, 2x60 min/wk and vitamin B supplementation  
- Group 3: walking 2x60 min/wk and placebo supplementation  
- Group 4: placebo activity, 2x60 min/wk and placebo supplementation, group intervention | Aerobic walking | 24–48 weeks | Neuropsychological tests, MMSE | No improvement in MMSE or verbal fluency  
Women with good attendance in aerobic walking improved delayed recall |
| 13  | Scherder et al. (2005) [35] | RCT    | - Walking group (n=15)  
- Hand and face exercises (n=13)  
- Control group (n=15) | - Walking group: walking 3x30 min/wk  
- Hand and face exercises, bending and stretching the fingers, producing different facial expressions 3x 30 min/week  
- Control group: social visits or normal social activities individual intervention | Walking, bending and stretching | 6 weeks | Executive Functions (EF) | Improvement in tasks appealing to EF walking group and the hand/face group |

(Continued to the next page)
<table>
<thead>
<tr>
<th>No.</th>
<th>Author (year)</th>
<th>Design</th>
<th>Population</th>
<th>Intervention</th>
<th>Strategies</th>
<th>Duration</th>
<th>Outcomes measured</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>Kim et al. (2010)</td>
<td>One group pre-test, post test</td>
<td>Exercise group (n=16)</td>
<td>Combined exercise: walk, Yoga three times/wk</td>
<td>Walking yoga</td>
<td>8 weeks</td>
<td>Improvement Cognition Scale for Older Adults (CSOA)</td>
<td>Improvement CSOA</td>
</tr>
<tr>
<td>15</td>
<td>Kim et al. (2019)</td>
<td>One group pre-test, post test</td>
<td>Internet of things (IoT)-based exercise group (n=30)</td>
<td>IoT-based exercise program (upper exercise content and lower exercise content): twice weekly exercise</td>
<td>IoT-based upper, lower exercise</td>
<td>12 weeks</td>
<td>Grip strength, Gait speed, Short Physical Performance Battery (SPPB), MMSE</td>
<td>Improvement Grip strength, Gait speed, Five chair standing time, SPPB score, MMSE exercise group</td>
</tr>
<tr>
<td>16</td>
<td>Jung (2018)</td>
<td>One group pre-test, post test</td>
<td>Square-stepping exercise group (n=26)</td>
<td>Square-stepping exercise: twice weekly exercise</td>
<td>Square-stepping exercise</td>
<td>8 weeks</td>
<td>Montreal Cognitive Assessment (MoCA-K), BBS</td>
<td>Improvement MoCA, BBS</td>
</tr>
</tbody>
</table>

Table 2. Continued

consists of items for treatment adherence; medication adherence, and physical activity level (gait phase and physical activity assessment) and additionally measures perceived health beliefs and self-efficacy.

2. Patient and Public Involvement

There are inadequately developed integrated approach for physical activity among older adults with MCI that ensures medication adherence, prevents and delays dementia and manages chronic diseases. This paper describes the methods used and outcomes obtained from developing and refining a theory- and evidence-based program to facilitate the ITAI. During the development process, the researcher was trained to conduct the intervention. The researcher participated in a one-day training course on the components of developing IoT interventions targeting older adults. The nurse involved in the intervention implementation received supervision and feedback from the first author, patients, and relatives on delivering the post-implementation interventions. Also, a trained nurse examined the pre-test of the intervention in five older adults with MCI from a neurology outpatient clinic who met the predetermined inclusion criteria. After ITAI was initially completed, five older adult patients with MCI tested the usability of the developed intervention. The patients and caregivers were informed that by signing this consent form, they consent to the collection and use of their information, and the data collected during the research will be used for research purposes. They were also informed that the findings would be published in international journals or through conferences without directly linking personal data to the collected information.

3. Delimitation of the Study

This study used Intervention Mapping to develop an ITAI for the management of MCI. Results from Steps 5 and 6 of the Intervention Mapping steps will be published in a future paper. We have applied only pre-testing using a feasibility test for the development of an intervention plan that can be implemented in future studies.

4. Ethics Approval and Consent to Participate

The study was approved by the IRB of Yonsei University...
Health System prior to conducting the study (IRB No. 4-2019-1317).

RESULTS

1. Step 1: Needs Assessment

In the first step of the needs assessment, we reviewed and analyzed the health problems and behaviors of MCI to identify the determinants. Furthermore, the final participation criteria were as follows: aged 65 years or older, diagnosed with MCI by a neurologist, no previous history of any psychiatric disease, taking medications for a chronic disease, using a smartphone, and those who have a primary caregiver. People with a diagnosis of dementia and severe respiratory and cardiovascular disease were excluded.

1) Analysis of Behavior

Compared to older adults in general, those with MCI suffered from more chronic diseases such as hypertension and diabetes [3]. Medication adherence among community-dwelling individuals with MCI was reportedly between 64.8% and 75.0% [13,26]. As most participants with MCI lived in their homes, the need for an integrated intervention to improve the adherence of doctor-prescribed medication and physical activity (hereafter referred to as treatment adherence) for dementia prevention was necessary.

We found that older adults with MCI perceived difficulties in performing healthy behaviors. Although they could perform normal activities, they had memory impairment due to cognitive decline, which means that even though they thought of implementing healthy behaviors, they could not practice them due to a decline in memory. Cognitive decline in such individuals, therefore, acts as a risk factor for lower medication adherence [40] and affects instrumental activities of daily living, rendering it difficult to comply with treatment [11]. Although exercise is recommended for those at risk or individuals who are living with dementia, many are inactive [41]. Older adults with MCI are less active than those without it, and few meet the recommended physical activity for maintaining their health and functioning [42]. The tendency for low physical activity and fitness in people with MCI or dementia may be due to different barriers concerning exercise participation. Because these people are generally older, they must fight the perceived age-related barriers to exercise participation, such as fear of falls, increased risk of injury, and a perception of limited benefits of exercise [42]. Education is needed to overcome these barriers. Moreover, it is essential to improve the perceived health beliefs related to physical activity [39].

2) Analysis of Behavioral Determinants

In this study, we confirmed the theoretical definition and developed an operational definition of treatment adherence. The former refers to the degree to which an individual performs behaviors consistent with a clinical prescription [8]. The latter entails the adherence to prescribed medication for chronic diseases and physical activity. We considered the major behavioral determinants of individuals with MCI based on the health belief model to identify the factors that could change behaviors for treatment adherence. The main factors affecting the health behavior of participants with MCI are problems of cognitive impairment, which do not allow behaviors to be practiced owing to the lack of perceived health beliefs (threats and expectations) [43] and memory deterioration. Exercise providers promote movement in these groups by recognizing and responding to the needs of people with MCI or dementia in exercise programs [41]. Furthermore, cue to action interventions have been implemented to help memory by focusing on strategies that trigger actions [13]. However, even if the perceived health beliefs are enhanced, it is difficult to practice them due to memory impairment. Specifically, we recognized the need for a method that could help improve health beliefs and memory for people with MCI to practice health behaviors.

2. Step 2: Outcomes and Objectives

The second step was to identify intervention outcomes based on needs assessment. The intervention goal was treatment adherence by improving the patients’ medication adherence and performance of physical activities, to reduce the risk of dementia. We defined behavioral outcomes as an “increase in treatment adherence.” As perceived health beliefs and behavioral triggers cause these treatment adherence behaviors, the performance goals should be devised around them. Subsequently, we established objectives by selecting important and modifiable determinants of behavior, taking medication based on perceived health beliefs and creating cues to action for behavior leading to reaching or maintaining medication adherence. To achieve these, we formulated the change goals (Table 3).
<table>
<thead>
<tr>
<th>Concept</th>
<th>Theoretical definition</th>
<th>Operational definition</th>
<th>Component of this study</th>
<th>Behavioral outcomes</th>
<th>Personal determinants</th>
<th>Performance objectives</th>
<th>Change objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Older adults with MCI</td>
<td>Individual demographic and sociological characteristics.</td>
<td>Demographic and health-related characteristics of the older adults with MCI.</td>
<td>Education, evaluation</td>
<td>Treatment adherence</td>
<td>Medication adherence</td>
<td>- Perceived health beliefs</td>
<td>- The patient decides to practice taking medication based on perceived health beliefs.</td>
</tr>
<tr>
<td>Threat</td>
<td>The combination of perceived severity and susceptibility is referred to as perceived threat. Perceived severity and perceived susceptibility to a given health condition depend on knowledge about the condition.</td>
<td>Personalized nursing education makes individuals more aware of perceived severity and susceptibility of dementia; they are more likely to participate in dementia-related health prevention actions.</td>
<td>Education, self-efficacy, demonstration, and evaluation</td>
<td>- Cue to action (reminder, personal influence)</td>
<td>- Cue to action for behavior leading to reaching or maintaining medication adherence.</td>
<td>- Provide a reminder strategy, an opportunity for action, to prevent memory impairment in patients to promote medication adherence.</td>
<td></td>
</tr>
<tr>
<td>Expectations</td>
<td>The expectation (perceived benefits, barriers, and self-efficacy) is that a certain health action could prevent the condition for which people consider they might be at risk.</td>
<td>Perceived benefits and barriers can be strengthened through personal nursing education with nurses. Use of self-efficacy strategies for program content.</td>
<td>Telephone calls and counseling, education, and Internet of things (IoT) device</td>
<td>Physical activity</td>
<td>- Perceived health beliefs</td>
<td>- The patients’ perceived health beliefs and behavioral triggers help them adhere to or maintain physical activity.</td>
<td>- To enhance perceived health beliefs and self-efficacy, the experts develop and apply perceived health belief improvement education.</td>
</tr>
<tr>
<td>Cue to action</td>
<td>The cue or trigger is necessary to increase engagement in health-promoting behaviors.</td>
<td>IoT device-based cue or trigger and personal nursing coaching.</td>
<td>Medication adherence, physical activity, and self-efficacy</td>
<td>Pre-post evaluation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Behavior</td>
<td>Behavior to reduce threats based on expectations. Health outcome that changes positively through modifications in health behaviors.</td>
<td>Medication adherence and physical activity among older adults with MCI.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

MCI=Mild cognitive impairment.
3. Step 3: Theoretical Methods and Practical Strategies

In the third stage, we identified and selected theoretical models and evidence-based methods to address the change objectives described earlier. The health belief model was found to be appropriate because it accounted for health behavior changes, including key motivational factors and individual perceptions, to explain preventive health behaviors. The health belief model is divided into risk and expectation factors in the perceived health beliefs; based on this classification, health behaviors can be practiced using a cue to action. Health beliefs refer to behaviors regarding disease control that help in behavior change and function as prerequisites for action [39]. The health belief model consists of five concepts of behavioral change: perceived severity, susceptibility, benefit, barriers, and self-efficacy [39]. To develop the interventions, we confirmed the theoretical definition of the health belief model, established an operational definition, identified the components of this study (Table 3), and constructed a framework.

1) Behavior Change Techniques

After identifying the patient and ITAI target behaviors, interventions were developed for older adults with MCI; an intervention method using the IoT to provide reminders was selected for action trigger strategies [25]. Additionally, perceived health beliefs promotion education and self-efficacy enhancement strategies were developed. Recently, devices that help medication adherence can prompt and monitor drugs based on the IoT, enabling the use of technology-oriented reminders [18]. As a strategy to promote physical activity, recommended walking (cardio exercise) that is not limited by time and space was selected as it could easily induce regular exercise in older adults [32]. Regarding the IoT, wrist-worn devices promoted walking. We further developed personalized goals and contents for their achievement as follows: the ITAI based on perceived health beliefs improvement education and the self-efficacy enhancement strategy; the IoT smart pillbox, wrist-worn devices, and action trigger strategies as reminders [25]; and personalized nursing coaching strategies [26].

4. Step 4: Developing Intervention Components

1) Development of the ITAI Content

The fourth stage involved designing an ITAI with components and materials consistent with the change goals and methods identified in Step 3, which was discussed with the expert group. The individual components and the real-world applications that were developed were described. First, design problems were identified by reviewing the literature on interventions based on the health belief model [39] and those using the IoT. Second, data on communication technology information about the device were obtained. Finally, educational programs on the perceived severity, susceptibility, benefit, and barriers (perceived health beliefs) were developed as a strategy for improving health behavior beliefs. The intervention strategy consisted of self-efficacy enhancement approaches, including achievement experience, proxy experience, and verbal persuasion [44]. To improve an individual’s perceived health beliefs, participants and their primary caregivers were educated on disease knowledge, dementia risk factors, the importance of medication adherence and physical activity, how to exercise walking, and how to practice drug use. Personalized training methods were implemented via handouts, and pre-intervention training was provided to participants lasting approximately 20–30 minutes. During the intervention period, for customized nursing coaching, an IoT-based smart pillbox alerted the user to take medicines, and a wrist wearable device reminded the user to go walking. In the introductory step, we trained a researcher (registered nurse) in prescription recommendations, IoT smart pillbox, and wrist wearables, using handouts, educational material, and demonstrations. Personalized nursing coaching, which is conducted via weekly telephone consultation, lasting about 20 minutes enquired about feedback on the patient’s medication adherence rates, the average weekly steps, and then the weekly steps goals for the ensuing week. Additionally, in real-time, the researcher immediately checked the medication adherence status through the data transmitted from the smart pillbox. If the patients failed to take medication more than twice, the researcher instantaneously contacted them via phone and sent a text message to the primary caregiver. Primary caregivers provide the most care for older adults with MCI, mainly daughters, sons, and daughters-in-law in Korea. When the primary caregivers received the text message, they were instructed to visit or call the older adults with MCI or help them take their medications. During the maintenance period, a reminder strategy was implemented, excluding customized nursing coaching, to maintain a reminder set for a personalized smart pillbox and a wearable alarm set as a maintenance strategy to promote physical activity.
2) Content Validation

The panel of five experts (comprising physician, nursing professors, and geriatric practitioners with at least 10 years of experience) evaluated the education and program content validity, and the relevance of the ITAI using the Polit and Beck methods [45]. We measured the content validity index of the overall ITAI program using the scale content validity index. The proportion of education and program content that reported a rating of 3 or 4 by all content experts (scale content validity index/universal agreement), the average of the item content validity index for all items on the scale (scale content validity index/average proportion), and the content validity index of ITAI individual content items (item content validity index) [46]. The scale content validity index is a composite score that requires key components like the scale content validity index/universal agreement, scale content validity index/average proportion, and the item content validity index. Each item was rated on a 4-point scale to avoid having an ambivalent midpoint: 1, not relevant; 2, somewhat relevant; 3, quite relevant; and 4, highly relevant. The experts’ scores are assigned relevance when they score 3 to 4 on the Likert-type scale. When the assigned score is deemed as relevant then a 1 is assigned and when it is deemed not to be relevant then a 0 is assigned. The individual item content validity index ratio was computed as the number of relevant ratings, therefore, dichotomizing the scale into either relevant (1) or not relevant (0). As a result, the scale content validity index/universal agreement, scale content validity index/average proportion, and scale content validity index/universal agreement ranged from 1.00. The criteria of the dimensions that indicated sound content validity were item content validity index > 0.78 and scale content validity index/average proportion > 0.90 (Appendix 2).

5. Step 5: Implementation Plan

The ITAI will be planned as a pre-post design with a control group, comprising an intervention period of 6 weeks, and a maintenance period of 4 weeks based on the 16 articles included in the literature review. We discussed the potential issues and barriers to intervention implementation and devised a plan to ensure the execution with the expert group. Additionally, the researcher was trained to conduct the intervention. The researcher who provided the intervention participated in a one-day training course on the components. Subsequently, the nurse received supervision and feedback on how they delivered the post-implementation interventions. A trained nurse examined the pre-test of the intervention in five older adults with MCI. After ITAI was initially completed, five older adults tested its usability. During the pre-test, the project leader supervised the nurse to ensure that the assessment was carried out as described. After a week of pre-testing, the five older adults with MCI and a research team met to discuss the barriers to implementation to develop an action plan to overcome the barriers. The main difficulty identified during the testing phase was that older adults with MCI forgot to use the device due to memory impairment. To solve this problem, we created a poster with an illustration and provided a description of the device, and placed it in the patients’ homes where they could observe it while taking medications.

6. Step 6: Evaluation Plan

The evaluation of the intervention is part of the implementation process. We conducted a pre-test and designed a randomized controlled trial to assess the feasibility of the intervention, and investigated the delivered practice. The goal of the intervention is to enhance medication adherence, physical activity, perceived health beliefs, and self-efficacy. The final IATI for older adults with MCI is presented in Table 4 and Figure 1. In the first week, which is the start of the intervention, the patients are given a demonstration of the IoT device in their homes. The nurse evaluates the physical activity assessment and medication adherence. Thereafter, the researcher provides face-to-face education for medication adherence and physical activity. The patients implement daily activity (steps count), which is monitored through a wearable device. For 1 to 6 weeks, the nurse researcher performs daily checks through real-time monitoring of medication adherence through the webserver. If medication non-adherence happens twice in a row, the nurse makes an immediate call to the participant and sends a text message to the caregiver. Furthermore, nurses provide weekly phone visits to provide feedback and motivation. For seven to 10 weeks, the participants themselves implement medication adherence and physical activity enhancement with the help of an IoT device. The primary outcomes are medication adherence rates and the average weekly step count. This study will have a duration of 10 weeks, and the outcome variables will be assessed at baseline, 6 weeks, and 10 weeks. Outcome assessment measures will include perceived health beliefs, self-efficacy, medication adherence, and physical activity.
### Table 4. Contents of the Internet of Things (IoT)-Based Treatment Adherence Intervention Program

<table>
<thead>
<tr>
<th>Week</th>
<th>Health beliefs cue to action sources</th>
<th>Intervention</th>
<th>Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Reminder</td>
<td>Personal influence</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>√ IoT-based smart pillbox setting in patient home; Training on the use of smart pillbox, and wrist-worn wearables and app (initial weeks)</td>
<td>Registered nurse (RN) evaluation</td>
<td>Demonstration and patient performance</td>
</tr>
<tr>
<td></td>
<td>√ Check how to take the medication and assess the remaining number</td>
<td>RN evaluation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>√ Physical activity assessment</td>
<td>Face-to-face education</td>
<td></td>
</tr>
<tr>
<td></td>
<td>√ Education on preventing and delaying dementia; the importance of medication adherence and physical activity</td>
<td>Patient performance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>√ Check the correct usage performance of the smart pillbox and wearable</td>
<td>RN and patient performance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>√ Wearable alarm settings to promote physical activity; check the weekly average step count and set target steps</td>
<td>RN evaluation (every day)</td>
<td>Patient performance</td>
</tr>
<tr>
<td>1~6</td>
<td>√ Real-time monitoring of medication adherence through the web server</td>
<td>RN evaluation (every day)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>√ Daily physical activity (step count) monitoring through wearable apps</td>
<td>Patient performance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>√ Wearable alarm settings to promote physical activity; check the weekly average step count and set target steps</td>
<td>RN evaluation; Telephone calls by RN</td>
<td></td>
</tr>
<tr>
<td></td>
<td>√ Medication non-adherence twice in a row: Immediate phone call; a text message sent to a caregiver</td>
<td>Telephonic counselling by RN</td>
<td></td>
</tr>
<tr>
<td></td>
<td>√ Weekly phone visit: feedback and motivation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7~10</td>
<td>√ Keep using smart medicine boxes and wearables</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>√ Follow personalized smart medicine box alarm settings</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>√ Follow the wearable alarm settings</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[Figure 1. Structure of Internet of things-based treatment adherence intervention.](https://doi.org/10.17079/jkgn.2023.00024)
levels. The outcomes will be analyzed using a linear mixed-effects model with random effects and repeated measures effects.

**DISCUSSION**

The use of Intervention Mapping ensured an efficient approach to intervention development, including the participation of the target population. It was ascertained that the intervention was systematically approached and based on the available evidence and theories. It was grounded in theory so that the project planner could specify the essential determinants and outcome factors. This framework also made it easy to determine what needed to be changed due to the intervention. In this study, we described the systematic evolution of the ITAI interventions according to the Intervention Mapping.

The goal of our intervention was to improve treatment adherence by enhancing medication adherence and physical activity so that dementia could be prevented or delayed in people with MCI in the long term. Previous interventions to promote medication adherence \([10,18]\) and physical activity \([32]\) exist, but relatively few interventions include a real-time approach and feedback. The program developed in this study is useful as it is an ITAI with a real-time approach focusing on treatment adherence and fully considers the environment in which the technology-based healthcare service influence has grown. This program is based on the theory of health belief behavior designed to increase treatment adherence and prevent cognitive decline in older adults with MCI. The ITAI will help improve treatment adherence outcomes, and ultimately, prevent or delay dementia and improve health status among community-dwelling older adults with MCI. Community health workers, healthcare providers, and administrators can easily access older adults with MCI living at home or in institutions and improve treatment performance.

The Intervention Mapping enabled us to describe and design our intervention using selected strategies that are essential for older adults with MCI. The Intervention Mapping was found to be a beneficial and systematic way to describe interventions; however, to ensure standardization using the IoT, we spent extensive time identifying and using IoT-based Korean products. This was done to select a product that would suit the patients’ individual needs. This paper explained the interventions in detail and with transparency to inspire other programs that are being developed using different methods.

Community-dwelling older adults with MCI have been observed to have varying impairments and considerable comorbidities. The ITAI is intended to provide support to older adults with MCI with some degree of independence who live in communities rather than those who receive institutional care or depend on domiciliary carers. Older adults with MCI within some communities may have considerable physical function limitations or deibilities and may be depressed. Therefore, our intervention might not entirely meet their needs and treatment adherence. As a result, those with specific difficulties (e.g., comorbid chronic illnesses, physical function limitations, behavioral and psychological symptoms) may require some tailored goal adherence support from a nurse, doctor, or pharmacist.

The possibility of accepting IoT devices for older adults with MCI was confirmed. The ITAI in this study can be managed at the patient’s home in real-time, and the health manager can check the patient’s treatment progress anytime, anywhere, making immediate intervention possible, reducing cost and time, and increasing the effect. However, older adults with MCI needed several educational sessions and demonstrations as one or two sessions were insufficient. The nurse researcher had to visit the participants’ homes several times because they forgot to use the device due to a malfunction or memory loss. Thus, the extent to which the provider intervention contributed to increased treatment adherence rates is unclear. For this reason, during the intervention period, older adults with MCI were asked to identify additional barriers by identifying the number of training and demonstration sessions required. Provider training was designed for providers serving older adults with MCI and might not be effective in diverse settings or contexts as the materials used may not resonate with other populations. Additionally, the Coronavirus disease 2019 (COVID-19) pandemic began after our intervention was developed, with accompanying restrictions on physical activity and interaction due to social distancing. In future programs, it is necessary to develop exercise interventions that can be applied within the COVID-19 context.

Nevertheless, Intervention Mapping can serve as a blueprint for adapting the intervention to different populations and environments while retaining the core program components. It is possible to reorganize and utilize training tailored to the target audience before the application of ITAI. Furthermore, as a strategy to increase utilization in practice, it is necessary to establish a web-based system that allows the target person to be linked
from the hospital to the community dementia prevention center for healthcare providers as a form of management. It can be used for patient treatment by establishing a system in which the patient management results are linked to the hospital for future use.

**CONCLUSION**

In conclusion, the Intervention Mapping was used as a methodical procedure for developing the ITAI for older adults with MCI. Healthcare providers can use this program to improve treatment adherence for chronic disease management and dementia prevention in older adults with cognitive impairment. Further studies are warranted to evaluate the effectiveness of this intervention. Efficacy assessment would contribute to strategies for improving treatment outcomes in older adults with MCI.

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**Authors’ contribution**

Study conceptualization and methodology - JS, EC, GSK, HK, BSY, and CGP; Data collection and analysis - JS and EC; Drafting and critical revision of the manuscript - JS, EC, GSK, HK, BSY, and CGP; Supervision - JS and EC; All authors have read and agreed to the published version of the manuscript.

**Conflict of interest**

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

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**Data availability**

All data generated or analyzed during this study are included in this published article.

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26. Smith GE, Lunde AM, Hathaway JC, Vickers KS. Telehealth home monitoring of solitary persons with mild de-


Jung HJ. The effects of square-stepping exercise on cognitive and physical exercise function of elderly with mild cognitive impairment [master's thesis]. Ewha Womans University; 2018. 81 p.


Appendix 1. Systematic literature review process of the study. DB=Database.

Journal records identified through DB searching (n=199) → Thesis & Dissertation records identified through DB searching (n=38)

Records identified through DB searching (n=237) → Duplicates removed (n=20)

Titles and abstracts screened (n=217) → Records excluded with reasons (n=194)
- Survey (n=21)
- Systematic literature review and Review studies (n=15)
- Mixed method study (n=1)
- Qualitative study (n=1)
- Different subjects (n=15)
- Different dependent variable (n=21)
- Not related subject study (n=120)

Full-text articles assessed for eligibility (n=23) → Full-text articles excluded, with reasons (n=7)
- Different contents of intervention (n=2)
- Combined studies (n=5)

Studies included in quantitative synthesis (n=16)
Appendix 2. Rating on an Internet of things-based treatment adherence intervention program of program content and education by five experts:
Rated 3 or 4 on a 4-point relevance scale. CVI=Content validity index; I=Item-level.

<table>
<thead>
<tr>
<th>Category</th>
<th>Expert 1</th>
<th>Expert 2</th>
<th>Expert 3</th>
<th>Expert 4</th>
<th>Expert 5</th>
<th>Experts in agreement</th>
<th>Item CVI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contents of Program</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td>5</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td>✓</td>
<td>5</td>
<td>1.0</td>
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Proportion relevant: 1.0 1.0 1.0 1.0 1.0
Average I–CVI= 1.0
INTRODUCTION

1. Background

South Korea became an aged society in 2018 and is projected to become a super-aged society by 2025 [1]. To manage older adults' health and functions effectively and thereby improve their quality of life, it is imperative for healthcare providers to obtain the appropriate knowledge and skills for elder care through additional education and training. The gerontological nurse practitioner (GNP) is one of the healthcare providers who have advanced education and training in elder care. In South Korea, the GNP refers to an advanced practice nurse (APN) who establishes nursing plans, conducts various programmes, and cares for older adults in hospitals, medical welfare institutions, and nursing homes to improve their health and conditions [2]. Following the legislation of the APN system in 2003, 2,511 registered nurses (RN) received a GNP certificate through certification examination by 2021 [3].

To become a GNP in South Korea, an RN must complete 13-credit core courses, 10-credit gerontological nursing didactic courses, and 10-credit clinical courses on master's-level in an educational institution recognized by the Minister of Health and Welfare and pass the national certification examination [4]. Although each institution operates its GNP programme with some variability, its curriculum is based on the standard...
curriculum that the Korean Accreditation Board of Nursing Education presents. The Board requires that the GNP educational programme consists of six core courses (i.e., pathophysiology, pharmacology, advanced health assessment, nursing research, nursing theory, APN roles and related policies), five gerontological nursing didactic courses (i.e., advanced gerontological nursing for healthy aging and health promotion, management of geriatric disorders I and II, management of long-term care I and II), and at least 300-hour gerontological nursing-related clinical courses (i.e., practicum in nursing management of health problems in older adults I and II, practicum of long-term care management I and II) [5].

The GNP educational programme has been evolving since its commencement in 2004. Under the permission of the Ministry of Health and Welfare in August 2003, seven Schools of Nursing launched the GNP educational programme in 2004 [6]. The Korean Accreditation Board of Nursing Education established operational guidelines for APN educational programmes to comply with in 2006 and convened a Curriculum Special Committee in 2014 to derive the core competencies of APNs and review the educational programmes by field. After a long discussion process, the Board confirmed the reorganization of the GNP programme curricula in 2021, and each school has been reorganizing its GNP programme curricula currently [5]. In addition, the Board has made the first revision to APN educational programme operation guidelines in March 2023 after the release of the operation guidelines in 2006 [7].

To improve or maintain the quality of APN education, the Korean Accreditation Board of Nursing Education has audited APN education programmes at each institution annually. However, the evaluation focuses on the status of student enrolment and completion as well as the structure and operation of APN programmes rather than the content and quality of education [8]. In 2014, Shin et al. [9] showed that GNP students faced difficulty in attaining the GNP competence owing to a lack of GNP preceptors who could serve as role models in the clinical setting. In the real-life scenario, staff nurses who are not GNPs and physicians served as preceptors in clinical practice [9].

On 19 April 2022, the Ministry of Health and Welfare revised and promulgated the Rules on Recognition of Qualifications as Professional Nurses, which stipulates the scope of practice for nurse practitioners (NPs) in 13 fields [10]. Furthermore, this revised regulation provides a basis for entrusting the quality management of professional nurse education institutions, which may contribute to the effective development of APNs’ clinical roles and capability. Unfortunately, knowledge of the quality of GNP programme curricula from the programme completers’ perspectives is limited. Therefore, this study was conducted with an aim to describe positive and negative aspects of the current GNP programme curricula and provide suggestions to promote/improve the programme, from the perspective of RNs who are certified GNPs. The findings of this study may provide a fundamental framework for the development of practical strategies that improve the quality of GNP education and training.

2. Research Purpose

This study was performed to describe nurses’ perceptions of the GNP programme curricula with a key focus on identifying the positive and negative aspects of the programme curricula and provide suggestions to improve the curricula.

METHODS

Ethic statement: This study was approved by the Institutional Review Board (IRB) at Chung-Ang University (IRB No. 1041078-202111-HR-330-01), and we obtained written informed consent from participants.

1. Study Design

This study employed a qualitative descriptive approach with semi-structured, individual interviews and conventional content analysis [11].

2. Participants and Recruitment

This study utilized purposeful sampling to recruit RNs with a GNP certification who provide care to older patients in clinical settings. Recruitment for this study was advertised through the website of Korean Association of Advanced Practice Nurses and the nurse community mobile application which was used by over three million nurses to manage and share their work schedules. Individuals who fulfilled the inclusion criteria and were interested in participating could directly contact the principal investigator (PI) or submit their name and contact information through the online link that was provided. The PI
explained the study’s purpose and methods again and received written informed consent which was submitted online. Each potential participant who was interviewed was asked about other potential participants, and this additional snowball sampling approach facilitated the recruitment process. The recruitment continued until no new information related to the experiences of GNP programme curricula emerged. A total of 21 participants were recruited.

3. Data Collection

Prior to data collection, the authors developed an interview guide based on a review of the relevant literature and a consultation with a nursing professor with expertise in gerontological nursing, and pilot-tested the interview guide on three RNs who were certified GNPs. The main interview questions were: “Please tell me how the GNP programme that you were enrolled has helped you with your clinical practice”; “Could you tell some good things about the GNP programme that you had enrolled in?”, “Tell me about something that you think is unsatisfactory or problematic in the GNP programme”; and “Please tell me any suggestion to improve the quality of the GNP programme curricula.”

The PI collected data through semi-structured individual interviews with the participants from 2 February to 8 March 2022. After obtaining permission from the participants for audio-recording an interview, the PI conducted interviews in person (n = 2) or by telephone (n = 19) based on the participant’s convenience, at their desired time, and in places (a meeting room at a hospital and separate area in cafe) where privacy could be protected. The PI started interviews by asking about the participants’ general characteristics (e.g., age, sex, degree of education, marital status, religion, years of GNP certification, total clinical experience, and position) and indicated their answers in the questionnaire. Prior to the main interviews, the PI obtained permission from the participants once again to audio-record the interviews. Each participant participated in one to two interviews; the first interview lasted 30–60 minutes whereas the second interview, which was conducted to ask additional questions or clarify unclear information, lasted, on average, 10 minutes. During the interview, questions were asked flexibly according to the flow of the participant’s story, and the PI maintained a sympathetic attitude as much as possible to create a comfortable atmosphere. Moreover, the PI documented the non-verbal expressions of the participants during the interviews and the reflection notes at the end of each interview (interview atmosphere, subject attitude, researcher’s feelings, summary of the interview, etc.). The audio-recorded interviews were transcribed verbatim, and the PI compared the transcripts with audio-recordings to confirm their accuracy.

4. Data Analysis

The general characteristics of the participants were analysed using descriptive statistical analysis in the IBM SPSS 27 program (IBM Corp.). We managed and analysed interview data using NVIVO 13 (QSR International), a qualitative research and analysis software. To describe nurses’ perceptions of the GNP programme curricula and provide suggestions to improve the curricula, the interview data were analysed using the conventional content analysis with an inductive coding method [12]. Two authors repeatedly read transcripts to familiarise themselves with the content of the interviews, and independently open-coded the first three transcribed interview data, compared the results, and reconciled any differences through discussion. Thereafter, the PI coded the rest of the transcripts and grouped similar or relevant codes into subcategories and categories; the second author reviewed and confirmed the codes, subcategories, and categories at weekly meetings. Moreover, two authors selected representative quotes from the interviews to present the findings, and the quotes were translated into English by the bilingual second author.

5. Researcher Preparation and Trustworthiness

The PI received education and training on qualitative research by availing nursing research courses in the master’s programme, reviewing the literature on qualitative methodologies, participating in qualitative research as an interviewer, and meeting with nursing professors who were qualitative research experts. Furthermore, the PI had more than 10 years’ experience in caring for older adults in the internal medicine and surgical wards and outpatient departments of tertiary general hospitals, which helped to not only establish relationships with the participants but also understand the contents of the interviews.

To secure the trustworthiness of the study’s findings, Lincoln and Guba’s four criteria were considered [13,14]. To ascertain credibility, which establishes whether the collected data and the analysed results are reliable, the PI conducted interviews
with sufficient margin to allow the participants to fully express their experiences. During the interview, the participants' ambiguous statements were clarified until the PI fully understood the statements. Furthermore, when the PI found a lack of content or an incomprehensible section during the analysis, she contacted the participants to schedule additional interviews. The reliability of analysis and interpretation could be increased through discussion with the second author about the research results. Transferability means to evaluate whether the analytical results can be extrapolated to a similar situation. The PI tried to increase the transferability by describing the participants' vivid and specific expressions. Dependability, a criterion for evaluating whether a study has been conducted in a consistent and traceable manner, was maintained by recording all processes of data collection and analysis and verifying the documentation with the second author who has rich experience in qualitative research. To determine the confirmability, a criterion for evaluating what efforts have been made to minimise researcher bias or influence, the PI tried to maintain neutrality by setting aside her personal bias and reflecting the experience and thoughts of the participants as much as possible.

6. Ethical Considerations

This study was approved by the IRB at Chung-Ang University (IRB No. 1041078-202111-HR-330-01). The PI informed the participants about the purpose of the research, methods, benefits and risks, the need for audio-recording of the interview, the anonymity of the data, the guarantee of privacy and confidentiality, the incentive for participating in the research, and the right to refuse to participate in the research. Then, the PI obtained written informed consent online from the participants.

RESULTS

1. General Characteristics of the Participants

Table 1 shows the general characteristics of the 21 participants (age: 38.1 ± 7.7 years, all females); the majority of participants were married (n = 12, 57.1%), religious (n = 11, 52.4%), had 10~20 years of professional experience (n = 10, 47.6%), and most frequently worked in tertiary general hospitals (n = 10, 47.6%), followed by secondary general hospitals (n = 5, 23.8%), long-term care hospitals (n = 3, 14.3%), and nursing homes (n = 3, 14.3%). The period from the GNP certification was mostly less than 5 years (n = 16, 76.2%). The participants’ current positions were a gerontological APN (n = 4, 19.0%), other APNs (n = 3, 14.3%), coordinator or educational nurse (n = 2, 9.5%), general nurses (n = 9, 42.9%), or managers (n = 3, 14.3%). Twenty-one participants in this study completed their education at ten different educational institutions.

2. Nurses’ Perceptions of the GNP Programme Curricula

From the data analysis, seven categories and 18 subcategories emerged regarding three domains: (a) positive aspects of GNP programme curricula; (b) negative aspects of GNP pro-
gramme curricula; and (c) suggestions to improve the curricula (Table 2).

1) Positive Aspects of the GNP Programme Curricula

The positive aspects of the GNP programmes that the participants had enrolled in included being able to acquire knowledge and skills specific to elder care and apply them to their clinical practice. This domain comprises two categories and four subcategories.

   (1) Acquiring knowledge and skills to elder care through the GNP programme

   Through the GNP programme curricula, participants articulated that they were able to descriptively and intensively learn about aging-related physical, cognitive, psychological, and social changes, the characteristics of older adults’ health problems, and how to manage the health problems. The most helpful content included non-specific signs and symptoms of older adults’ health problems, types and management of dementia, and the latest management guidelines for various diseases that are common in older adults. Through their acquisition of knowledge about older adults’ aging-related normal changes and common health problems, the participants were able to cultivate an inclusive attitude toward older adults and their health problems.

   We learned a lot of knowledge and skills related to older adults. This knowledge and skill helps to understand not only the physical part of older adults, but also the social and psychological parts. It really helped me a lot in caring for older patients, and I came to understand them more comprehensively.

   (2) Application of gerontological nursing-related knowledge and skills attained from the GNP programme

   By learning advanced health assessment, pharmacology, and communication methods, the participants were able to

Table 2. Participants’ Perceptions of GNP Programme Curricula

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<th>Domain</th>
<th>Category</th>
<th>Subcategory</th>
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<td>programme curricula</td>
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GNP=Gerontological nurse practitioner.

https://doi.org/10.17079/jkgn.2023.00031
their knowledge and skills to their care of older adults and families in clinical practice. Particularly, some participants stated that education about long-term care insurance for older adults helped them to provide older adults and their families with better education regarding the social welfare services that are available to older adults and families.

While I was in the GNP programme, I learned a lot. First, my knowledge increased a lot, so the application of it also improved a lot. In fact, older adults are different from adults, right? By getting to know those characteristics (of older adults) better, I was able to take care of the older patient’s emotional part in a different way.

Besides the acquisition of knowledge and skills specific to elder care, there were a couple of additional comments. One participant liked the content that pertained to GNPs being primary care providers in the United States, and another participant stated that it was good to learn how to begin and operate long-term care businesses and facilities.

2) Negative Aspects of the GNP Programme Curricula

The negative aspects of the GNP programme curricula that participants enrolled in included didactic education that was insufficient for the development of expertise in gerontological nursing and ineffective and suboptimal operation of the clinical practice curriculum. This domain consists of two categories and six subcategories.

(1) Didactic education insufficient for developing expertise in gerontological nursing

Participants stated that the didactic education of the GNP programme curricula was less focused on elder care than they had expected. Though many older adults have multiple chronic conditions, the didactic content was too focused on the management of individual diseases to address the complex and complicated care needs of older adults with multiple chronic conditions. Moreover, some participants pointed out the insufficiency of content on social welfare and long-term care of older adults.

Furthermore, participants reported that the didactic education provided in the GNP programme often barely reflected the latest trends or actual clinical practice; therefore, they felt that the didactic content was disconnected from the current clinical practice. Specifically, the content of advanced health assessment course was considerably general and old-fashioned; thus, participants found it difficult to apply their knowledge and skills for assessing older adults’ health and functional status and even found some skills actually useless in clinical practice. In addition, though they believed that GNPs should be able to interpret the results of diagnostic tests that are commonly performed for older adults and understand the pharmacological mechanisms of medications that are commonly prescribed to older adults in clinical practice, the basic science courses were less helpful for the equipment of such practical knowledge than they expected.

What I was dissatisfied with the most was the content of basic medical science. I expected that learning basic medical science would give me the ability to interpret patients’ culture results in a clinical setting, but it didn’t. What medication should be used based on the results of the culture? What criteria are considered by the infectious department? What does extended-spectrum beta-lactamase or carbapenem-resistant Enterobacteriaceae mean? As an APN, [we should know] …

Furthermore, some participants complained about the insufficient course content on the roles of GNPs in elder care. Though the participants learned how to treat individual health problems of older adults, they were still uncertain about how to contribute to elder care as GNPs.

In the management of diseases in older adults... Though the opinions of physicians are important, I think that nurses also have specialised knowledge necessary to perform direct nursing care when caring for [older] patients in clinical practice. So, I wondered what it would have been like to have lectures about geriatric diseases and their treatments from APN.

(2) Ineffective and suboptimal operation of the clinical practice curriculum

Participants articulated that the GNP programme’s clinical practicum was ineffective and suboptimal to develop their professionalism as GNPs. The reasons were the lack of high-quality clinical practice guidance, suboptimal practice settings, and
poor clinical practice operation.

First, in relation to the lack of high-quality clinical practice
guidance, it was difficult to learn about the role of a GNP be-
cause clinical practice was mainly based on observation, with-
out a GNP preceptor or systematic practice guidance. One par-
ticipant stated, “In clinical settings, I didn’t have much experi-
ence [besides observation]. I didn’t even observe how GNPs func-
tion in elder care [because there weren’t GNPs in clinical set-
tings].”

Furthermore, some participants indicated suboptimal prac-
tice sites, wherein their clinical practice sites included outpa-
ient clinics (often unrelated to elder care), high-end long-term
care hospitals, and nursing homes. Often, the clinical sites did
not meet the individual learning needs of students, as ex-
pressed by one participant: “To be honest, I don’t think there was
much I could learn from outpatient clinic practice. We didn’t
know about [medical histories of] the outpatients who visited,
but we just sat there listening to physicians talking to patients.”

Furthermore, poor operation of clinical practice, charac-
terised by the unsystematic management of student practice and
unwelcome atmosphere at the practice sites, contributed to the
participants’ dissatisfaction with the clinical practice curricula.

When I went to the clinical practice, staff in practice sites often
didn’t know that GNP students were coming to the practice due
to poor communication among the staff within the practice site.
In clinical practice at a hospital, physicians mainly guided us
with enthusiasm. However, fellow physicians often asked ‘who
are they?’ pointing to us, and then we felt a little intimidated.

Other minor comments about the negative aspects of the
GNP programme curricula included questionable usefulness
of nursing theory and nursing research courses, different edu-
cational contents in educational institutions, and lack of up-to-
date information on the GNP certification examination.

3) Suggestions to Improve the Quality of GNP Programme
Curricula

The participants proposed three main suggestions to im-
prove the quality of the GNP programme curricula: (a) en-
hancement of education in core courses; (b) strengthening the
contents of gerontological nursing didactic courses; and (c)
quality improvement of clinical practice education for geriatric
nurses. This domain consists of three categories and eight sub-
categories.

(1) Enhancement of education in core courses

The participants reported that it would be better for the edu-
cational content of certain core courses to be delivered in the
context of elder care. To develop and strengthen their clinical
capabilities as GNPs, the participants believed that pathophys-
ology and pharmacology courses should comprise aging-relat-
ed changes. Particularly, the advanced health assessment
course needs to have more intensified and gerontological nurs-
ing-related content than the undergraduate health assessment
course.

[Rather than separately learning basic science such as patho-
physiology and pharmacology] Wouldn’t it be helpful to integrate
the content of pathophysiology and pharmacology into the Ad-
vanced Gerontological Nursing for Healthy Aging course and ex-
plain pathophysiology and pharmacology by diseases common in
older adults in detail and comprehensively?

Moreover, participants recommended that pathophysiology
and pharmacology courses reflect real-life clinical practice. For
example, one participant articulated that it would be more
practical to review medications that a certain older patient
took to manage his/her medical problems, with a focus on their
mechanisms, how to prescribe them, and common side
effects. Thereby, the participants thought that they might be
able to apply the knowledge attained from the basic medical
science courses to clinical practice better.

I think drug reviews are important…… The content of phar-
macology is currently too general. ……In the pharmacology
class, if we review a list of drugs that the patient is actually taking
in consideration of the patient’s disease state and clinical symp-
toms, we would be able to learn which drugs should be contin-
ued, stopped, or switched to different drugs.

Some participants suggested the inclusion of additional con-
tent on professional skills for communication, administration
and planning, and education in core courses to strengthen
their competence as GNPs. Specifically, effective communica-
tion and presentation skills, and the capacity to develop educa-
tional programmes for older adults, families, or other profes-
sionals were mentioned.

Preparing, planning, or creating an educational programme
related to elder care requires a lot of thought and efforts. I must
set up an education schedule, a type of audience, instructors to invite, and a place to increase the effectiveness of education... I think I need some experience [in preparing, planning, or creating educational programmes] to develop my capacity of administration, planning, and education as a GNP.

(2) Strengthening the contents of gerontological nursing didactic courses

Participants stated that, in order to provide better health management for older adults as a GNP, the specialty-related didactic courses should address older adults’ common health problems, management approaches, medical welfare services, and the latest elder care trends more comprehensively and intensely. Regarding the older adults’ common health problems and management, participants thought that the deep understanding of key features of geriatric diseases and conditions (especially, dementia) and strategies to respond to medical emergencies of older adults are particularly imperative. Thus, they articulated the need of more education on such topics. For instance, one participant expressed, “Isn’t dementia-related education really lacking? I thought a lot about it. So, what if the dementia-related programme curricula was a little longer?”

With regard to medical welfare services for older adults, participants wanted more content about the medical welfare services that were available for community-dwelling older adults after discharge from hospitals. In addition, some participants suggested more content regarding the establishment of nursing homes and the latest trends in elder care, such as new paradigms, technologies, and products related to gerontological nursing.

In my case, the most frequently asked question is about the affiliated hospitals which patients can go to after discharge because it is hard for older patients to take care of themselves on their own after discharge from a tertiary hospital. In connection with this, many people ask about national benefits, support, and subsidies that older adults can receive, and other intermediate facilities, but there is little information about them...

(3) Quality improvement of clinical practice education

Participants strongly suggested the need for quality improvement in clinical practice to improve the GNP curriculum. For the quality improvement of clinical practice, most of the participants emphasised the importance of having clinical sites where they could observe the role of GNPs. For instance, one participant stated, “Wouldn’t it have been more stimulating for me if I could go and see the place where they are playing the role of a GNP? I wish I hadn’t felt that way.”

Participants highlighted that various clinical sites should be available for GNP students to experience various types of elder care. Such clinical sites included geriatric wards in general hospitals, long-term care hospitals, long-term care centres (e.g., day-care centres for older adults), and nursing homes of diverse quality grades. Some participants mentioned that they had observed elder care that was provided in exclusive nursing homes or long-term care hospitals only, and therefore wished to experience elder care in moderate (or general) institutions that are more common.

The nursing home [which I went to for clinical practice] was of a very good standard. It was a nursing home where people with a bit of material freedom reside. It was a bit difficult to feel the inferiority of nursing facilities. I wonder what it would be like to have clinical practice in nursing homes that are common around us or where marginalised older adults reside.

DISCUSSION

As a result of analysing the interviews in this study, four main positive and negative aspects of the current GNP programme curricula emerged. Although the participants were able to obtain the knowledge and skills related to elder care from the GNP curricula and apply them into their practice, the quality of gerontological nursing-related didactic and clinical courses was questionable. As participants stated, it is necessary to enhance education in core courses and gerontological nursing didactic courses (e.g., a strong focus on gerontological nursing), improve the quality of clinical practice, and diversify types of clinical practice sites (e.g., clinical sites where GNP students can observe the role of GNPs). The study findings also indicate that the GNP programme curricula should actively reflect the opinions of educators, policymakers, and GNPs in the clinical fields in order to provide high-quality education and training to students in GNP programmes.

In this study, the GNP programme curricula provided the participants with an opportunity to intensively learn about geriatric diseases and atypical/non-specific responses of older adults to illnesses and cultivate an inclusive attitude towards older adults. This finding is consistent with those of previous studies that greater knowledge of the physical, psychological,
and social features of older adults leads to more positive attitudes of nurses towards older adults [15,16] and that long-term care hospital nurses’ knowledge of the older population and their nursing performance improved after the receipt of education on gerontological nursing [17]. Professional knowledge about elder care and an inclusive attitude towards older adults are important for providing professional geriatric care, and the GNP programme curricula contribute to the development of these competencies.

This study presented that one of the main problems of the current GNP programme curricula in general was ineffective and suboptimal operation of clinical practice for GNP students that was characterised by the lack of GNP preceptors or role models for the GNP students, limited clinical sites, and the unwelcome atmosphere in the available clinical sites. Moreover, the participants emphasised the necessity of improving the quality of clinical practice in GNP education by correcting such deficiencies. The lack of systematic guidance due to a lack of GNP preceptors or roles models at clinical sites has been identified previously [9,18]. In a survey of APN students, professors, and nursing administrators in APN programmes regarding the status of preceptors for practical guidance, nurses who were not APNs or physicians at clinical sites were seen to act as preceptors [19]. In the case of physician preceptors, the participants found it difficult to acquire the role of an APN because physician preceptors focused on the content that was necessary to train physicians [19]. In the United States, when the lack of qualified preceptors and limited clinical sites for NPs students became big issues, there were several suggestions to resolve these issues, including a review (evaluation) of existing clinical practice, use of simulation education to maximise the effect of clinical practice, expansion of clinical practice to geriatric hospitals and long-term care facilities, and interprofessional education [20]. In Taiwan, the APN students learned and improved their interpersonal and communication skills by interviewing standardized patients [21]. As Korea experiences a similar shortage of GNP preceptors and clinical sites, simulation, interdisciplinary education, and expansion of clinical practice to long-term care centres and hospitals and dementia centres may prove realistic alternatives. Moreover, for ensuring quality of practice, stringent criteria for clinical preceptors and more discussions and strategies to increase GNP positions in healthcare institutions are necessary.

In this study, the lack of didactic content for cultivating expertise in gerontological nursing as a GNP was considered an area for improvement. This finding is consistent with that of a previous study which found that the GNP programme curricula did not significantly differ from the undergraduate curriculum and did not correspond to an advanced level of knowledge and skills [19]. Particularly, this study showed that despite the presence of the ‘Elderly Welfare Nursing’ course as one of the major didactic courses, the educational content on social and medical welfare and long-term care services for older adults was insufficient. This finding indicates that though the ‘Elderly Welfare Nursing’ course aims to provide an understanding of policies that are related to the welfare for older adults and to integrate gerontological nursing and welfare [22], the course does not include the content that nurses actually require in clinical practice. Thus, through periodic evaluations with GNP students, GNPs, RNs, and other professionals who provide elder care in clinical practice, the educators should continually evaluate the content of major didactic courses and address the educational needs of GNPs and nurses in practice. Additionally, utilising electronic learning resources (e.g., podcasts, case studies, educational videos) may be useful in providing self-learning materials to students and improving the quality of lectures [23].

Besides the improvement of gerontological nursing-related didactic and clinical education, the enhancement of the education in core courses (e.g., pharmacology, pathophysiology, advanced health assessment) was one of the suggestions of the participants in this study. To enhance such education, core courses need to reflect aging-related changes and elder care. This suggestion is in line with the opinion of Oh et al. [19] that core courses need to be included in consideration of the APNs’ specialty. In the real-world scenario, GNP students often take the core courses with students from other APN programmes as the course contents overlap across specialties. To facilitate students’ learning in the core courses while reflecting their specialty, educators need to devise innovative and practical strategies for imparting knowledge. Having group activity sessions wherein GNP students review the medications that are prescribed, the pathophysiology of geriatric diseases diagnosed, and health assessments in specific scenarios involving older patients, while taking core courses with other APN students, may be helpful to meet their educational needs.

This study has several limitations. Although educational institutions follow the standard curriculum that the Korean Accreditation Board of Nursing Education presents, the educational content and programme operation may vary across edu-
cational institutions. This variability may not be revealed in our findings as the sample size is small and not representative of all the GNP programmes. Most participants were working in secondary or tertiary general hospitals, and their perceptions might have differed from those of nurses working at long-term care institutions. As we recruited only nurses who were GNP certified, the programme educators’ and other stakeholders’ opinions, which are necessary to evaluate the GNP programme curricula comprehensively, were not explored. Despite these limitations, this study was one of the few studies that looked into the quality of GNP education in South Korea.

**CONCLUSION**

This qualitative descriptive study identified positive and negative aspects of the GNP programme curricula and suggestions to improve the curricula. The findings presented herein may provide a fundamental framework for developing practical strategies to improve the quality of GNP education. Based on the study’s findings, we suggest the following: (a) incorporation of the opinions of healthcare providers, including GNPs, nurses, and other relevant professionals, to reorganise the GNP programme curricula and to advance GNP students’ knowledge and skills in elder care; (b) evaluation of students’ satisfaction with their GNP programmes on a regular basis; (c) surveys that target all GNP educational institutions to systematically describe and examine variability in the educational content and programme operation; and (d) surveys to identify the professional status of GNP programme graduates and the status of GNPs by clinical field type to explore GNPs’ roles in clinical settings and to evaluate the efficiency and effectiveness of GNP performance on patient outcomes.

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**Authors' contribution**

Study conceptualization and methodology - JP and HK;  
Data collection - JP;  
Data analysis and interpretation - JP and HK;  
Drafting and critical revisions of the manuscript - JP & HK;  
Supervision - HK;  
All authors have read and agreed to the published version of the manuscript.

**Conflict of interest**

Hyejin Kim has been associate editor of the Journal of Korean Gerontological Nursing since January 2021. She was not involved in the review process of this manuscript. Otherwise, there was no existing or potential conflict of interest relevant to this article was reported.

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**Data availability**

Please contact the corresponding author for data availability.

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Health-related quality of life for older patients with chronic low back pain: A structural equation modeling study

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Purpose: This study aimed to develop and validate a structural equation model for health-related quality of life in older patients with chronic low back pain. Methods: We selected social support, symptoms, fear-avoidance beliefs, functional disability, health perception, and health-related quality of life as the main variables based on Wilson and Cleary's model of health-related quality of life. A total of 211 participants aged ≥65 years who had been diagnosed with low back pain for more than three months were considered in this study. Data were collected from two hospitals in D Metropolitan City and A City, one public health center, and two senior citizen centers. We utilized SPSS/WIN 24.0 and R package 'plspm' (R Version 3.1.3) for data analysis. Results: The overall fit of the proposed hypothesized model was .53, which met the acceptable threshold, confirming the adequacy of the model's fit. Social support, symptoms, fear-avoidance beliefs, functional disability, and health perception were statistically significant variables in the health-related quality of life, and the explanatory power of these variables was 75.1%. Out of the 15 hypotheses in the model, 13 hypotheses were supported. Conclusion: The model showed 12 significant direct effects, one significant indirect effect, and 13 significant total effects (both direct and indirect). To enhance the health-related quality of life in older patients with chronic low back pain, alleviating fear-avoidance beliefs and functional disability is necessary, and improving positive social resources such as social support and health perception is essential.

Keywords: Chronic low back pain; Health-related quality of life; Structural equation modeling

INTRODUCTION

The proportion of people aged ≥65 years in South Korea is expected to reach 25.5% by 2030 [1]. Consequently, chronic diseases among older adults are predicted to become increasingly important social issues in the near future. In particular, the prevalence of chronic low back pain among older adults was reported to be 24.1% in 2017 and 10.0% in 2020 [2]. Chronic pain in older adults often persists for a long period, leading to negative psychological states and functional impairments in daily life, ultimately reducing their quality of life and functional abilities [3].

Quality of life is a multidimensional and extensive concept that includes an individual’s subjective evaluation of satisfaction or dissatisfaction with functional abilities in life [4]. The quality of life of patients with chronic pain is influenced by the interaction of physical and psychological symptoms caused by back pain, as well as the social environment [5]. Although various studies have described models of quality of life, the factors that affect quality of life are wide-ranging, and the effects vary depending on the disease [6-8]. Therefore, it is necessary to identify the factors that affect quality of life according to the characteristics of the disease and to understand the relationship between these factors.
The fear-avoidance beliefs arising from physical and psychological symptoms of chronic low back pain significantly influence the deterioration of the quality of life in older patients with chronic low back pain [9]. Fear-avoidance beliefs are disease-specific factors more common in patients with chronic low back pain than in those with other chronic illnesses [9]. These beliefs are based on the internalized notion that physical activity and daily life worsen pain [10]. Furthermore, patients with chronic pain who experience pain as the primary symptom further strengthen these beliefs, avoiding physical activity and worsening their physical functional state, thereby reducing their quality of life [11]. Therefore, to establish a model of quality of life for patients with chronic pain, it is necessary to consider the characteristics of the disease and to verify the relationship between fear-avoidance beliefs and various factors affecting quality of life within the model.

Wilson and Cleary's health-related quality of life model [12] explains the relationship between various dimensions of health-related quality of life, including physical, psychological, social, and environmental aspects. Wilson and Cleary's model of health-related quality of life is an essential framework for health assessment, evaluating the overall quality of life (Figure 1). This model is an important measure of health evaluation and evaluates the overall quality of life. It also categorizes physiological factors, symptoms, functional status, health perceptions, and characteristics of quality of life while establishing relationships with the patient's personal and environmental characteristics. By analyzing the causal relationships between these variables, it measures health-related quality of life. Quality of life studies based on Wilson and Cleary's model have been widely used, both domestically and internationally, for patients with chronic diseases, patients with cancer, and patients who have undergone surgery [6-8,13,14]. These studies have shown that quality of life varies depending on the characteristics of the disease and the environment, and is influenced by various factors.

In most studies, when targeting individuals with chronic illnesses, the elderly, or patients with back pain, researchers have established the theoretical framework by adding key variables and excluding less relevant ones [6-8]. However, it was challenging to find studies specifically targeting older patients with chronic low back pain. Therefore, it is necessary to examine the relationship between chronic pain in older adults and their quality of life, taking into account the disease characteristics of chronic pain, based on Wilson and Cleary's health-related quality of life model. The symptoms described by Wilson and Cleary's model, such as pain [15] and depression [16], are also present in chronic pain of older adults, which can worsen functional disabilities [15] and reduce quality of life [17]. Social support [6-8] and health perception [18], which are environmental characteristics presented in Wilson and Cleary's model, have been shown to be related to the quality of life of patients with chronic diseases; however, research on chronic pain of older adults is still insufficient.

Studies targeting older adults with chronic pain [6], and studies focusing on patients with chronic pain [15], have also reported that as pain severity increases, the quality of life decreases. However, research specifically addressing the quality of life of older adults with chronic pain remains limited. Environmental characteristics such as social support can lead to positive health outcomes and improve quality of life, and health perception based on how one perceives their illness is an important factor affecting quality of life. Therefore, to provide reasonable evidence for the causal relationships between quality of life factors and chronic pain in older adults, it is necessary to consider the complex factors of pain, depression, functional disabilities, health perception, and environmental characteristics such as social support, in the quality of life model. Additionally, because fear-avoidance beliefs reflect the characteristics of patients with chronic pain, it is necessary to consider them in the quality of life model.

The conceptual model of this study expanded on Wilson and Cleary's health-related quality of life model by adding fear-avoidance beliefs to the four domains of environmental characteristics, symptoms, functional status, and health perceptions. In total, five domains were examined to identify the factors influencing the quality of life (Figure 2). Therefore, we...
aim to construct a hypothetical model of health-related quality of life in older patients with chronic low back pain and validate it through research findings. The results of this study will serve as the theoretical groundwork for research on health-related quality of life in older patients with chronic low back pain. They will also be utilized as evidence for proposing nursing interventions that consider both physical and psychological factors among the subjects, as well as for developing programs aimed at improving the quality of life for older patients with chronic low back pain.

**METHODS**

**Ethic statement:** This study was approved by the Institutional Review Board (IRB) of Keimyung University (IRB No.: 40525-202002-HR-086-02). Informed consent was obtained from the participants.

1. **Study Design**

   The objective of this research was to create and verify the structural equation model that captures the impact on the health-related quality of life in older patients who are dealing with chronic low back pain.

2. **Participants**

   Older patients with chronic back pain who visited two hospitals in D metropolitan city and A city, one public health center, and two senior citizen centers, who agreed to participate and met the following selection criteria, were included in this study: 1) aged ≥65 years with a diagnosis of low back pain; 2) low back pain symptoms lasting for more than 3 months; 3) capable of understanding the questionnaire with no psychiatric diagnoses.

   Prior to conducting the survey, participants were instructed to provide information about their age, the presence or absence of low back pain, and any history of psychiatric diseases in the questionnaire. We collected data from June 15, 2020, to August 30, 2020. The minimum required sample size for conducting a Partial Least Squares (PLS) structural equation modeling analysis is 10 times the number of measurement variables. Since this study included 20 measurement variables, the recommended minimum sample size was 200. Considering the possibility of dropouts, 220 questionnaires were distributed for this study, and we excluded inconsistent response results from the data analysis. Finally, 211 questionnaires were used for the data analysis. The sample size used for analysis was therefore deemed appropriate [19].

3. **Measurements**

1) **Social support**

   Social support was measured using a tool adapted by Lim [20], which is based on the Social Support Tool developed by Sherbourne and Stewart [21] for chronic diseases. This tool...
consists of four subdomains: tangible support (four items), affection (three items), positive interaction (three items), and emotional/informational support (eight items). The tool uses a 5-point Likert scale ranging from “not at all” (1 point) to “always” (5 points), with higher scores indicating higher levels of social support. The tool has a high reliability with a Cronbach’s α of .97. In this study, the overall Cronbach’s α was .95, and that for each sub-domain was: .86 for tangible support, .85 for affection, .88 for positive interaction, and .92 for emotional/informational support.

2) Chronic pain
To measure chronic pain, a chronic pain tool developed by Von Korff et al. [22] to measure pain lasting three months or longer, such as low back pain and headaches, was used. We translated this tool into Korean according to the recommendations by Beaton et al. [23]. The tool consists of seven items and three subscales: duration of pain, intensity of pain, and disability caused by pain. Six of the items were scored on a 0–10 scale and the remaining item was scored on a 0–3 scale. In the Disability Score, scores ranging from 0 to 29 points are categorized as 0 points, scores from 30 to 49 points are categorized as 1 point, scores from 50 to 69 points are categorized as 2 points, and scores of 70 points or above are categorized as 3 points. Each score is then recalculated on a 0 to 3 point scale. Higher scores indicated more severe chronic pain. The tool originally had a Cronbach’s α of .74, and Smith et al. [24], using the same tool, reported a Cronbach’s α of .91. In this study, the Cronbach’s α was .89.

3) Depression
The Korean version of the depression scale shortened tool, translated by Kee [25] from Sheikh and Yesavage’s [26] depression scale tool, was used to measure the degree of depression in older adults. The tool consists of 15 questions using a binary scale (‘yes’ or ‘no’), with scores ranging from 0 to 15; higher scores indicate more severe depression. The Cronbach’s α reliability coefficient was .95 when the tool was developed, and .87 in this study.

4) Fear-avoidance beliefs
We measured fear-avoidance beliefs using the fear-avoidance belief questionnaire developed by Waddell et al. [27]. Based on the translational guidelines provided by Beaton et al. [23], we have completed the translation of this tool into Korean. This tool is composed of 16 questions and two subscales measuring fear-avoidance beliefs related to physical activity and daily life. Responses were measured on a 7-point Likert scale ranging from 0 (‘completely disagree’) to 6 (‘completely agree’), with higher scores indicating greater fear-avoidance beliefs. When the tool was developed, Cronbach’s α reliability coefficients were .88 for fear-avoidance beliefs related to physical activity and .77 for fear-avoidance beliefs related to daily life. In this study, the overall Cronbach’s α was .78, and the Cronbach’s α coefficients for the subscales of fear-avoidance beliefs related to physical activity and daily life were .76 and .79, respectively.

5) Functional disabilities
To measure functional disability, the tool developed by Fairbank et al. [28] and modified and supplemented by Jeon et al. [29] was used. This tool consists of 10 items: pain intensity, personal hygiene, lifting, walking, sitting, standing, sleeping, sexual activity, social activity, and travel. In this study, sexual activity was excluded to account for participants without spouses, and the measurement tool consisted of nine items. Higher scores indicate more severe functional disabilities. Cronbach’s α reliability coefficient was .85 when the tool was developed, .93 in Jeon et al’s study [29], and .89 in this study.

6) Health perception
Health perception was measured using a tool developed by Ware [30], which was translated by Yoo et al. [31] and modified for use with older patients by Lee and Chung [32]. The tool consists of 20 questions in six subscales: current health, prior health, health outlook, health worry and concern, resistance-susceptibility, and rejection of sick role. Responses were measured on a 4-point Likert scale ranging from 1 (‘completely disagree’) to 4 (‘completely agree’), with scores ranging from 20 to 80. Higher scores indicated greater health perception. The Cronbach’s α reliability coefficient was .91 when the tool was developed, and .62 in Yoo et al’s [31] study, .85 in Lee and Chung’s study [32], and .86 in this study.

7) Health-related quality of life
Health-related quality of life was measured using The Medical Outcomes Study 36-Item Short Form Health Survey Instrument Version II developed by Ware et al. [33]. The tool consists of 36 items, including one item measuring changes in health status and 35 items measuring health-related quality of life, with eight subscales: physical functioning (10 items), role
physical (four items), bodily pain (two items), general health (five items), vitality (four items), social functioning (two items), role emotional (three items), and mental health (five items). Scores were calculated by assigning weights to each response and summing them to obtain a total score, which was then converted to a 0~100 scale, excluding one item that measured changes in health status. Higher scores indicated a higher health-related quality of life. When the tool was developed, the Cronbach’s α reliability coefficients for the eight subscales were .78 to .93. In this study, the overall Cronbach’s α was .86, and the Cronbach’s α coefficients for the subscales of physical functioning, role physical, bodily pain, general health, vitality, social functioning, role emotion, and mental health were .85, .86, .80, .82, .75, .76, .81, and .77, respectively.

4. Data Analysis

The measured data were analyzed using SPSS/WIN 24.0 (IBM Corp.) and the R package ‘plspm’ (R Version 3.1.3). Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to analyze the general characteristics of the participants and each variable. The differences in health-related quality of life for the general characteristics were analyzed using t-tests and ANOVA. Data analysis using PLS structural equation modeling was divided into two stages: measurement model analysis and structural model analysis. The reliability of the measurement indicators was assessed using Cronbach’s α, which measures internal consistency and composite reliability.

The goodness-of-fit of the hypothesized model was verified with the following indices: Cronbach’s α ranged from .70 to .95, composite reliability ranged from .82 to .97, factor loading ranged from .65 to .96, average variance extracted index ranged from .51 to .87, Fornell-Larcker criterion, model’s coefficient of determination (R²) ranged from .24 to .75, redundancy values ranged from .03 to .37, and the overall model fit was .53, which met the acceptable threshold, confirming the adequacy of the models fit.

5. Ethical Considerations

After obtaining approval from the IRB at Keimyung University (IRB No.: 40525-202002-HR-086-02), data collection for this study began. Data collection involved obtaining consent from the responsible departments of hospitals, public health centers, and senior centers. After obtaining consent, voluntary participation of the subjects was initiated, and they provided written consent for the study. The survey took approximately 20 minutes to complete, and all participants in the study were provided with appropriate tokens of appreciation.

RESULTS

1. General and Disease Characteristics of the Participants

Of the 211 participants included in this study, 63.0% were female and 37.0% were male. The mean age was 72.2±5.97 years, with 70.1% and 26.5% of participants in the age range of 65~74 and 75~84 years, respectively. In terms of marital status, 59.2% were married and 29.9% were widowed; 50.7% lived with their spouses and 28.9% lived alone. Regarding the education level, the proportion was highest for individuals who were high school graduates (31.3%) and those who had less than elementary school education (25.1%). Regarding religion, 39.8% of the participants had no religion and 37.4% were Buddhists. In terms of economic status, 64.5% of the participants were in the middle economic class. Differences in health-related quality of life were found to be related to marital status (F=6.36, p=.002), living arrangements (F=8.72, p<.001), educational level (F=7.75, p<.001), and economic status (F=7.49, p<.001). Post hoc analysis showed that health-related quality of life was higher among unmarried and married individuals than among widowed individuals. Participants living with a spouse or children/others had a higher health-related quality of life than those living alone. At the education level, the groups with high school and college or higher education showed higher health-related quality of life than the elementary or middle school groups. Participants in the middle or high economic classes had a higher health-related quality of life than those in the low economic class (Table 1).

In terms of disease characteristics, 31.3% of the participants had an illness duration of >10 years. Furthermore, regarding the frequency of low back pain, 38.9% felt it occasionally and 22.3% experienced low back pain 3~4 times per week. Regarding the pattern of low back pain, 36.0% of the participants experienced severe pain with movement and 15.6% reported that the pain worsened at night. The causes of back pain were aging (39.8%) and occupational factors (22.3%). The types of treatment included medication (49.3%) and physical therapy...
(26.1%). Of the respondents, 63.5% reported experiencing treatment effects and 27.5% reported worsening back pain when bending forward. Of the patients, 77.7% had other chronic diseases and 78.2% had no history of surgery for low back pain. Significant differences were observed in health-related quality of life depending on the duration of symptoms ($F=7.81, p<.001$), frequency of low back pain ($F=8.59, p<.001$), low back pain patterns ($F=5.51, p<.001$), therapeutic effect ($t=2.83, p<.001$), presence of other chronic conditions ($t=10.98, p<.001$), and surgical history ($t=6.95, p=.009$). Post-hoc analysis showed that health-related quality of life was higher in groups with symptom duration of <1 year, 1~3 years, 3~5 years, and 5~10 years, than in the group with symptom duration of >10 years. Health-related quality of life was higher in the groups experiencing low back pain 1~2 times per week or occasionally than in the group experiencing it daily (Table 2).

### 2. Fit Analysis of the Structural Model

In the structural model analysis, fit analysis involves evaluating the coefficient of determination $R^2$, the redundancy values in the structural model, and the overall model fit. The coefficient of determination $R^2$ assesses the explanatory power of the latent variables, and higher values indicate greater explanatory power. Redundancy values are statistical estimators in the structural equation modeling, and positive values indicate a good fit of the structural model. Lastly, the overall model fit should be at least .10 or higher, with values between .25 and .36 considered as moderate fit and values between .10 and .25 as weak fit.

In this study, the fit analysis of the structural model revealed positive redundancy values for all latent variables. Additionally, the coefficient of determination $R^2$ showed explanatory power for symptoms (.24), fear-avoidance beliefs (.20), health perception (.44), and functional disability (.64), while the dependent variable, health-related quality of life, had an $R^2$ of .75, indicating a high explanatory power. The overall model fit was .53, validating the appropriateness of the proposed structural model in this study.

### 3. Descriptive Statistics of Variables

In this study, there were significant negative correlations between health-related quality of life and symptoms, fear-avoidance beliefs, and functional disability. Additionally, health-related quality of life showed positive correlations with social support ($r=.37, p<.001$) and health perception ($r=.59, p<.001$), indicating consistent and expected directional relationships.
among the factors based on prior research, thus ensuring the construct validity (Table 3). The results of this study regarding the direct, indirect, and total effects of the different variables, as well as their statistical significance, are shown in Table 4 (Figure 3). $\beta$ represents the standardized regression coefficient, which was used to calculate the effects and verify the statistical significance between exogenous and endogenous variables. In the path model, direct effects refer to the direct impact of independent variables on dependent variables, whereas indirect effects refer to the influence of independent variables on dependent variables through one or more mediating variables. The total effect represents the sum of the direct and indirect effects. When interpreting the study results, it is important to consider not only direct effects, but also indirect and total effects, as it is difficult to accurately determine the effect size based on direct effects alone. We used the bootstrap method to investigate the direct, indirect, and total effects of the measured and endogenous variables. In this study, bootstrapping was performed 500 times.

When symptoms were selected as endogenous variables, so-

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Category</th>
<th>n (%)</th>
<th>Health-related quality of life Mean±SD</th>
<th>t or F (p), Scheffe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration of symptom (year)</td>
<td>≥1</td>
<td>34 (16.1)</td>
<td>46.12±15.53</td>
<td>7.81 (.001), e&lt;a,b,c,d</td>
</tr>
<tr>
<td></td>
<td>&lt;1 to ≤3</td>
<td>41 (19.4)</td>
<td>49.26±14.68</td>
<td></td>
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<tr>
<td></td>
<td>&lt;3 to ≤5</td>
<td>29 (13.7)</td>
<td>46.2±13.45</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt;5 to ≤10</td>
<td>41 (19.4)</td>
<td>45.65±10.20</td>
<td></td>
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<tr>
<td></td>
<td>&gt;10</td>
<td>66 (31.3)</td>
<td>34.12±15.19</td>
<td></td>
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<tr>
<td>Frequency of low back pain</td>
<td>Daily</td>
<td>52 (24.6)</td>
<td>34.03±14.30</td>
<td>8.59 (.001), a&lt;c,d</td>
</tr>
<tr>
<td></td>
<td>3~4 times per week</td>
<td>47 (22.3)</td>
<td>41.40±13.73</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1~2 times per week</td>
<td>30 (14.2)</td>
<td>39.40±15.18</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Occasionally</td>
<td>82 (38.9)</td>
<td>45.02±14.51</td>
<td></td>
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<tr>
<td>Low back pain patterns</td>
<td>Pain throughout the day</td>
<td>61 (28.9)</td>
<td>34.85±13.67</td>
<td>5.51 (.001), a,c&lt;b,d,e</td>
</tr>
<tr>
<td></td>
<td>Pain in the morning or afternoon</td>
<td>17 (8.1)</td>
<td>49.41±14.94</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pain worsens at night</td>
<td>33 (15.6)</td>
<td>41.90±12.33</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pain worsens with movement</td>
<td>76 (36.0)</td>
<td>42.90±15.17</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>24 (11.4)</td>
<td>47.66±15.88</td>
<td></td>
</tr>
<tr>
<td>Low back pain causes</td>
<td>Accident/injury</td>
<td>18 (8.5)</td>
<td>29.88±15.94</td>
<td>4.13 (.147)</td>
</tr>
<tr>
<td></td>
<td>Disease</td>
<td>21 (10.0)</td>
<td>37.76±13.59</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Occupational</td>
<td>47 (22.3)</td>
<td>43.77±12.96</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aging</td>
<td>84 (39.8)</td>
<td>43.69±14.75</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unknown cause</td>
<td>41 (19.4)</td>
<td>31.80±15.42</td>
<td></td>
</tr>
<tr>
<td>Treatment method</td>
<td>Medication</td>
<td>104 (49.3)</td>
<td>39.48±15.16</td>
<td>1.68 (.156)</td>
</tr>
<tr>
<td></td>
<td>Physical therapy</td>
<td>55 (26.1)</td>
<td>43.69±15.85</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Traditional Korean medicine</td>
<td>27 (12.8)</td>
<td>42.29±12.47</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>25 (11.8)</td>
<td>43.96±13.27</td>
<td></td>
</tr>
<tr>
<td>Therapeutic effect</td>
<td>Positive treatment effect</td>
<td>134 (63.5)</td>
<td>45.78±14.47</td>
<td>2.83 (.001)</td>
</tr>
<tr>
<td></td>
<td>Negative treatment effect</td>
<td>77 (36.5)</td>
<td>34.01±14.17</td>
<td></td>
</tr>
<tr>
<td>Aggravating behaviors</td>
<td>When bending forward</td>
<td>58 (27.5)</td>
<td>39.20±14.66</td>
<td>3.84 (.535)</td>
</tr>
<tr>
<td></td>
<td>When leaning backwards</td>
<td>19 (9.0)</td>
<td>46.84±16.11</td>
<td></td>
</tr>
<tr>
<td></td>
<td>When changing position</td>
<td>27 (12.8)</td>
<td>42.59±15.30</td>
<td></td>
</tr>
<tr>
<td></td>
<td>When lying down</td>
<td>22 (10.4)</td>
<td>41.00±14.48</td>
<td></td>
</tr>
<tr>
<td></td>
<td>When sitting</td>
<td>20 (9.5)</td>
<td>39.35±15.92</td>
<td></td>
</tr>
<tr>
<td></td>
<td>When walking</td>
<td>30 (14.2)</td>
<td>40.46±11.68</td>
<td></td>
</tr>
<tr>
<td></td>
<td>When lifting objects</td>
<td>35 (16.6)</td>
<td>43.91±14.33</td>
<td></td>
</tr>
<tr>
<td>Presence of other chronic conditions</td>
<td>Present</td>
<td>164 (77.7)</td>
<td>38.15±15.31</td>
<td>10.98 (.001)</td>
</tr>
<tr>
<td></td>
<td>Absent</td>
<td>47 (22.3)</td>
<td>45.20±14.76</td>
<td></td>
</tr>
<tr>
<td>Surgery history for low back pain</td>
<td>Yes</td>
<td>46 (21.8)</td>
<td>36.26±14.99</td>
<td>6.95 (.009)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>165 (78.2)</td>
<td>42.94±15.25</td>
<td></td>
</tr>
</tbody>
</table>

The sum of the percentages does not equal 100% because of rounding. SD=Standard deviation.
Social support showed significant direct ($\beta=-.49, p<.001$) and total effects ($\beta=-.49, p<.001$) on symptoms, and accounted for 23.6% of the variance. When fear-avoidance beliefs were used as endogenous variables, social support showed no significant direct ($\beta=.21, p=.125$), indirect ($\beta=-.25, p=.290$), or total effects ($\beta=-.04, p=.371$) on catastrophic beliefs. However, symptoms had significant direct ($\beta=.51, p<.001$) and total effects ($\beta=.51, p<.001$) on fear-avoidance beliefs. The explanatory power of these variables for catastrophic beliefs was 20.0%. When functional disability was considered as the endogenous variable, social support showed significant direct ($\beta=-.28, p<.001$), indirect ($\beta=-.19, p<.001$), and total effects ($\beta=.47, p<.001$) on functional disability. Fear-avoidance beliefs had significant direct ($\beta=.45, p<.001$) and total effects ($\beta=.45, p<.001$) on functional disability. Social support, symptoms, and fear-avoidance beliefs accounted for 64.4% of functional disabilities.

When health perception was used as an endogenous variable, social support showed statistically significant direct ($\beta=.22, p<.001$), indirect ($\beta=.22, p<.001$), and total effects ($\beta=.43, p<.001$) on health perception; likewise, symptoms also showed statistically significant direct ($\beta=-.38, p<.001$), indirect ($\beta=-.14, p<.001$), and total effects ($\beta=-.52, p<.001$). Fear-avoidance beliefs showed statistically significant direct ($\beta=-.21, p<.001$), indirect ($\beta=-.03, p<.001$), and total effects ($\beta=.24, p<.001$) on health perception, while functional disability showed statistically significant direct ($\beta=-.06, p=.473$) and total effects ($\beta=-.06, p=.473$). Social support, symptoms, and fear-avoidance beliefs accounted for 43.9% of functional disabilities.

### Table 3. Correlations Between Research Variables ($N=211$)

<table>
<thead>
<tr>
<th>Research variable</th>
<th>V1</th>
<th>V2</th>
<th>V3</th>
<th>V4</th>
<th>V5</th>
<th>V6</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1 (Social support)</td>
<td>1.00</td>
<td>-0.25 (&lt;.001)</td>
<td>-0.39 (&lt;.001)</td>
<td>-0.25 (&lt;.001)</td>
<td>0.39 (&lt;.001)</td>
<td>0.37 (&lt;.001)</td>
</tr>
<tr>
<td>V2 (Symptoms)</td>
<td>-0.25 (&lt;.001)</td>
<td>1.00</td>
<td>-0.39 (&lt;.001)</td>
<td>-0.25 (&lt;.001)</td>
<td>-0.43 (&lt;.001)</td>
<td>-0.57 (&lt;.001)</td>
</tr>
<tr>
<td>V3 (Fear-avoidance beliefs)</td>
<td>-0.39 (&lt;.001)</td>
<td>-0.39 (&lt;.001)</td>
<td>1.00</td>
<td>0.58 (&lt;.001)</td>
<td>-0.63 (&lt;.001)</td>
<td>0.24 (&lt;.001)</td>
</tr>
<tr>
<td>V4 (Functional disability)</td>
<td>-0.25 (&lt;.001)</td>
<td>-0.25 (&lt;.001)</td>
<td>0.58 (&lt;.001)</td>
<td>1.00</td>
<td>-0.49 (&lt;.001)</td>
<td>-0.78 (&lt;.001)</td>
</tr>
<tr>
<td>V5 (Health perception)</td>
<td>0.39 (&lt;.001)</td>
<td>-0.43 (&lt;.001)</td>
<td>-0.63 (&lt;.001)</td>
<td>-0.49 (&lt;.001)</td>
<td>1.00</td>
<td>0.59 (&lt;.001)</td>
</tr>
<tr>
<td>V6 (Health-related quality of life)</td>
<td>0.37 (&lt;.001)</td>
<td>-0.57 (&lt;.001)</td>
<td>0.24 (&lt;.001)</td>
<td>-0.78 (&lt;.001)</td>
<td>0.59 (&lt;.001)</td>
<td>1.00</td>
</tr>
</tbody>
</table>

$r$ values in parentheses indicate statistical significance. Variables are defined as follows: V1=Social support; V2=Symptoms; V3=Fear-avoidance beliefs; V4=Functional disability; V5=Health perception; V6=Health-related quality of life.

### Table 4. Direct, Indirect, and Total Effect Analysis of Hypothetical Models ($N=211$)

<table>
<thead>
<tr>
<th>Endogenous variable</th>
<th>Exogenous variable</th>
<th>$\beta$ ($p$)</th>
<th>Direct effect ($p$)</th>
<th>Indirect effect ($p$)</th>
<th>Total effect ($p$)</th>
<th>SMC*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptoms</td>
<td>Social support</td>
<td>-.49 (.001)</td>
<td>-.49 (.001)</td>
<td>.236</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fear-avoidance beliefs</td>
<td>Social support</td>
<td>.21 (.125)</td>
<td>-.25 (.290)</td>
<td>-.04 (.371)</td>
<td>.200</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Symptoms</td>
<td>.51 (.001)</td>
<td>.51 (.001)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Functional disability</td>
<td>Social support</td>
<td>-.28 (.001)</td>
<td>-.19 (.001)</td>
<td>-.47 (.001)</td>
<td>.644</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Symptoms</td>
<td>.36 (.001)</td>
<td>.23 (.001)</td>
<td>.58 (.001)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fear-avoidance beliefs</td>
<td>.45 (.001)</td>
<td>.45 (.001)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health perception</td>
<td>Social support</td>
<td>.22 (.001)</td>
<td>.22 (.001)</td>
<td>.43 (.001)</td>
<td>.439</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Symptoms</td>
<td>-.38 (.001)</td>
<td>-.14 (.001)</td>
<td>-.52 (.001)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fear-avoidance beliefs</td>
<td>-.21 (.001)</td>
<td>-.03 (.001)</td>
<td>-.24 (.001)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Functional disability</td>
<td>-.06 (.473)</td>
<td>-.06 (.473)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health-related quality of life</td>
<td>Social support</td>
<td>.09 (.075)</td>
<td>.37 (.001)</td>
<td>.47 (.001)</td>
<td>.751</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Symptoms</td>
<td>-.32 (.001)</td>
<td>-.37 (.001)</td>
<td>-.69 (.001)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fear-avoidance beliefs</td>
<td>-.23 (.001)</td>
<td>-.17 (.001)</td>
<td>-.39 (.001)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Functional disability</td>
<td>-.28 (.001)</td>
<td>-.01 (.001)</td>
<td>-.29 (.001)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Health perception</td>
<td>.18 (.001)</td>
<td>.18 (.001)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Squared multiple correlation; The overall fit of the model is .53.
Among the factors affecting health-related quality of life, the indirect (β=.37, p<.001) and total effects (β=.47, p<.001) of social support were statistically significant; however, the direct effect (β=.09, p=.075) was not. Symptoms had statistically significant direct (β=.32, p<.001), indirect (β=.37, p<.001), and total effects (β=.69, p<.001) on health-related quality of life; similarly, fear-avoidance beliefs also had statistically significant direct (β=.23, p<.001), indirect (β=.17, p<.001), and total effects (β=.39, p<.001). Functional disability had statistically significant direct (β=.28, p<.001), indirect (β=.01, p<.001), and total effects (β=.29, p<.001) on health-related quality of life, while health perception had statistically significant direct (β=.18, p<.001) and total effects (β=.18, p<.001). The explanatory power of these variables on health-related quality of life, as the final endogenous variable, was 75.1%.

**DISCUSSION**

This study aimed to construct a structural model of health-related quality of life for elderly individuals with chronic pain. Based on disease-related characteristics and key concepts of health-related quality of life, the study proposed the causal relationships and directions between social support, symptoms, fear-avoidance beliefs, functional disability, health perceptions, and health-related quality of life. This study analyzed the structural model of health-related quality of life in older patients with chronic low back pain using PLS structural equation modeling. PLS structural equation modeling provides a robust statistical validation for the relationship between the research model and the population, especially when dealing with numerous variables and complex path explanations of diverse variables.

In the proposed model of health-related quality of life in older patients with chronic low back pain, social support as an environmental characteristic exerts an indirect influence on health-related quality of life. Furthermore, symptoms, fear-avoidance beliefs, functional disability, and health perceptions were found to have a direct impact on health-related quality of life in the proposed model, explaining 75.1% of the variance. The explanatory power of health-related quality of life in hospitalized patients with pulmonary tuberculosis was 52.4% [13]. For the study focusing on older patients with degenerative arthritis, which falls under chronic musculoskeletal pain, the explanatory power was 63.6% [6].

The reason for the higher explanatory power of the model in this study compared to previous research is that most of the prior studies presented the main variables from the health-related quality of life model as they were. However, in this study, fear-avoidance beliefs a disease-related characteristic of chronic pain patients, were selected as a major variable. By adding...
this significant variable that influences the quality of life in older patients with chronic low back pain, it is estimated that the explanatory power of this study’s model was higher. According to the findings of this study, Wilson and Cleary’s model of health-related quality of life, social support indirectly influences health-related quality of life, while symptoms, fear-avoidance beliefs, functional disability, and health perceptions directly impact health-related quality of life. These results align with the theoretical pathways of the key concepts in Wilson and Cleary’s model. Thus, this study has been validated as an appropriate model with sufficient variables to predict health-related quality of life in older patients with chronic low back pain.

In this study, the health-related quality of life of older patients with chronic low back pain was found to be 41.37 out of 100, which is similar to the results of a study by Lee [15], who used the same tool and reported a score of 42.84. In contrast, a study by Im [34] on community-dwelling older individuals without chronic pain reported a higher level of quality of life, with a score of 63.13, which indicated that the presence of chronic pain has a significant impact on quality of life. Older individuals experiencing chronic pain have various problems compared to general older individuals, and are more vulnerable to physical and psychological issues related to pain that affect their quality of life [16].

Social support for older people with chronic back pain was found to have a positive (+) indirect effect on their health-related quality of life. In addition, social support had a negative (-) direct effect on symptoms and functional disability, and a positive (+) direct effect on health perception. Our study found that social support, an environmental characteristic, affects symptoms such as pain, physical function, and depression [6,35]. This is consistent with the results of previous studies [13,18] which reported that social support indirectly affects health-related quality of life. Additionally, social support has been demonstrated to have a direct negative (-) effect on functional disability, which is consistent with previous reports showing that social support indirectly affects functional status in older patients with degenerative joint disease [6]. Moreover, Halvorsrud et al. [7] reported that social support had an effect on symptoms and functional disability, and that the higher the health perception, the higher the quality of life. Therefore, social support for older adults with chronic low back pain is necessary at multiple environmental levels, including family, medical professionals, and the community, as it can help reduce negative physical and psychological symptoms and ultimately contribute to improving their quality of life.

Symptoms were found to have a positive (+) direct effect on fear-avoidance beliefs and functional disability, and a negative (-) direct effect on health perception and health-related quality of life in older adults with chronic low back pain. In other words, as the degree of symptom experience increases, fear-avoidance beliefs and functional disabilities tend to increase, and individuals tend to perceive their health and quality of life negatively. These results are consistent with those of previous studies [15,16,36], which confirmed that the greater the experience of symptoms in older individuals with chronic low back pain, the lower their quality of life. Additionally, as this study measured the latent variables of symptoms such as physical pain and psychological symptoms such as depression, it is consistent with previous research [6,13,37], which confirmed that not only physical but also psychological symptoms such as depression are major factors affecting quality of life in older adults with chronic low back pain.

In the current study, symptoms were found to affect fear-avoidance beliefs, which are often higher in individuals with chronic low back pain than in those with other chronic conditions owing to their physical and psychological symptoms [9]. These results are consistent with the findings of Seo’s study [17]. Specifically, symptoms associated with chronic low back pain were found to affect functional disability, which is similar to previous studies reporting that pain intensity and damage from chronic low back pain are related to functional disability [38]. In addition, the symptoms of this population were found to affect their health perception, which is supported by the results of Park et al. [39], who reported a negative correlation between pain intensity and health perception in patients with chronic low back pain. Therefore, older individuals with chronic low back pain, who experience pain as a primary disorder, may avoid physical and daily life activities due to fear-avoidance beliefs, leading to functional disability. Thus, active management of physical and psychological symptoms is important for improving the quality of life of these individuals.

The fear-avoidance beliefs of older adults with chronic low back pain were found to have a positive (+) direct effect on functional disability and a negative (-) direct effect on health perception and health-related quality of life in this study. Fear-avoidance belief refers to the inherent belief that daily life and physical activity exacerbate pain [10]. This negative psychological factor leads to a fear of further injury and ultimately
makes movement difficult, leading to persistent functional disabil-

ity in patients with chronic low back pain, as reported in previous studies \[10, 40\]. Notably, Trinderup et al. \[41\] showed that fear-avoidance beliefs affect disability levels and quality of life in patients with chronic low back pain. Similarly, Seo \[17\] showed that fear-avoidance beliefs are a major factor in functional disability and health-related quality of life in patients with chronic low back pain, and Won \[38\] found that higher fear-avoidance beliefs were associated with higher levels of pain and functional disability, which is similar to the results of this study.

Our study showed that functional disability in older adults with chronic low back pain was found to have a negative (-) direct effect on health-related quality of life. Functional disability in older adults with chronic low back pain was found to be correlated with quality of life, and the more severe the limitations in daily functional activities caused by chronic low back pain, the lower the quality of life \[15, 16\]. Seo \[17\] reported that functional disability in patients with chronic low back pain is a major factor affecting health-related quality of life, which is similar to the results of this study. In addition, patients with rheumatoid arthritis who have better functional status have a higher quality of life \[42\], and postoperative physical function and activity restriction have been reported as the most important predictors of improved health-related quality of life in patients who have undergone total hip arthroplasty \[18\].

Health perception of older adults with chronic low back pain had a direct positive (+) effect on their health-related quality of life. Previous studies on health perception and quality of life have found that an individual's subjective perception of their health has a greater effect on their quality of life than an objective evaluation of their health status \[43\]. Moreover, individuals with higher subjective health levels tend to have a better quality of life \[44\], and health perception of older adults with chronic musculoskeletal pain has been shown to have an effect on their quality of life \[45\]. Furthermore, Choi and Park \[46\] reported a significant difference in quality of life based on the subjective perception of chronic pain among older individuals. Therefore, our results, together with those of previous studies, confirm that environmental characteristics such as social support and symptoms, fear-avoidance beliefs, functional disability, and health perception have direct or indirect effects on the health-related quality of life of older individuals with chronic low back pain.

CONCLUSION

In this study, statistically significant variables affecting the health-related quality of life in older patients with chronic low back pain included social support, symptoms, fear-avoidance beliefs, functional disability, and health perceptions. Among these, symptoms were presented as the variable with the greatest explanatory power. Specifically, these factors could serve as foundational data for developing comprehensive interventions aimed at mitigating fear-avoidance beliefs and functional disability caused by symptoms, while also enhancing social support and health perception levels. Such interventions, addressing both physical and psychological symptoms, could ultimately be employed to enhance the health-related quality of life of older patients with chronic low back pain. In addition, this study has a limitation in that it does not include older patients with chronic back pain who were hospitalized due to the severity of their pain or those who have impaired mobility in their own homes. It is suggested that future research should encompass the entire population of older patients with chronic back pain and explore other variables beyond the ones that were investigated in this study.

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Authors' contribution

Study conception and design acquisition - SL and EJL; Data collection - SL; Analysis and interpretation of the data - SL and EJL; Drafting and critical revision of the manuscript - SL and EJL

Conflict of interest

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

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Data availability

Please contact the corresponding author for data availability.

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Assessing the implementation of a nursing home-based physical and mental training: Utilizing the Reach, Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM) framework: A qualitative descriptive study

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INTRODUCTION

The prevalence of sedentary behavior among nursing home residents has been high [1], especially during the coronavirus disease 2019 (COVID-19) pandemic [2]. Sedentary behavior is a risk factor for cardiovascular disease [3]. Furthermore, sedentary behavior can cause obesity, type 2 diabetes, muscle and bone problems, mental health issues, certain cancers, weaker bones, poor blood circulation, and trouble thinking. Many older adults do not know about physical exercise programs based on expert recommendations, so they do not achieve the expected results [4]. Some older adults believe physical exercise is
Many exercise programs have been designed to change sedentary behavior in older adults living in nursing homes; however, changes in behavior do not last long [9]. Physical exercise has several physical, mental, and social benefits. An example of a physical benefit is reducing the risk of cardiovascular disease and falling. Therefore, developing an exercise program suitable for nursing home residents is essential [10]. Various physical activity programs are necessary so that older adults do not get bored easily during exercise; increase motivation and compliance with exercise [11]; improve mood, self-confidence, and happiness; and reduce anxiety and depression to improve their quality of life [12].

Caregiver staff for nursing home residents must also increase motivation and pay attention to older adults’ preferred physical activity desires [8]. In addition to physical activity, mental and spiritual activities must also be included. It aims to improve the quality of life in older adults. Holistic care emphasizes the importance of the dynamic interaction of biological, psychological, social, and spiritual components to obtain optimal results [13].

A new program was designed for older adults who could move independently in nursing homes. This program is called Spirit and refers to enthusiasm. The Spirit program comprises a blend of physical exercises and mindfulness practice, including chair exercises, stationary bike exercises, walking, muscle-strengthening exercises, flexibility exercises, balance training, breathing relaxation, and gratitude practice. It aims to improve physical fitness and reduce anxiety, blood pressure, and the risk of falling, thus improving the quality of life of older nursing home residents. The researchers were interested in creating a new program for nursing home residents by combining safe, easy, and beneficial physical activities, such as aerobic exercises, strength training, flexibility exercises, and balance exercises. The program was complemented by breathing relaxation and gratitude therapy.

The Spirit program was based on recommendations from a review of 29 articles that highlighted the importance of engaging in physical activities that could be performed at home during the COVID-19 pandemic [14]. These activities focused on aerobicics, strength, flexibility, balance exercises, relaxation, and meditation practices, as they can improve both physical and mental health while reducing the risk of falls, especially in older adults. The program consisted of physical exercises that included gymnastics, stationary bicycles, and walking, combined with breathing relaxation and gratitude, performed for 60 minutes three times a week, accompanied by an instructor. Researchers trained caregiver staff at a nursing home to become program instructors and supervisors in three sessions of 2 hours each until caregivers were deemed capable of becoming instructors. The research team member and caregiver taught or instructed the nursing home resident to follow the Spirit program. This program starts according to the abilities of older adults and can be gradually added.

In Indonesia, research on easy, inexpensive, and low-risk physical activities for older individuals is limited. Current research topics in the older adult population mostly focus on non-pharmacological therapies for disease prevention and mild disorders (minor health problems or medical conditions that are not overly severe but still have a slight impact on an individual’s well-being or functioning) [15]. Meta-analysis results have shown that regular physical exercise in older adults is beneficial for reducing depression, improving the quality of life, and enhancing self-esteem [16]. As a non-pharmacological therapy, slow breathing techniques can lower blood pressure in older adults [17]. Therefore, it is expected to provide an easily implementable physical activity program for older adults as a follow-up to these findings.

The Spirit program was conducted in a nursing home. This study aimed to evaluate the pilot implementation of the Spirit program to determine whether it could be applied to a broader population.

**METHODS**

*Ethic statement:* The Faculty of Medicine, Sebelas Maret University’s research ethics committee has examined the protocol and given ethical clearance number: 88/UN27.06.6.1/KEP/EC/2021. The participants had given verbal consent to participate and they could withdraw at any time.
The Spirit program aimed to improve the physical and mental health of older adults residing in nursing homes during the social restrictions of the pandemic. The Spirit program was developed based on a literature review until May 14, 2020, and focused on maintaining physical fitness and mental health during the COVID-19 pandemic. From 29 high-quality publications in reputable databases, such as Embase, PubMed, SCOPUS, SPORTDiscus, and Web of Science, reduced physical activity during the pandemic was found to cause declines in various aspects such as oxygen consumption, cell oxygen uptake, stroke volume, circulation, and muscle metabolism. These conditions lead to physical and mental impairments. Recommendations for older adults include aerobic exercises, strength training, flexibility exercises, meditation, and balance training. Institutions are advised to create home-based physical activity programs, especially during government-imposed restrictions [14].

We formed a team comprising two experts: one specializing in sports and the other in psychology. The sports specialist validates the physical activity movements for older adults that we propose by reviewing video recordings we have created. The sports expert team then meticulously evaluates these movements and provides feedback for improvement. To improve this, we got help from a psychology specialist to suggest mental and spiritual activities to go along with exercises. Afterwards, we concluded that exercises could be combined with relaxation and expressing gratitude. The inquiries we directed to both expert teams were as follows: 1) What do you think about stationary cycling, walking exercises, senior gymnastics, muscle-strengthening exercises, flexibility routines, relaxation, and expressing gratitude for elderly individuals?; 2) How do you perceive the exercise timing (3 times a week, 50~60 minutes)?; 3) According to your perspective, what elements influence the engagement of older adults in this initiative?; and 4) What advice or suggestions would you offer for enhancing this program?

The trial of the Spirit program was conducted on July 2022 for 4 weeks at a nursing home. Data were collected 1 week after the program trial was completed by interviewing seven older adults and two caregivers who had participated in the Spirit program trial. All sources provided informed consent to participate in the study. To participate in the Spirit program, individuals need to meet the following criteria: Being aged ≥ 60 years, possessing good communication skills, being willing to undergo the intervention, having resided in a nursing home in Surakarta for at least 3 months, having a Katz Index of Activities of Daily Living score indicating independence in essential daily activities [18], and obtaining permission from the nursing home management.

The researcher used a structured interview guide within The Reach, Effectiveness, Adoption, Implementation, Maintenance (RE-AIM) framework (Table 1). The RE-AIM was developed by Glasgow in 1999 [19]. This evaluation framework has five dimensions: reach, effectiveness, adoption, implementation, and maintenance. This study assessed the effects of public health interventions [19]. Interviews were conducted by a principal investigator with prior experience. The list of interview questions is presented in Table 1. The interviews were audio recorded and transcribed verbatim. NVivo12 software was used for data processing, coding, and analysis [20]. The research ethics committee examined and approved the study protocol and gave ethical clearance (institutional review board approval No. 88/UN27.06.6.1/KEP/EC/2021). The participants

<table>
<thead>
<tr>
<th>Table 1. Interview Guide With RE-AIM Framework</th>
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<tbody>
<tr>
<td><strong>Domain</strong></td>
</tr>
<tr>
<td>Reach</td>
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<tr>
<td>Effectiveness</td>
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<tr>
<td>Adoption</td>
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<tr>
<td>Implementation</td>
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<tr>
<td>Maintenance</td>
</tr>
<tr>
<td><strong>Question example</strong></td>
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</table>

RE-AIM=Reach, Effectiveness, Adoption, Implementation, Maintenance.
provided verbal consent to participate and withdraw from the study at any time. To ensure data credibility, researchers employed triangulation. This was achieved by involving multiple researchers in the analytical process to merge the data’s interpretations objectively. Steps were taken, including team collaboration involving multiple researchers, discussions, and comparisons of the results, achieving consensus through in-depth discussions, and additional validation through external parties to objectively merge the interpretation of data [21].

We employed a descriptive qualitative methodology with a deductive approach during our qualitative analysis, integrating the RE-AIM framework. Our research aimed to evaluate the current and future status of the Spirit program, focusing on participant reach, program effectiveness, nursing home adoption, implementation consistency, and program maintenance. We asked the same interview questions to both older adults and caregivers using the RE-AIM framework and sought to understand the perspectives of both groups. Despite the limited participant size, the responses exhibited a common and steady pattern. This indicates that the collected data reached saturation, suggesting that the incorporation of additional participants is improbable to bring forth substantial or pertinent novel insights related to the research topic.

## RESULTS

The older adults living in this nursing home have an average age of 66.0 years. They have been residents there for almost 2 years. Among the seven participants, five of them don’t have any other health conditions. The particulars of these characteristics of older adult participants are indicated in Table 2.

The descriptive qualitative analysis results are presented as findings across various themes, utilizing the RE-AIM framework are presented in Table 3. Reach: Older adults who are in good health and can walk can access the Spirit Program for nursing home residents. Effectiveness: The Spirit program brings older adults happiness, togetherness, entertainment, and good care and improves physical health, especially regarding better sleep quality. Adoption: Nursing home caregivers actively support the program by dedicating time as instructors, providing facilities, and motivating older adults to participate. Implementation: Older adults can actively engage in Spirit programs. It is recommended that balance exercises be simplified for easier participation by all older adults, with strict supervision from the instructor. Maintenance: The Spirit program is intended to be sustained by nursing home residents, with the primary goal of improving the quality of life for older adults. This is achieved through various means, including facility maintenance, communication, and implementation of feedback support programs. Furthermore, multiple benefits in different domains are identified and discussed in the following sections.

Table 2. Characteristics of Participants

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Older adult (n=7)</th>
<th>Caregiver (n=2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average age (year)</td>
<td>66.00±2.49</td>
<td>35.00±3.12</td>
</tr>
<tr>
<td>Length of stay in nursing home (month)</td>
<td>23.00±9.77</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>3 (42.9)</td>
<td>2 (100)</td>
</tr>
<tr>
<td>Female</td>
<td>4 (57.1)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Educational background</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elementary school</td>
<td>5 (71.4)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>High school</td>
<td>2 (28.6)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Undergraduate</td>
<td>0 (0)</td>
<td>2 (100)</td>
</tr>
<tr>
<td>Comorbid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>With comorbid</td>
<td>2 (28.6)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Without comorbid</td>
<td>5 (71.4)</td>
<td>2 (100)</td>
</tr>
</tbody>
</table>

Values are presented as mean±standard deviation or n (%).

Table 3. Finding

<table>
<thead>
<tr>
<th>Domain</th>
<th>Finding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reach</td>
<td>Older adults who can carry out independent activities can actively participate in the Spirit program.</td>
</tr>
<tr>
<td>Effectiveness</td>
<td>The Spirit program implemented adds new activities that they can do has various benefits, increases happiness, increases stamina by improving joint health, and improves sleep quality for older adults as participants.</td>
</tr>
<tr>
<td>Adoption</td>
<td>Participants expressed that there were various directions from caregivers, no compulsion to join the program, instructors who guided the exercises, good schedule management, and various suggestions from other participants and caregivers.</td>
</tr>
<tr>
<td>Implementation</td>
<td>Participants revealed that the various activities during the Spirit program included gymnastics, cycling on site, walking within the nursing home complex, weight training, flexibility training, balance training, and breathing relaxation. Older adults can move well, but some experience obstacles when doing balance exercises. None of older adults suffered injuries while participating in the program.</td>
</tr>
<tr>
<td>Maintenance</td>
<td>The continuity of the program can be supported by the availability of tools that are easily accessible to older adults, so that older adults can carry out their physical activities and are not limited in time.</td>
</tr>
</tbody>
</table>
ifferent directions motivated participants to continue with the Spirit program.

1. Reach

The program’s scope was evaluated to determine how much it could reach a specific population or group. Additionally, reach can be interpreted as how many participants can follow or participate in the program. The scope or reach of the program was revealed by the orphanage staff, namely, the older adults in nursing homes who were still healthy and able to walk. Residents who have to rest completely or just bed rest cannot participate in the program. Participants indicated that the Spirit program was easy to implement for older adults, making it applicable to any nursing home setting and benefiting a larger population of independent nursing home residents.

“For individuals who are still in good health, meaning they can walk and do not require bed rest, they are still able to engage in their daily activities.” (Older Adult 6)

“For the number of participants themselves, from start to finish, 7~8 older adults participate in this program.” (Caregiver 1)

2. Effectiveness

Effectiveness is assessed based on how the program can provide benefits as directly expressed by participants.

The older adults revealed that the Spirit program is one of the things they enjoy because after participating, they can feel happiness, togetherness, and entertainment well-cared for. Moreover, after regularly participating in the program, older adults felt physically healthier, especially due to better sleep quality.

“Yes, if I could get an extra hour of sleep, it would benefit me. Second, I feel happy when we are always cared for together. Consequently, I do not feel bored like that. I sincerely thank you for your attention.” (Older Adult 4)

3. Adoption

Adoption describes how the program is promoted, accepted, and followed by all the respondents or participants. In this study, nursing home caregivers actively supported the program by providing time to become instructors, providing facilities, and motivating older adults to participate.

“We always encourage the older adults to join us. We reach out to the caregivers in all departments to include as many grandparents as possible, especially those still capable of participating in the program. However, we should not push too hard. If they decide to come, they can come; if not, they have the choice not to attend.” (Caregiver 1)

The nursing home caretakers also revealed that the Spirit program could become a well-organized program and facilitate the active movement of older adults.

“That is good enough, good enough... The grandmother is also happy. Most of them are still here. No more suggestions are needed; it is already good they have been trained. Um... their joints are active again, just like that.” (Caregiver 2)

4. Implementation

Implementation was assessed based on program implementation, including how the program was implemented, the schedule of activities, participants’ enthusiasm, reasons for participants wanting to join the program, and criticism and suggestions from older adult participants and nursing home staff regarding the sustainability of the Spirit Program.

“Yes, sir, because the instructor has not arrived yet. Some grandparents inquired about the delay and wondered why the sports instructor did not arrive. Their questions indicated their desire to engage in instructor-led activities. They eagerly await the instructor’s arrival as they are strongly inclined to participate in sports activities.” (Caregiver 1)

Seniors can join the movement in the Spirit program.

“For the movement, it is already possible to reach, sir, at least according to his grandmother. It is not too difficult.” (Older Adult 5)

Balance exercises must be simplified in movement to make them easier for all older adults and require close supervision from instructors.
“I am sorry, sir, but I am unable to do it. I cannot walk in a straight line like that if I do not have something to hold onto.” (Older Adult 1)

5. Maintenance

Maintenance refers to how program participants can still use the experiences they found while participating in the Spirit program to continue being carried out by nursing home residents. Participants can utilize their experiences to continue implementing the Spirit program in nursing homes. Various benefits motivated the participants to continue the Spirit program. In ensuring the continuity of this program, maintenance was conducted by involving participants’ experiences, facility maintenance, and ongoing communication. Additionally, suggestions are provided to support the program’s implementation to continue running in nursing homes.

“Later on, we might place this tool in the hall. For instance, there will be a designated area for it in the future.” (Older Adult 5)

“Yes, we will... we will also have regular briefings for the present clients. Afterward, we will guide them to use it. Additionally, on Fridays, we have an exercise session. Later, we will invite the older adults to come to the hall and perform the exercises independently, especially those still capable of walking actively.” (Caregiver 2)

“Whenever I can use the bicycle, I do not need to bring it to the office. It can stay here. If I am at the office, I hesitate to ask someone from the office first (laughs).” (Older Adult 2)

DISCUSSION

The qualitative in-depth interview analysis used the RE-AIM framework to present the findings. The Spirit Program is accessible to healthy older adults living in nursing homes. It brings happiness, togetherness, entertainment, and good care and improves physical health, including sleep quality. Nursing home caretakers actively supported the program by dedicating time as instructors and providing facilities to motivate participation. Under instructor supervision, older adults participated in a program with the recommended simplified balance exercises. The program aimed to sustain and enhance older adults’ quality of life in nursing homes, motivated by multiple benefits.

The Spirit program was conducted in stages according to the abilities of the older adults. Programming considers the results of previous research on activities for older adults [8,14,22]. This study’s results are consistent with those of previous studies that have shown a significant increase in the quality of life of older adults after participating in a program [22,23], especially during the COVID-19 pandemic [24]. The results are also consistent with meta-analysis conclusions regarding the relationship between physical activity and quality of life in older adults [16].

Existing programs must be evaluated periodically. Researchers have used the RE-AIM framework to assess the Spirit program because RE-AIM has been widely used by many researchers in public health and behavior change, especially qualitative research. This design can provide more in-depth information about the benefits obtained from a program and why and how the process occurs, which is difficult to explore using quantitative research [24].

Overall, the older adults performed well in the Spirit program. Indoor static bicycle exercise is the preferred exercise in fitness centers and is beneficial for increasing aerobic capacity and lowering blood pressure, lipid profile, and body composition [25]. The review results showed that regular physical activity positively affects all body systems; reduces stress and anxiety; and increases self-confidence and hormones of happiness, brain performance, and memory [26]. Participants stated that they benefited not only from healthier aspects of physical health, namely, being fitter, more flexible, and having better sleep quality, but also from feeling happy, being together, being entertained, and feeling cared for.

The participants revealed that there were older people with limited movement; therefore, the exercises were adjusted to their abilities, especially during balance exercises. Balance training can be performed using static or dynamic exercises. It can be prescribed based on older adults’ ability to consult a health sports expert [27]. Balance training must still be conducted, considering that the prevalence of injuries related to falls in older adults in Indonesia is 12.8%; therefore, efforts are needed to prevent falls [28]. The meta-analysis showed that balance training, as a single program or combined with other activities, effectively prevented falls in older adults, especially those in nursing homes [29].

Activities should have the ability to make older adults feel comfortable, motivating them to do it regularly and avoiding excessive exercise that risks injury. Physical activity beyond the threshold of the training zone results in a decrease in mito-
chondrial function in cells [30], interferes with insulin metabolism and reduces the immune system [31].

Social support is essential in implementing programs for older adults [32]. The Spirit program received social support from nursing home managers, fellow seniors, and outsiders. The support provided was in the form of information, assistance with facilities and infrastructure, and motivation. This is one of the reasons older adults consistently participate in the Spirit program so that it can be appropriately implemented and is highly effective.

The maintenance and continuation of the Spirit program should be accompanied by various improvements and the availability of facilities for physical activity, motivation, and social support for nursing home residents, as well as scheduling adjusted to the abilities of older adults participating in the program. This maintenance and sustainability are based on a positive increase in the quality of life of older adults toward consistent, productive physical activity, especially when facing various events in their lives [33].

The Spirit program, combined with physical activity, relaxation techniques, gratitude therapy, and blood pressure monitoring, offers a comprehensive approach to address the unique challenges older adults face during this difficult time. By engaging in regular physical exercise, older adults can maintain their physical fitness, improve their mental well-being, and reduce their risk of falls [34]. The inclusion of relaxation techniques and gratitude therapy further contributed to managing stress and promoting a positive mindset. Additionally, the integration of blood pressure monitoring allows for the proactive management of cardiovascular health, which is crucial for older adults. By implementing the Spirit program, nursing home residents and older adult care facilities can provide a holistic and tailored approach to support older adults’ well-being and overall quality of life during a pandemic. Future research should explore the long-term effects and sustainability of the Spirit program in improving the physical and mental health outcomes of older adults in similar settings.

This study has some limitations. Although the RE-AIM provides comprehensive guidelines for evaluating public health interventions, the findings may not directly apply to a broader population. The applicability of the results could be influenced by the specific conditions and characteristics of the evaluation study. Another limitation is the small number of participants in the qualitative research. This choice was because of the study’s focus on a limited population of nursing home residents, which affected the amount of data that could be collected.

**CONCLUSION**

The Spirit program, which consists of gymnastics, stationary bicycles, walking, flexibility exercises, muscle strength, and balance, combined with breathing relaxation, provides the benefits of increasing physical fitness, health, happiness, and social interaction, making it worthy of being considered as a program to improve the quality of life of older adults in nursing homes.

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**Authors’ contribution**

Conceptualization - EBC and AAS; Data curation - EBC; Formal analysis - EBC and S; Funding acquisition - AAS; Investigation - EBC; Methodology - AK and S; Project administration - EBC; Resources - AAS; Supervision - AAS, AK, and S; Validation - AAS, AK, and S; Writing – original draft - EBC; Writing – review & editing - EBC, AAS, AK, and S.

**Conflict of interest**

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

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**Data availability**

Please contact the corresponding author for data availability.
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REFERENCES


The impact of Long COVID, work stress related to infectious diseases, fatigue, and coping on burnout among care providers in nursing home: A cross-sectional correlation study

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Purpose: An increasing number of nursing home are being established because of the increased demand for treatment and care of older adults with chronic diseases related to population aging. This study aimed to examine the impact of Long COVID, infectious diseases-related to work stress, fatigue, and coping on burnout among care providers in nursing home during the persistent COVID-19 pandemic. Methods: A total of 168 care providers, including nurses, nursing assistants, and caregivers working in nursing home between July 22 and August 12, 2022 were polled by a questionnaire survey. The collected data were analyzed using an independent t-test, one-way analysis of variance, Scheffé test, Pearson correlation coefficient, and multiple regression analyses via SPSS 21.0. Results: The prevalence of Long COVID-19 among care providers in nursing home was 85.7%, with a mean burnout score of 2.59 out of 5. Work stress related to infectious diseases (β=.27, p=.002) and infection control fatigue (e.g., fatigue related to complexity of nursing duties and shortage in employees [β=.51, p=.019], conflicts caused by uncertain situations and a lack of support [β=.50, p=.012]) were the variables that significantly associated with burnout. Conclusion: It is crucial to actively explore strategies for reducing overall work stress, anxiety, and fatigue, particularly related to infection management to alleviate burnout among care providers in nursing home. Our findings provide fundamental data for the development of interventions and policies to prevent care providers’ burnout, thus enabling the provision of high-quality care in nursing home.

Keywords: Long COVID; Burnout; Caregivers; Nursing home

INTRODUCTION

As of May 13, 2023, South Korea has reported a total of 31,390,699 confirmed coronavirus (COVID-19) cases and 34,597 deaths. Of these, 32,406 deaths occurred among individuals aged 60 years or older, accounting for 93.7% of all deaths. Older adults, particularly those residing in nursing home and facilities, have been vulnerable to outbreaks [1]. COVID-19 is characterized by its ability to spread quickly in enclosed and crowded environments, placing caregivers in nursing home at a high risk of infection because of their exposure to facility conditions, such as high occupancy rates, narrow bed-to-bed distances, frequent physical contact with clients, and shared meals [2]. Many patients diagnosed with COVID-19 have reported symptoms that persist after the acute phase of COVID-19. The Centers for Disease Control and Prevention (CDC) has termed these post-COVID conditions as “chronic COVID-19 syndrome” or “Long COVID”, defined as...
symptoms that persist for weeks following the initial COVID-19 infection. Common symptoms of Long COVID include fatigue, shortness of breath, chest pain, heart palpitations, headaches, sleep issues, dizziness, and changes in smell or taste [3,4].

Burnout refers to a state of psychological, emotional, and physical exhaustion that affects both individuals and organizations. More than half of hospital workers experience burnout, which raises serious concerns because it reduces the quality of patient care and productivity, and can even lead to relationship breakdowns and suicide [4]. Although data on the prevalence of Long COVID among care providers in nursing home are unavailable, a study in the United Kingdom found that approximately 36% of healthcare workers experienced Long COVID, with 57% experiencing burnout, indicating a correlation between the two [5]. In addition, the care and support responsibilities of care providers in nursing home frequently lead to high levels of job stress due to various work-related factors, emotional strain, and a lack of self-care, all of which have been shown to contribute to burnout [6]. Notably, during the COVID-19 pandemic, healthcare workers have been experiencing high levels of fatigue and burnout, with fatigue serving as a predictor of burnout [7]. Coping mechanisms play a crucial role in managing burnout among healthcare workers. Coping is a continuously evolving set of cognitive and behavioral changes aimed at managing an individual's perceived internal and external demands, and it serves as a strategy to mitigate burnout in healthcare workers [8].

Given that the quality of care and treatment provided by care providers in nursing home is closely related to their psychosocial health, it is important to pay attention to their mental health and well-being [9]. In nursing home, care is primarily provided by nurses, nursing assistants, and caregivers. Nursing assistants and caregivers provide direct care for older patients, while nurses are primarily responsible for educating and supervising them [10]. Providing care in nursing home involves inherent tension, arising from caring for physically disabled or dementia-affected older adults, accompanied by the burden of addressing various issues related to the care for older individuals [9-11]. As LTC hospitals are expanding owing to rapid population aging, burnout among care providers in this care setting is on the rise. While studies on burnout have been conducted at home and abroad, most have focused on healthcare workers such as nurses and doctors [5-7,10-15]. There is a lack of research on burnout among care providers in nursing home in Korea, where COVID-19 outbreaks are frequent.

In particular, very few domestic studies have examined the relationship between Long COVID, infectious disease work stress, infection control fatigue, coping, and burnout among nursing home care providers. Therefore, this study aims to investigate the prevalence of Long COVID among care providers in nursing home and analyze the effects of Long COVID, work stress related to infectious, infection control fatigue, and coping mechanisms on burnout. The findings may provide a basis for developing effective strategies to reduce burnout among care providers nursing home and for long-term COVID-19 management in the future.

1. Objectives

This study aims to explore the impact of Long COVID, work stress related to infectious diseases, infection control fatigue, and coping on burnout among care providers in LTC hospitals. The specific objectives of this study are as follows:

To determine the prevalence of Long COVID among care providers nursing home and identify their levels of work stress related to infectious, infection control fatigue, coping, and burnout.

To identify the factors that contribute to burnout among care providers in nursing home.

METHODS

Ethic statement: This study was approved by the Institutional Review Board (IRB) of Jeonbuk National University (IRB No. 2022-06-037-001). Informed consent was obtained from the participants.

1. Study Design

This cross-sectional study was conducted to determine the impact of Long COVID, work stress related to infectious, infection control fatigue, and coping on burnout levels among care providers in nursing home.

2. Theoretical Framework

This study utilized the stress process model as a theoretical framework that explains mental health issues such as burnout, and consists of stressors, mediators, contextual, background,
and outcome factors (Figure 1). Based on the stress process model and previous studies [4-6,8,10,12,13], this study included burnout as an outcome factor, with Long COVID, infectious disease-related work stress, infection control fatigue, and coping as a mediating factor. It also considers demographic (gender, age, education, and income), job-related (type of job, duration of work at the current hospital, and type of work), and health-related (underlying diseases) characteristics, as well as COVID-19-related (vaccination, time since COVID-19 diagnosis, symptoms, and substitute/extended work due to co-worker's COVID-19 diagnosis) characteristics as contextual factors [16] (Figure 2).

3. Study Participants

The target population comprised care providers working in nursing home in Korea, including nurses, nursing assistants, and caregivers, who provided care for older patients in four nursing home located in Jeonbuk Province. As the study focused on burnout among nursing home care providers who provided direct care to older adults, physical therapists and social workers were excluded. The inclusion criteria consisted: 1) those who had worked in a nursing home for more than 1 year, 2) those aged 18 years or older, 3) nurses, nursing assistants, and caregivers who were directly involved in patient care, 4) those who had been diagnosed with COVID-19 for more than 4 weeks, 5) those who voluntarily agreed to participate in the study, and 6) those who understood the study content and were able to complete the questionnaire. The exclusion criteria comprised those who were asymptomatic when diagnosed with COVID-19 and those with a psychiatric history.

Participants were selected using convenience sampling from four nursing home in Jeonbuk Province. Data were collected using a questionnaire, and only participants who expressed their willingness to participate were recruited. To calculate the sample size, the G*Power version 3.1 program was utilized with an effect size of .15, a significance level of .05, power of .80, and 17 predictor variables, which required a minimum of 146 participants. Considering a dropout rate of approximately 20%, data were collected from 183 participants. The data from a total of 168 participants were used in the final analysis after excluding participants who were not nurses, nursing assistants, or caregivers (n = 5), provided insufficient answers (n = 4), had been diagnosed with COVID-19 for less than 4 weeks (n = 4), and were asymptomatic at diagnosis (n = 2).

4. Research Instruments

The research instruments used in this study were approved
by their respective developers. A pilot test was conducted with 15 nurses, nursing assistants, and caregivers (five each) to assess their understanding of the questions and the time required to complete the final questionnaire. The results indicated that the time to complete the questionnaire ranged from 10 to 30 minutes, with an average time of 13.6 minutes, and all participants found the questions easy to understand.

1) Burnout

Burnout was measured using the Maslach Burnout Inventory Human Services Survey for Medical Personnel developed by Maslach and Jackson [17]. The instrument consists of three subscales: emotional exhaustion, depersonalization, and personal accomplishment, measured on a 22-item, 5-point Likert scale (1 = not at all, 5 = very much). For ease of interpretation, the personal accomplishment items were reverse-transformed and analyzed, with higher total scores indicating higher burnout levels. In the original instrument development study [17], the Cronbach’s α was reported to be .84, while in this study, the Cronbach’s α was .87.

2) Long COVID

In this study, Long COVID was defined in accordance with the CDC definition as the persistence of symptoms beyond 4 weeks of COVID-19 diagnosis [3]. Participants were asked to indicate whether they had experienced any of the 23 symptoms reported by the CDC. Each symptom experienced was coded as 1 if the respondent answered “Yes” and 0 if the respondent answered “No”, and the scores for all 23 questions were summed. A total score of 0 indicated no experience of Long COVID, whereas a score of 1 or higher indicated the presence of Long COVID. A higher total score indicated a greater number of Long COVID symptoms reported by the participant.
3) Work stress related to infectious diseases

To measure work stress related to infectious diseases, this study employed the 3-item Stress and Anxiety to Viral Epidemics-9 scale developed by the Seoul Asan Medical Center [18], specifically corresponding to the ‘work stress’ subscale. The scale was measured using a 5-point Likert scale (1 = not at all, 5 = very much), with higher scores indicating higher levels of work stress related to viral epidemics. At the time of development, the Cronbach’s α was reported to be .79, and in this study, Cronbach’s α was .67.

4) Infection control fatigue

Infection control fatigue was measured using the infection control fatigue scale developed by Gu [19]. The scale consists of 39 items organized into five subdomains: exhaustion related to complexity of nursing duty and shortage in employees, deterioration of patients’ conditions and lack of knowledge, conflicts caused by uncertain situation and lack of support, concerns on infections and burden caused by excessive amount of attention, and conflict and lack of support due to uncertainty, burden factors due to infection concerns and excessive attention, and new roles and demands. Each item was measured on a 5-point Likert scale (1 = not at all, 5 = very much), with higher scores indicating higher levels of COVID-19 infection control fatigue. In Gu’s study [19], the Cronbach’s α was .96, and Cronbach’s α was .98 in the current study.

5) Coping

Coping was measured using an instrument developed by Lazarus and Folkman [20] and translated by Han and Oh [21]. It comprises 33 items and six subscales, including problem focus, wishful thinking, apathy, seeking social support, positive perspective, and relaxation. Each item was measured on a 4-point Likert scale (1 = not at all, 4 = very much), with higher scores indicating greater use of various coping methods. In Han and Oh’s [21] study, Cronbach’s α was .79, and in this study, Cronbach’s α was .86.

6) General characteristics

The general characteristics of the participants included demographic, job-related, health-related, and COVID-19-related characteristics. Demographic characteristics included information on gender, age, education, and income. Job-related characteristics included type of job, duration of work at the current hospital, and work type. Health-related characteristics included information on whether the participants had any medical conditions. COVID-19-related characteristics included information on COVID-19 vaccination status, time since COVID-19 diagnosis, symptoms of COVID-19 infection, and whether they had to work alternative or extended hours due to co-worker’s COVID-19 diagnosis.

5. Data Collection

Data collection was conducted from July 22 to August 12, 2022, among nurses, nursing assistants, and caregivers working in four nursing home in Jeonbuk Province. The study’s purpose, content, and participation methods were explained to the nursing directors of each hospital. After obtaining their cooperation and approval, a recruitment notice was posted on the staff bulletin board. The nursing director of each hospital distributed the questionnaires and informed consent forms to staff members who expressed their willingness to participate. The completed questionnaires were sealed in a paper envelope and placed directly in a designated collection box in each nursing home.

The participants completed the structured questionnaire manually, which took approximately 20 minutes to complete. A small gift (a travel toothbrush set) was offered as compensation for their time.

6. Ethical Considerations

This study was approved by the IRB of Jeonbuk National University University (IRB No 2022-06-037-001).

7. Data Analysis

The collected data were analyzed using SPSS software (version 21.0; IBM Corp.). General characteristics, Long COVID experience, work stress related to infectious diseases, infection control fatigue, coping, and burnout were analyzed using frequencies, percentages, means, and standard deviations. Differences in burnout levels according to general characteristics were analyzed using an independent t-test and analysis of variance, followed by post-hoc tests using the Scheffé test. The correlations among Long COVID, work stress related to infectious diseases, infection control fatigue, coping, and burnout were analyzed using Pearson’s correlation coefficient. To examine the factors contributing to burnout among the participants, we
performed a regression analysis. The analysis included education, job type, and the count of symptoms during COVID-19 diagnosis as control variables. Additionally, Long COVID, work-related stress linked to infectious diseases, infection control fatigue, and coping were considered as independent variables. The dependent variable was burnout. Education and job type, both measured nominally, were treated as dummy variables, with middle school graduates and caregivers as the respective baseline values.

RESULTS

1. Differences in Burnout Based on General Characteristics of Participants

The general characteristics of the participants are presented in Table 1. Among the study participants, 163 (97.0%) were women, with a mean age of 52.50 ± 9.44 years. As for education, 90 (53.6%) graduated from high school, and 89 participants (53.0%) had a monthly income between Korean Won (KRW) 1,510,000 and KRW 2,000,000. In terms of job-related characteristics, 77 (45.8%) were nursing assistants, 65 (38.7%) had been working at their current nursing home for more than 6 years, and 115 (71.4%) were three-shift care providers. Regarding health-related characteristics, 92 (56.4%) had no medical conditions, while 61 (37.4%) had one medical condition. Regarding COVID-19-related characteristics, 113 participants (67.3%) had received four COVID-19 vaccinations at the time of their recent diagnosis. At the time of COVID-19 diagnosis, 116 (69.5%) had received three vaccinations. One-hundred twenty-nine (73.8%) reported that the time since their COVID-19 diagnosis was 3~6 months. The average number of symptoms at the time of diagnosis was 3.70 ± 1.87, and 129 participants (77.2%) reported working substitute or overtime shifts due to a coworker's COVID-19 diagnosis (Table 1).

Participants' burnout levels varied significantly based on education (F = 4.17, p = .017), type of job (F = 4.48, p = .013), and the number of symptoms at the time of COVID-19 diagnosis (F = 4.53, p = .004). Nurses had higher levels of burnout than caregivers, as did those with a college degree or higher than those with a middle school degree. In addition, participants with five or more symptoms at the time of COVID-19 diagnosis exhibited higher levels of burnout than those with two or fewer symptoms (Table 1).

2. Participants’ Experience of Long COVID, Work Stress Related to Infectious Diseases, Infection Control Fatigue, Coping, and Burnout

Of the total participants, 144 (85.7%) reported having Long COVID, with an average of 6.03 ± 4.29 symptoms. Cough was the most commonly experienced symptom, reported by 122 participants (72.6%). Other frequently reported symptoms included fatigue (n = 113; 67.7%), sore throat (n = 96; 57.1%), lethargy (n = 96; 57.1%), and headache (n = 90; 53.6%). The symptoms experienced less frequently included pneumonia (n = 1; 0.6%), other unspecified symptoms (n = 4; 2.4%), rashes (n = 5; 3.0%), and abdominal pain (n = 9; 5.4%) (Table 2). The mean score for work stress related to infectious diseases was 2.88 ± 0.80. The overall mean score for infection control fatigue was 3.06 ± 0.83, with subscales of complex procedures and staffing shortages at 3.37 ± 0.90 and burdened by infection concerns and excessive attention at 3.21 ± 0.96. Coping had a mean score of 2.62 ± 0.28, and burnout had a mean score of 2.59 ± 0.48. The skewness and kurtosis of the data were also examined. The skewness values ranged from -1.37 to 0.53, while the kurtosis values ranged from -0.54 to 6.19, with a skewness value of 3 and a kurtosis value of 10 fulfilling the assumption of normality of the data (Table 3).

Regarding the relationship between the number of Long COVID symptoms, work stress related to infectious diseases, infection control fatigue, coping, and burnout, the findings indicated that burnout was positively and significantly correlated with the number of Long COVID symptoms (r = .20, p = .010), work stress related to infectious diseases (r = .35, p < .001), and infection control fatigue (r = .39, p < .001). In contrast, burnout and coping (r = .09, p = .240) were not significantly correlated (Table 4).

3. Factors Influencing Burnout

Among the independent variables, coping was not found to be significantly related to burnout in the univariate analysis. However, as coping is a significant factor in the stress process model, which forms the theoretical basis of this study, it was included in the multivariate analysis.

Before running the regression, we checked whether the underlying assumptions were satisfied, and we found that all assumptions were met. The normality of the residuals was confirmed as the scatterplot closely resembled a 45° straight line.
## Table 1. Differences in Burnout to General Characteristics (N=168)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>Mean±SD or n (%)</th>
<th>Burnout</th>
<th>t or F</th>
<th>p-value</th>
</tr>
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<tbody>
<tr>
<td></td>
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</tr>
<tr>
<td>Gender</td>
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</tr>
<tr>
<td></td>
<td>Men</td>
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<td></td>
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<tr>
<td>Age (year)</td>
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<td>50–59</td>
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<td></td>
<td>≥60</td>
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<td>2.48±0.49</td>
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<td>52.50±9.44</td>
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<td>2.51±0.44</td>
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<td>2.50±0.49</td>
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<td>Job</td>
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<td>50 (29.8)</td>
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<tr>
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<td>&lt;2</td>
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<td>2.50±0.49</td>
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<td>3-shift</td>
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<td>Night fixed</td>
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<td>2.50±0.49</td>
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<td>92 (56.4)</td>
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<td>≥2</td>
<td>10 (6.1)</td>
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<td>2.50±0.49</td>
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<td>Current COVID-19 Vaccination</td>
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<td>≤2</td>
<td>2 (1.2)</td>
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<td>.407</td>
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<td>3</td>
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<td>4</td>
<td>113 (67.3)</td>
<td>2.57±0.54</td>
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<td></td>
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<td>2.50±0.49</td>
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<tr>
<td>Vaccinations before COVID-19 diagnosis (n=167)</td>
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<tr>
<td></td>
<td>≤2</td>
<td>6 (3.6)</td>
<td>2.43±0.54</td>
<td>2.15</td>
<td>.119</td>
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<td>3</td>
<td>116 (69.5)</td>
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<td>4</td>
<td>45 (26.9)</td>
<td>2.48±0.47</td>
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<td>2.50±0.49</td>
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<td>Time since COVID-19 diagnosis (month)</td>
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<td>1–3</td>
<td>16 (9.5)</td>
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<td>1.38</td>
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<td>3–6</td>
<td>129 (76.8)</td>
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<td>6–12</td>
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<td>Symptoms at the COVID-19 diagnosis</td>
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<tr>
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<td>1–2</td>
<td>49 (29.2)</td>
<td>242±0.50</td>
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<td>.004</td>
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<td>3–4</td>
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<td>2.60±0.46</td>
<td>a&lt;b</td>
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<td>5–6</td>
<td>37 (22.0)</td>
<td>2.72±0.41</td>
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<td>≥7</td>
<td>14 (8.3)</td>
<td>2.86±0.54</td>
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<td>2.50±0.49</td>
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<tr>
<td>Substitute/extended work due to co-worker (n=167)</td>
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<td>129 (77.2)</td>
<td>2.60±0.51</td>
<td>0.50</td>
<td>.615</td>
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<td>No</td>
<td>38 (22.8)</td>
<td>2.56±0.46</td>
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<td></td>
<td>2.50±0.49</td>
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</tbody>
</table>

The sum of the percentages does not equal 100% because of rounding. SD=Standard deviation.

Linearity and homoscedasticity assumptions of the model were satisfied, as the residuals were evenly distributed around zero. The autocorrelation of the dependent variable was checked using the Durbin-Watson index, which was 2.13, indicating that the residuals were independent without autocorrelation. In addition, the variation inflation factor ranged from 1.15 to 7.96, which did not exceed 10, indicating no multicollinearity among the independent variables. Furthermore, the regression

https://doi.org/10.17079/jkgn.2023.00045
model fit was significant (Table 5).

The regression analysis indicated that the major factors influencing burnout were work stress related to infectious diseases (β = .27, \( p = .002 \)), the sub-domain of infection control fatigue related to complexity of nursing duty and shortage in employees (β = .51, \( p = .019 \)), and the sub-domain of conflicts caused by uncertain situation and lack of support (β = .50, \( p = .012 \)), with an explanatory power of 23.7% (Table 5).

**DISCUSSION**

By examining the prevalence of Long COVID among care providers in nursing home who were on the frontlines of patient care and support during the COVID-19 outbreak and the impact of work stress related to infectious diseases, infection control fatigue, and coping on burnout, this study attempted to provide a foundation for managing burnout during the prolonged COVID-19 period. The major factors influencing burnout were work stress related to infectious diseases, the sub-domain of infection control fatigue related to complexity of nursing duty and shortage in employees, and the sub-domain of conflicts caused by uncertain situation and lack of support.

The prevalence of Long COVID in this study was found to be 85.7%, while the average number of symptoms reported by participants was more than six. The most common symptoms were cough, fatigue, lethargy, sore throat, headache, and muscle pain. This finding is similar to the results of a study conducted by Yong [22], which examined symptoms after COVID-19 in countries such as the United Kingdom, Italy, and Australia and found that the prevalence of Long COVID ranged from 38.7% to 87.4% across different countries, with similar symptoms such as cough, fatigue, sore throat, lethargy, and shortness of breath. Therefore, it is necessary to closely monitor the symptoms of nursing home care providers with

<table>
<thead>
<tr>
<th>Variable</th>
<th>Yes, n (%)</th>
<th>Mean±SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long COVID experience</td>
<td>144 (85.7)</td>
<td>6.03±4.29</td>
<td>0~17</td>
</tr>
<tr>
<td>Cough</td>
<td>6.03±4.29</td>
<td>122 (72.6)</td>
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<tr>
<td>Fatigue</td>
<td>6.03±4.29</td>
<td>113 (67.7)</td>
<td></td>
</tr>
<tr>
<td>Sore throat</td>
<td>6.03±4.29</td>
<td>96 (57.1)</td>
<td></td>
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<tr>
<td>Lethargy</td>
<td>6.03±4.29</td>
<td>96 (57.1)</td>
<td></td>
</tr>
<tr>
<td>Headache</td>
<td>6.03±4.29</td>
<td>90 (53.6)</td>
<td></td>
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<td>Myalgia</td>
<td>6.03±4.29</td>
<td>84 (50.0)</td>
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<td>Joint pain</td>
<td>6.03±4.29</td>
<td>57 (33.9)</td>
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<tr>
<td>Fever</td>
<td>6.03±4.29</td>
<td>55 (32.7)</td>
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<tr>
<td>Smell or taste dysfunction</td>
<td>6.03±4.29</td>
<td>53 (31.5)</td>
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<td>Depression</td>
<td>6.03±4.29</td>
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<td>Dizziness</td>
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<td>30 (17.9)</td>
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<td>Sleep problems</td>
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<td>Palpitation</td>
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<td>Diarrhea</td>
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</tr>
<tr>
<td>Nausea</td>
<td>6.03±4.29</td>
<td>20 (11.9)</td>
<td></td>
</tr>
<tr>
<td>Dyspnea</td>
<td>6.03±4.29</td>
<td>18 (10.7)</td>
<td></td>
</tr>
<tr>
<td>Menstrual cycle change</td>
<td>6.03±4.29</td>
<td>14 (8.3)</td>
<td></td>
</tr>
<tr>
<td>Abdominal pain</td>
<td>6.03±4.29</td>
<td>9 (5.4)</td>
<td></td>
</tr>
<tr>
<td>Rashes</td>
<td>6.03±4.29</td>
<td>5 (3.0)</td>
<td></td>
</tr>
<tr>
<td>Others: dry eye, brain fog, facial paralysis, memory problems</td>
<td>6.03±4.29</td>
<td>4 (2.4)</td>
<td></td>
</tr>
<tr>
<td>Pneumonia</td>
<td>6.03±4.29</td>
<td>1 (0.6)</td>
<td></td>
</tr>
</tbody>
</table>

*Multiple response; SD=Standard deviation.
Long COVID given its high prevalence, and special attention should be given to the potential occurrence of complications. To this end, it is crucial to offer assistance in managing post-effects, as well as educating nursing home care providers about tailoring their daily routines to individual circumstances, thereby empowering them to engage in effective self-care practices.

The average score of work stress related to infectious diseases among the participants in this study was 2.88 out of 5. The stress related to infectious diseases was examined in a study focusing on acute-stage nurses responsible for newly admitted patients with infectious diseases. The recorded stress level was 3.45, surpassing the findings of our current study. While caregivers in acute hospitals attend to moderately ill patients for brief durations, those in nursing home are tasked with consistently managing stress due to caring for older patients with chronic diseases, including cases of COVID-19. Considering that nursing home care providers are constantly exposed to COVID-19 infections, they are burdened with intense workloads for long periods, along with anxiety about infection risks, resulting in increased physical and mental stress. Therefore, it is necessary to establish clear infectious disease work protocols for nursing home during new epidemics, provide comprehensive response training to help nursing home care providers adapt to infectious disease work, support the expansion of rest areas, and improve convenience measures to reduce work-related stress.

The participants reported an average infection control fatigue score of 3.06 out of 5, with higher fatigue levels noted in the subcategories of complexity of nursing duty and shortage in employees, conflicts caused by uncertain situation and lack of support. This finding is somewhat lower than that found in a study among general hospital nurses caring for patients during the COVID-19 pandemic, which reported a fatigue score of 3.45, but it still indicates a moderate-to-high level of fatigue. This difference in scores may be due to disparities in the characteristics of healthcare organizations and the general characteristics of the people being cared for. Among the subcategories, complexity of nursing duty and shortage in employees indicated the highest levels of fatigue, which is consistent with previous research on caring for patients with respiratory infections. Healthcare workers on the frontline during the COVID-19 pandemic experienced more multifaceted fatigue than those caring for the general population owing to fear of

### Table 4. Correlation of Major Variables (N=168)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Long COVID symptom</th>
<th>Work stress related to infectious disease</th>
<th>Infection control fatigue</th>
<th>Coping</th>
<th>Burnout</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>r (p)</td>
<td>r (p)</td>
<td>r (p)</td>
<td>r (p)</td>
<td>r (p)</td>
</tr>
<tr>
<td>Long COVID symptoms</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work stress related to infectious diseases</td>
<td>.20 (.011)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infection control fatigue</td>
<td>.47 (&lt;.001)</td>
<td>.30 (&lt;.001)</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coping</td>
<td>.05 (.564)</td>
<td>.25 (.001)</td>
<td>.18 (.019)</td>
<td>.09 (.240)</td>
<td>1</td>
</tr>
<tr>
<td>Burnout</td>
<td>.20 (.010)</td>
<td>.35 (&lt;.001)</td>
<td>.39 (&lt;.001)</td>
<td>.09 (.240)</td>
<td>1</td>
</tr>
</tbody>
</table>

### Table 5. Factors Influencing Burnout (N=168)

<table>
<thead>
<tr>
<th>Variable</th>
<th>β</th>
<th>SE</th>
<th>t</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>.41</td>
<td>3.97</td>
<td>&lt;.001</td>
<td></td>
</tr>
<tr>
<td>Education (ref. middle school)</td>
<td>.01</td>
<td>.15</td>
<td>0.08</td>
<td>.938</td>
</tr>
<tr>
<td>High school</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ College</td>
<td>.001</td>
<td>.11</td>
<td>0.01</td>
<td>.996</td>
</tr>
<tr>
<td>Job (ref. caregiver)</td>
<td>.09</td>
<td>.29</td>
<td>0.30</td>
<td>.768</td>
</tr>
<tr>
<td>Nurse</td>
<td>-.02</td>
<td>.27</td>
<td>-0.08</td>
<td>.935</td>
</tr>
<tr>
<td>Nursing assistant</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Symptoms at the COVID-19 diagnosis</td>
<td>.18</td>
<td>.05</td>
<td>1.67</td>
<td>.097</td>
</tr>
<tr>
<td>Long COVID symptoms</td>
<td>-.11</td>
<td>.011</td>
<td>-1.07</td>
<td>.289</td>
</tr>
<tr>
<td>Work stress related to infectious diseases</td>
<td>.27</td>
<td>.05</td>
<td>3.17</td>
<td>.002</td>
</tr>
<tr>
<td>ICF 1</td>
<td>.51</td>
<td>.12</td>
<td>2.39</td>
<td>.019</td>
</tr>
<tr>
<td>ICF 2</td>
<td>.32</td>
<td>.11</td>
<td>1.66</td>
<td>.099</td>
</tr>
<tr>
<td>ICF 3</td>
<td>.50</td>
<td>.11</td>
<td>2.54</td>
<td>.012</td>
</tr>
<tr>
<td>ICF 4</td>
<td>.26</td>
<td>.10</td>
<td>1.25</td>
<td>.215</td>
</tr>
<tr>
<td>ICF 5</td>
<td>.14</td>
<td>.09</td>
<td>0.86</td>
<td>.391</td>
</tr>
<tr>
<td>Coping</td>
<td>.01</td>
<td>.14</td>
<td>0.06</td>
<td>.953</td>
</tr>
</tbody>
</table>

ICF 1=Exhaustion related to complexity of nursing duty and shortage in employees; ICF 2=Deterioration of patients’ conditions and lack of knowledge; ICF 3=Conflicts caused by uncertain situation and lack of support; ICF 4=Concerns on infections and burden caused by excessive amount of attention; ICF 5=New roles and demands; SE=Standard error.

R²=.31, Adjusted R²=.24, F (p)=4.172 (<.001)
contagion, unfamiliar tasks, and frequently changing quarantine guidelines [24]. Furthermore, the deteriorating health of care recipients due to COVID-19 has increased the workload and intensity for healthcare and care facility workers, leading to prolonged tension-related fatigue [23,25].

Coping of nursing home care providers, as parameterized in this study through the stress process model, scored 2.62 out of 4, indicating their ability to cope with burnout within their work environment. A study on clinical nurses [25] during the COVID-19 pandemic using the same instrument as in this study, reported a similarly moderate coping score of 2.67. An emerging infectious disease pandemic, such as COVID-19, may contribute to a decrease in coping capacity, leading individuals to perceive the situation as beyond their control [21,25]. Therefore, national preparedness and robust response strategies are required to prevent and reduce burnout among healthcare workers who provide care to susceptible populations during an infectious disease outbreak such as COVID-19, in addition to improving individual coping skills.

The mean burnout score in this study was 2.59 out of 5 (39.8 on a 100-point scale). A study on nurses in Korean general hospitals during the initial COVID-19 pandemic [11] reported a burnout score of 30.0, while a study on nursing home caregivers in Spain during the COVID-19 pandemic [26] reported a burnout score of 31.9. The factors contributing to this higher mental and physical burnout in nursing home include the high risk of outbreaks in such vulnerable facilities, the high level of tension experienced by nursing home care providers, and the potential severe outcomes, such as patient deaths due to infectious diseases [12]. As burnout among nursing home care providers can reduce the quality of care provided to patients and increase workers’ turnover intentions [13], it is important to strengthen disaster response capabilities for new infectious disease epidemics. This can be achieved by implementing appropriate job-oriented regulations and conducting regular simulation training for nursing home care providers before the outbreak of infectious diseases so that they can respond appropriately and mitigate the impact of burnout.

Based on a stress process model, this study examined the impact of Long COVID, work stress related to infectious diseases, infection control fatigue, and coping on burnout. The results indicated that burnout levels increased when participants experienced higher levels of work stress related to infectious diseases and infection control fatigue, compared to complexity of nursing duty and shortage in employees, conflicts caused by uncertain situation and lack of support. Several previous studies [11,18] have also shown that higher levels of burnout were associated with increased anxiety and stress related to infectious diseases, and that continued exposure to work anxiety, stress, and burnout eventually results in turnover and resignation among healthcare workers. Infection control fatigue related to healthcare workforce shortages during the COVID-19 pandemic has increased burnout levels among nurses in the United States [26] and Korean nurses caring for patients with respiratory infections [15]. Therefore, to reduce burnout among care providers in nursing home, proactive efforts to reduce infection control fatigue, which is exacerbated in healthcare settings where caregivers provide face-to-face care for vulnerable patients, remain a priority. One crucial measure is the establishment of clear protocols for care provision. In addition, government policies should include practical and reasonable support measures, such as the recruitment of additional personnel and the utilization of care assistants to address the labor shortage problem at the frontline.

One of the strengths of this study is the systematic consideration of various influencing factors. The stress process model, which is widely used in the literature and mental health research, encompasses stressors, mediators, contextual, background, and outcome factors. This study found that the “stressors” of infection-related work stress and fatigue, rather than demographic, occupational, or COVID-19-related factors suggested by the stress process model, were the most influential factors contributing to nursing home care providers’ burnout. Therefore, stress-reduction strategies should be implemented to reduce burnout among care providers in nursing home. Further research is required to identify other sources of stress, in addition to infection-related work stress and fatigue, to expand the understanding of nursing home care providers’ experiences. Although coping was found to be correlated with burnout as a mediator, the regression analysis showed that the two variables were not statistically significant. This suggests that the effectiveness of coping may not always be fixed but could depend on the situational context in which stress is experienced [20]. In addition, the emergence of COVID-19 variants and the prolonged pandemic may have led to changes in individuals’ ability to cope with problematic situations. Therefore, it is important to conduct replication studies on the impact of coping on burnout as the COVID-19 pandemic comes to an end.

Although the present study reveals important findings, it has
several limitations. First, the study was conducted with care providers in local nursing home, which may limit the generalizability of the results to all nursing home care providers in Korea. In addition, there could be biases in the findings as participants recalled their experiences with COVID-19 symptoms through a self-administered questionnaire. In addition, the majority of care providers in this study were women, which may influence the results. Therefore, future research should consider the influence of gender.

However, this study is significant in that it identified the prevalence of Long COVID among nursing home care providers and the factors influencing burnout in the context of the COVID-19 pandemic, especially with the emergence of the omicron mutation and recurrent outbreaks. The study also serves as a basis for developing programs aimed at preventing and managing burnout among nursing home care providers in the event of new infectious diseases. A core strength of this study is that it examined the effects of infection control fatigue and work stress related to infectious diseases on burnout during the COVID-19 pandemic using measures specifically related to infection control.

### CONCLUSION

This study aimed to determine the prevalence of Long COVID among LTC hospital care providers in the context of the ongoing COVID-19 pandemic, as well as the factors contributing to burnout, including work stress related to infectious diseases, infection control fatigue, and coping. The results showed that work stress related to infectious diseases and infection control fatigue caused by complicated procedures, conflicts due to staff shortages and uncertainty, and lack of support significantly contributed to burnout.

While patient-facing infection control work is critical, care providers in nursing home without negative-pressure rooms continue to work overtime, leading to high levels of stress and fatigue in their efforts to prevent the spread of COVID-19 infection. Therefore, to reduce burnout among care providers of vulnerable populations, it is essential to develop a comprehensive plan that thoroughly prepares care providers in nursing home for an infectious disease pandemic. In addition, the roles for infection prevention in medical institutions and facilities should be systematically defined. Moreover, it is necessary to provide sufficient education and training to reduce overall work stress and fatigue, including infection control measures.

Active support and multifaceted measures, such as ensuring rest breaks, guaranteed working hours, and hiring additional personnel to alleviate the workload burden on care providers, should also be implemented.

In conclusion, this study serves as a foundation for establishing effective interventions and policies to prevent burnout among care providers who provide care to vulnerable populations during emerging infectious disease outbreaks in the future. As the number of nursing home continues to increase owing to the demand for treatment and care due to rapid population aging and the increase in the number of older patients with chronic diseases, it is crucial to address the unique challenges faced by care providers, including burnout.

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### Authors’ contribution

Study conception - JP, YS, and YY; Data collection - YS; Analysis and interpretation of the data - JK, HL, YY, and JP; Drafting and critical revision of the manuscript - HL, JK, HYS, JP, and YY; Final approval - YY, HL, and JK

### Conflict of interest

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

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### Data availability

Please contact the corresponding author for data availability.
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REFERENCES


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Healthyagingoffrailolderadultsinthecommunity:Ahybridconceptanalysis

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Purpose:Althoughastrainof‘healthyaging’hasbeencreated,thereisnochonusconsensusondefining
healthyagingperceivedbyfrailolderadults.Thisstudywasconductedtoinvestigatetheconcept
ofhealthyagingperceivedbyfrailolderadults.Methods:Thehybridmodelconsistedofthreephases.
Intheoreticalphase,definingcharacteristicsofhealthyagingamongfrailolderadultswereiden-
tifiedthroughaliteraturereview.Atotalof1,166articleswascalculated,and32relativewere
included.Duringthefieldphase,in-depthinterviewswereconductedwithninerfrailolderadultswhomethefrailtycriteria,andthedatwascalculatedthroughcontentanalysis.Inthefinalphase,based
ontheanalysisoftheliteraturereviewandqualitativeinterviews,afinaldefinitionofhealthyaging
infrailolderadultswasextracted.Results:Thconceptofhealthyagingperceivedbyfrailolderadults
wasfoundincognitive,behavioral,psychological,andsocialandindependentdomains.Forthe
frailolderadults,healthyagingreferstothabilitytomaintainone’sownhealththroughself-man
agement,acceptagingandnaturaldeathwithapositiveoutlook,andbeindependentwithoutrelying
onothers.Conclusion:Infrailolderadults,healthyagingconsistsofanumberofmultidimensional
domainsand11attributes,includingmaintaininghealth,acceptingtheprocessofaging,beingposi-
tive,andbeingindependent.Usingthisfinaldefinition,healthpromotionstrategyscouldbedevel-
opedtoachievethetheoptimalconstraint.Toprovideeffectiveinterventionstofrailolderadults,furtherre-
searchisneededtodevelopavalidandreliableassessmentscale.

Keywords:Frailelderly;Subjectivehealth;Healthyaging;Concept-analysis

연구방법

1. 연구설계


2. 자료수집 및 분석

1) 이론적 단계

이론적 단계에서는 추상화된 개념을 구체화하여 개념의 영역과 속성을 증조적으로 사전적 의미와 분석의 백그라운드를 분석하고자 한다. 본 연구에서는 2021년 8월을 기준으로 '허약노인', '주관적 건강', '건강한 노화', '사회적 노화' 등의 주요 검색어를 이용하여 국내외 문헌을 검색하였다. 수집된 문헌은 DBpia와 DBpia과 같은 검색 motor를 이용하여 검색 결과의 306개의 문헌을 검색하였다. 주로 문헌 44편은 제외한 보도 기사 등 257편을 검색하였으며, 국내 문헌 20편은 제외한 총 306 개의 문헌이 제출되었다. 본 연구에서는 허약노인의 건강한 노화 개념의 영역과 속성을 매우 중요하다고 하였다.

2) 현장작업 단계

현장작업 단계는 실험 결과의 개념적 특성을 분석하고 정의를 규명하는 방법론적 연구이다. 혼종모형의 이론적 단계에서 체계적이고 광범위한 문서 고찰 단계를 통해 개념의 속성과 정의를 파악하고, 현장작업 단계에서 개념의 검증을 확인한 후, 최종 분석 단계에서 이론적 단계와 현장작업 단계를 통해 도출된 결과를 비교, 분석하여 개념의 속성과 정의를 확인하였다.

3) 최종 분석 단계

최종 분석 단계에서는 학문적 의미를 구체화하여 개념의 영역과 속성을 증조적으로 사전적 의미와 분석의 백그라운드를 분석하고자 한다. 본 연구에서는 2021년 8월을 기준으로 '허약노인', '주관적 건강', '건강한 노화', '사회적 노화' 등의 주요 검색어를 이용하여 국내외 문헌을 검색하였다. 수집된 문헌은 DBpia와 DBpia과 같은 검색 motor를 이용하여 검색 결과의 306개의 문헌을 검색하였다. 주로 문헌 44편은 제외한 보도 기사 등 257편을 검색하였으며, 국내 문헌 20편은 제외한 총 306 개의 문헌이 제출되었다. 본 연구에서는 허약노인의 건강한 노화 개념의 영역과 속성을 매우 중요하다고 하였다.

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2) 현장작업 단계
(1) 연구자 준비
본 연구의 연구자들은 현장작업 단계로 심층면담을 수행하기에 앞서 박사과정에서 질적연구방법론을 수강하였으며, 두 차례의 질적연구에 참여하여 연구 참여자 선정, 심층면담 진행, 녹음된 자료의 필사, 필사 자료로부터 주제와 관련 있는 의미 있는 단어와 추상적인 언어로 주제들을 도출하는 훈련을 하였다.

(2) 현장 설정 및 교섭
기존의 혼종모형에서는 현장작업 단계에서 현장을 설정하여 교섭한 후 사례를 선택하고, 참여관찰을 통해 자료를 수집하는 것을 권고하였으나[14], 허약노인의 건강한 노화에 대한 개념의 생성 및 전이 현상을 발견하고 실제적인 현장의 모습을 파악하기 위해 개별 심층면담으로 진행하였다.

(3) 연구 참여자 선정
현장작업 단계의 연구 참여자는 지역사회의 센터를 통해 허약노인

Figure 1. Procedure of literature identification and selection. CINAHL=Cumulative Index to Nursing and Allied Health Literature; KISS=Korean-studies Information Service System; RISS=Research Information Sharing Service.
울 의도적으로 표집하였다. 연구 참여자의 구체적인 선정 기준은 1) 지역사회에 거주하는 65세 이상의 노인, 2) 한국형 허약노인 선별도구 [15]에서 5문항(피로, 저항, 보행, 질병, 체중감소) 중 3개 이상 충족한 경우 허약군(frail), 1~2개인 경우 전허약군(prefrail), 0개인 경우 robust군으로 분류되며, 본 도구를 이용한 허약노인 선별 결과에 따른 허약군과 전허약군, 3) 본 연구를 이해하고 참여에 동의한 자로 이론적 단계의 초기에 수집된 문헌 고찰에 근거하여 허약노인의 주관적 건강 인식에 따른 건강한 노화의 본질과 속성을 가장 잘 설명할 수 있는 대상자로 9명을 선정하였다. 선정된 9명의 연구 참여자의 연령은 60대 1명, 70대 4명, 80대 4명이었으며, 성별은 남자 2명, 여자 7명으로 이 중 4명은 허약군, 5명은 전허약군이었다(Table 1).

(4) 자료수집

2021년 9월 1일부터 10월 30일까지 대전광역시의 지역사회 센터에 등록된 65세 이상으로 허약 또는 전허약으로 판정된 노인 중에서 연구의 목적을 이해하고 연구 참여에 동의한 허약노인을 대상으로 심층면담을 진행하였다. 심층면담은 전화로 참여자가 원하는 시간으로 정하여 지역사회 센터 내 회의실, 교회 회의실 및 대상자의 집에서 1인당 1회 시행하고, 허약노인이 인지하는 건강한 노화 속성을 확인할 수 있는 구조화된 핵심 질문을 이용하였으며, 주요 질문 내용은 ‘나이가 들어감에 따라 건강에 대해 어떻게 느끼나요?’, ‘자신이 잘 늙어가고 있다고 느꼈던 경험에는 어떤 것이 있었나요?’, ‘잘 늙어가기 위해서 중요한 건강의 요소는 무엇이라고 생각하나요?’ 등이다.

(5) 자료 분석

현장작업 단계의 자료 분석은 이론적 단계에서 확인된 개념의 구성 요인 및 분석을 확장하고 통합하는 것으로 문헌 고찰을 통해 확인된 허약노인이 인지하는 건강한 노화 개념에 관련된 속성을 염두에 두고 진행하였다. 현장단계에서 총 30회에 걸쳐 수집된 원자료는 질적 내용분석 방법으로 분석을 시행하였다[16]. 질적 내용분석 방법은 현장에서 수집된 자료로부터 지속적이고 비교하고 분류하는 과정을 통해 개념을 도출하여 더 추상적인 수준으로 범주화하는 것으로[16], 질적 내용분석을 위해 면담 내용을 당일 필사하여 전사된 내용을 반복적으로 읽으며 의미 있는 진술들에 밑줄을 그어 의미 있는 단어를 찾아낸 후 공통된 의미들을 찾아 하위 범주를 도출하고 범주의 속성과 차원을 도출하였다. 이론적 단계로부터 도출된 속성과 각 범주 속성, 차원을 비교 분석하면서 진술의 의미를 가장 잘 보여줄 수 있는 용어를 선정하였다.

(6) 연구의 타당도 고려

Sandelowski[17]의 기준에 따라 연구 참여자가 이야기한 그대로 녹음하고 필사하여 자료의 신뢰성을 높이고, 필사한 자료를 반복하여 분석으로서의 가능성을 의도적으로 시행하고 비교함으로써 분석의 신뢰성을 높였다. 본 연구의 분석 내용과 결과에 대한 타당성 확보를 위해 9인의 연구 참여자들에게 연구자가 분석한 결과를 보여주며 자신이 의도한 내용과 일치하는지 확인하였으며, 연구 참여자

<table>
<thead>
<tr>
<th>Patient No.</th>
<th>Age (year)</th>
<th>Sex</th>
<th>Education (year)</th>
<th>Living status</th>
<th>Subjective economic status</th>
<th>Medication of chronic disease</th>
<th>Frailty by FRAIL scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant 1</td>
<td>86</td>
<td>Female</td>
<td>Elementary (4)</td>
<td>Living together (son)</td>
<td>Poor</td>
<td>Hypertension, diabetes mellitus, cardiovascular disease</td>
<td>Frail</td>
</tr>
<tr>
<td>Participant 2</td>
<td>80</td>
<td>Female</td>
<td>None</td>
<td>None</td>
<td>Fair</td>
<td>Hypertension, cardiovascular disease</td>
<td>Frail</td>
</tr>
<tr>
<td>Participant 3</td>
<td>86</td>
<td>Male</td>
<td>Elementary (6)</td>
<td>Living together (spouse)</td>
<td>Fair</td>
<td>Pain killer, dermatology medication</td>
<td>Frail</td>
</tr>
<tr>
<td>Participant 4</td>
<td>80</td>
<td>Female</td>
<td>Elementary (3)</td>
<td>Living together (spouse)</td>
<td>Fair</td>
<td>Hypertension, diabetes mellitus, cerebrovascular disease, osteoarthritis</td>
<td>Frail</td>
</tr>
<tr>
<td>Participant 5</td>
<td>75</td>
<td>Female</td>
<td>Middle (8)</td>
<td>Living together (spouse, son)</td>
<td>Poor</td>
<td>Cardiovascular disease, osteoarthritis</td>
<td>Prefrail</td>
</tr>
<tr>
<td>Participant 6</td>
<td>68</td>
<td>Female</td>
<td>Elementary (6)</td>
<td>Living together (spouse)</td>
<td>Fair</td>
<td>Hypertension, pain killer</td>
<td>Prefrail</td>
</tr>
<tr>
<td>Participant 7</td>
<td>79</td>
<td>Male</td>
<td>Elementary (5)</td>
<td>Living together (spouse)</td>
<td>Poor</td>
<td>Pulmonology medication</td>
<td>Prefrail</td>
</tr>
<tr>
<td>Participant 8</td>
<td>70</td>
<td>Female</td>
<td>Elementary (6)</td>
<td>Living together (son)</td>
<td>Poor</td>
<td>Diabetes mellitus</td>
<td>Prefrail</td>
</tr>
<tr>
<td>Participant 9</td>
<td>77</td>
<td>Female</td>
<td>Elementary (6)</td>
<td>Living together (spouse)</td>
<td>Poor</td>
<td>Hypertension, calcium supplement, nephrology medication</td>
<td>Prefrail</td>
</tr>
</tbody>
</table>

FRAIL scale=Fatigue, resistance, ambulation, illnesses, and loss of weight.

https://doi.org/10.17079/jkgn.2023.00038 287
모집 방법과 자료수집 절차를 자세히 기록하고 원자료를 남겨 신뢰성 끌어오르고자 하였다. 도출된 주제들과 원자료 간의 명확성을 위해 연구 결과에 연구 참여자의 진술문을 삽입하였으며, 연구의 확증성과 타당성 높이기 위해 질적연구 경험이 있는 간호학 교수 2명에게 고찰을 받았다.

(7) 윤리적 고려
본 연구의 윤리적 타당성을 확보하기 위해 충남대학교 생명윤리위원회(IRB)의 승인(IRB No. 202104-SB-060-01)을 받았다. 연구 참여자의 모집 및 심층면담 시각 전 참여자에게 연락하여 연구의 목적과 취지를 설명하고 자발적인 서면동의를 얻었다. 심층면담 내용의 녹음과 면담 도중 참여자가 원하면 면담을 중단할 수 있으며, 면담 내용은 연구의 목적 이외에는 사용되지 않는다는 것을 설명하고, 개인정보가 유출되지 않도록 보안을 유지하며 자료 분석 후 일정 기간이 지난 후 폐기시켰다. 필사본의 작성과 연구 결과 진술 시 연구 참여자를 구분하기 위해 임의적으로 구별할 수 있는 사항은 모두 기호화하여 기록하였다. 본 연구의 연구 참여자들은 연구 참여에 따른 소정의 보상은 제공하지 않았으며 연구 참여자 개인의 인적사항이나 신원을 파악할 수 있는 사항은 모두 기호화하여 기록하였다.

2) 간호학 문헌에서 제시된 허약노인이 인지하는 건강한 노화 영역과 속성
간호학 문헌에서 허약노인이 인지하는 건강한 노화는 신체적 영역, 행동적 영역, 심리적 영역, 사회적 영역, 통합적 영역의 5개 영역에 따른 6개 속성을 기술하였다(Table 2). 분석 결과에 따라 신체적 영역에서 증상이 지속되면서 자기 효능감을 유지하며 면역력이 높아진 상태로, 행동적 영역에서는 자기 집중력이 높아져서 임상상황을 해결하는 데에 기여하고, 심리적 영역에서는 우울증이 없기 때문에 안정된 정서가 유지되며, 사회적 영역에서는 사회 참여의 질이 높아져 사회적 거부감이 줄어들고, 통합적 영역에서는 자기 효능감과 자기 인식의 향상으로 인해 건강한 노화의 향상효과를 일으킨다. 이상의 사례를 바탕으로 허약노인이 인지하는 건강한 노화가 나타난 결과로 'frail'은 '약한, 약한'이며, 'elderly'는 '노인이 다. 건강한 노화의 영문 표기에 따라 'health'와 'aging'으로 나뉘며, 'health'는 '건강을 유지하려고 하는 것', 'aging'은 '노화, 동물 또는 사물이 따라 나타나는 것'으로 정의되어 있으며, 'frail'은 '약한, 약한 노인이 따라 나타나는 것'으로 정의되어 있다. 이상의 사례를 바탕으로 허약노인이 인지하는 건강한 노화는 '연약하고 약한 노인이 따라 나타나는 것'으로 정의할 수 있다.

3) 최종 분석 단계
혼종모형의 최종 분석 단계는 이론적 단계와 현장작업 단계의 결과를 비교, 분석하여 연구 결과를 통합하는 단계이다. 이론적 단계의 문헌 고찰을 통해 도출된 결과를 허약노인이 인지하는 건강한 노화에 대한 분석적 속성과 현장작업 단계에서 확인된 속성을 비교하여 허약노인이 인지하는 건강한 노화 개념의 영역, 속성, 정의, 경험적 준거를 확인하고 최종 정의를 내렸다.

연구결과

1. 이론적 단계에서 나타난 허약노인이 인지하는 건강한 노화에 대한 영역과 속성 확인

1) 허약노인이 인지하는 건강한 노화 사전적 의미
조선국어사전[18]에서 '약한'은 '약하다'고 하였으나 '약하다'는 '약한'의 사전적인 의미와는 다르기 때문에, '약한'은 '약하다'는 의미로 사용할 수 없다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리고 '약한'은 '약하다'는 의미로 사용할 수 있다. 그리
Table 2. Components of Frail Elderly’s Healthy Aging Defined in Theoretical Phase

<table>
<thead>
<tr>
<th>Classification</th>
<th>Category</th>
<th>Attribute</th>
<th>Content</th>
</tr>
</thead>
</table>
| Nursing        | Cognitive| Positive beliefs and thoughts about my-self | - Perception of self-efficacy [A1,A2]
|                |          |           | - Thinking as young [A3] |
| Behavioral     |          | Able to self-manage | - Take care of health management by self [A4,A5,A6] |
|                |          | Maintenance of daily living and functional ability levels | - Maintaining the level of daily living ability [A7] |
| Psychological  |          | Not depressive condition | - Maintaining functional ability levels [A2] |
| Social         |          | Have a social tie through social participation | - No depressive symptoms [A9] |
|                |          |           | - Maintenance of active social participation [A2,A10,A11] |
|                |          |           | - Building a social relationships [A1,A12] |
|                |          |           | - Having a social tie [A12] |
|                |          |           | - High level of health [A10,A13] |
| Other disciplines | Cognitive | Awareness of not being frailtiy and maintenance of identity | - Maintaining one’s presence and identity [A14,A15] |
|                |          |           | - Thinking not being frailty [A16,A17] |
| Behavioral     |          | Having a ability to control | - Ability to self-control [A18,A19] |
|                |          | Independent daily life | - No difficulty in performing activities of daily living [A15,A20,A21,A22] |
| Psychological  |          | Psychological well-being | - Maintaining functional ability levels [A20,A23,A24,A25,A26] |
|                |          |           | - Having a psychological well-being [A14,A18,A27] |
|                |          |           | - Having a resilience to stress [A28] |
|                |          |           | - No depressive symptoms [A20] |
| Social         |          | Socialization through active participation in life | - Active social participation [A25] |
|                |          |           | - Socialization of activities [A17,A26] |
|                |          |           | - No disease and healthy [A25,A29,A30,A31] |
|                |          |           | - Maintaining and coping with natural teeth [A32] |
| Integrative    | Cognitive| Acceptance of frailty naturally | - Thinking not being frailty |
|                |          |           | - Thinking as young |
|                |          |           | - Perception of self-efficacy |
|                |          |           | - Maintaining of positive identity |
| Behavioral     |          | Have a self-management skills | - Ability to take care of one’s own health |
|                |          | Independent daily life | - Ability of self-control |
|                |          |           | - Maintaining functional ability levels |
|                |          |           | - No difficulty in performing activities of daily living |
|                |          |           | - Maintaining functional ability levels |
| Psychological  |          | Psychological well-being | - Having a psychological well-being |
|                |          |           | - Having a resilience to stress |
|                |          | No depressive symptoms | - No depressive condition |
|                |          |           | - No depressive symptoms |
| Social         |          | Formation of social bond through active social participation | - Active social participation |
|                |          |           | - Building a social relationships |
|                |          |           | - Socialization of activities |
|                |          |           | - Having a social tie |
|                |          |           | - High level of health |
| Integrative    |          | Comprehensive health promotion | - Maintaining and coping with natural teeth |
|                |          | Physiologically healthy state | - No disease and healthy |


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이론적 단계에서 확인된 허약노인이 인지하는 건강한 노화 영역과 속성 및 정적적 정의

이론적 단계에서 간호학과 타 학문의 문헌을 체계적으로 고찰하여 도출한 영역과 속성을 비교 검토한 결과 간호학과 타 학문 모두에서 인지적 영역, 행동적 영역, 심리적 영역, 사회적 영역, 통합적 영역의 5개 영역이 동일하게 확인되었다(Table 2). 간호학의 인지적 영역에서 도출된 ‘자신에 대한 긍정적인 믿음과 생각’ 속성과 타 학문에서 도출된 ‘허약하지 않는 인식과 정체성 유지’는 각 속성의 특성에 따라 ‘허약함을 자연스럽게 수용하는 것’과 ‘자신에 대한 긍정적인 정체성 유지’의 2개 속성으로 분류하였다. 행동적 영역의 경우 타 학문에서 ‘통제할 수 있는 능력을 갖는 것’의 속성은 간호학에서의 ‘자기관리를 하고 있는 상태’로 재명명하였으며, 간호학의 ‘일상생활능력과 기능적 능력 수준의 유지’ 속성은 타 학문의 ‘독립적인 일상생활이 가능한 상태’로 분류하였다. 심리적 영역의 경우 간호학에서 도출된 ‘우울하지 않은 상태’의 속성은 타 학문의 ‘심리적 웰빙’의 속성으로 재분류하였다. 사회적 영역의 경우 도출된 각 속성은 간호학에서의 ‘이의요구는 해낼 수 있는 능력과 사회적 자립’ 속성으로 재분류하였다. 통합적 영역은 각 간의 ‘고령의 건강증진’과 ‘생리적으로 건강한 상태’의 2개 속성으로 분류하였다. 따라서 이론적 단계에서 확인된 허약노인이 인지하는 건강한 노화는 인지적, 행동적, 심리적, 사회적, 통합적 영역에 따라 허약하지 않는 긍정적인 정체성을 가지고, 자기 관리와 소통, 사회참여를 통해 건강한 노화를 표현하였다.

현장작업 단계에서 나타난 허약노인이 인지하는 건강한 노화에 대한 영역과 속성 확인

현장작업 단계에서 허약노인이 인지하는 건강한 노화에 대한 영역과 속성 확인

현장작업 단계에서 나타난 허약노인이 인지하는 건강한 노화에 대한 영역과 속성 확인

(1) 영역 1: 인지적(cognitive) 영역

인지적 영역에는 ‘상대적 건강 상태’와 ‘지급의 건강에 대한 인내’의 2개 속성이 도출되었다. 과거 또는 다른 사람과 비교한 건강 상태를 통해 허약하지 않거나 잘 �iatrics고 있다고 생각하거나 지급의 건강 상태를 받아들이고 후 참고 견디는 것을 의미하였다.

(2) 영역 2: 행동적(behavioral) 영역

행동적 영역에는 ‘노년의 품위 유지’, ‘더 나은 건강을 위한 노력’의 2개 속성이 도출되었다. 참여자들은 낭방생활을 보이고 실제로 실지 않으며, 더 나은 건강을 위한 노력으로 아프지 않은 몸을 바라보거나 스스로 건강관리를 위해 노력하여 더 나은 건강을 소망하는 것을 건강한 노화로 표현하였다.

(3) 영역 3: 사회적(social) 영역

사회적 영역에는 ‘주변과의 긍정적 관계’와 ‘사회적 유대감을 경험하는 것’의 2개 속성이 도출되었다. 사회적 영역에서는 간호학에서의 ‘사회적 유대감을 경험하는 것’의 속성은 타 학문의 ‘적극적인 사회참여를 통해 사회적 유대감을 가지는 것’으로 재분류하였다.

(4) 영역 4: 통합적(integrative) 영역

통합적 영역에서는 각 간의 ‘고령의 건강증진’과 ‘생리적으로 건강한 상태’의 2개 속성으로 분류하였다.
교회를 가지고 있어도 누가 차로 태워다 곧도 남편이 차로 태워다 준다 고 해도 내가 여러 사람 보기에 막 아니도 나도 인식하고 이래면 남부끄리서 못 가고 있는 거야. 못 가고 있는 거야. 못 가는 거야. 그래서. 부끄러워서, 참여자5 이렇게 막 수그려야 되고, 막 하려 구부정해졌고 또부러져야 되고

(2) 더 나은 건강을 위한 노력

'다른 건강을 위한 노력'의 속성에는 '아프지 않은 몸', ' 스스로 건강관리를 위해 노력함', '다 다른 건강을 바라봄'이 분류되었다. 참여자들은 건강한 노화에 대해 아프지 않은 몸을 바라면서, 건강에 대한 열망과 바람을 드러냈다. 건강해야 하며, 여러 이유들을 말하며 지금보다 더 나은 건강을 소망하는 것으로 건강한 노화를 표현하였다.

이렇게 막 수그려야 되고, 막 허리 구부정해갖고 꼬부라져야 되고

하니까 남부끄럽지... (참여자5)

(2) 영역 3: 심리적(psychological) 영역

심리적 영역에는 '살에 대한 긍정적 수용'의 1개 속성이 도출되었 다. 편안한 마음을 가지고 긍정적으로 사는 것으로, 감사하는 마음으로 일상의 소중함을 유지하며 살아가는 삶을 의미하였다.

(1) 살에 대한 긍정적 수용

'살에 대한 긍정적 수용'의 속성에는 '편안하고 긍정적인 마음', '반복되는 일상의 소중함'이 분류되었다. 참여자들은 편안한 마음을 가지고 하루하루 감사하며 사는 삶을 말하며, 일상생활의 의미 있는 활동을 통해 인생의 아름다움을 유지하고 건강한 노년의 삶을 지속하는 것으로 건강한 노화를 설명하였다.

그냥 항상 건강했고, 그냥 사는 게 뭐라고 할까? 뭐 그런 데 집착 해가면서 살, 그럴 정도가 아니었으니까. 그냥 건강하고, 그냥 하나 날 믿고, 감사하고, 원망, 불평 없고, 저 마음은 항상 편안했어요. 지금도 마음은 되게 편안해요. 뭐 하나 없다고, 부족하다고 불평할 것도 없고, 갤마 마음은 편안해요. 하루하루 이렇게 감사하며 사는 거지. (참여자2)

허락된다면 더 살 수가 있을 데야, 지금처럼 그저 편안하게 마음 편하게... 그 일 좀 들고 있일 좀 많이 줄이고 노동력이 절감되고 이렇게 좀 지나가는 것이 늘어서는 좀 필다 싶어요. (참여자7)

4) 영역 4: 독립적(independent) 영역

독립적 영역에는 '남에게 의존하지 않는 독립적인 삶'과 '자연스러운 죽음'의 2개 속성이 도출되었다. 참여자들은 건강한 노화에 대해 자신에게 폐를 가지지 않은 존재가 되기를 바라며 이대로 살아가기로 했다. 참여자

그저 안 아프고, 그냥 건강하게 자식들에게 피해 안 주고, 저 잘 먹고, 아침 잘 먹고, 저녁에 폐를 끼치지 않아야. (참여자2)

'자녀에게 의존하지 않는 삶'의 속성에는 '자녀에게 피해가 되지 않는 삶'이 분류되었다. 참여자들은 자신의 건강에 대해 이렇게 하여서 자신들에게 폐를 가지지 않은 존재가 되기를 바라며 이대로 살아가기로 했다.

그저 안 아프고, 그냥 건강하게 자식들에게 피해 안 주고, 저 찰

지금은 나이가 먹으니까... 지대로 늙어간다... 잘 늙어가는 건...

자식들에게 의존하지 않는 삶'의 속성에는 '자식에게 피해가 되지 않는 삶'이 분류되었다. 참여자들은 자신의 건강에 대해 이렇게 하여서 자식들에게 폐를 끼치지 않기를 바라며 이대로 살아가기로 했다.

그저 안 아프고, 그냥 건강하게 자식들에게 피해 안 주고, 저 찰

그래서 다 해봤습니다. 하나님은 이대로만 더 추하지 않고 더 아프지 않고 지금의 건강을 유지하려고 하며 부모님 못 험으로 전시가 되거나 험한 것이 아닌가... 자식들에게 피해 주면 안 되고. 그렇다면 안 되고. (참여자6)

하루하루 이렇게 감사하며 사는 거지. (참여자2)

이렇게 살다가 저기에서는... (참여자6)

그렇게 하면 더 좋아합니다. 하나님은 왜이모만 더 추하지 않고 더 아프지 않고, 이대로만 잘 살아가는 거가 가장 가게 해주세요. 한남시

히락된다면 더 살 수가 있을 데야, 지금처럼 그저 편안하게 마음 편하게... 그 일 좀 들고 있일 좀 많이 줄이고 노동력이 절감되고 이

이렇게 하러 가는 것이 늘어서는 좀 필다 싶어요. (참여자7)

현장작업 단계의 심층면담을 통해 확인된 허약노인이 인지하는 건강한 노화는 일기적, 행동적, 심리적, 독립적 영역에서 허약함을 받 아들이 다른 사람과 비교하며 건강하게 늙어간다는 생각을 가지고 부끄럽지 않은 일을 통해 노년의 품위를 유지하며 더 나은 건강을 위си.
해 노력하고, 삶을 긍정적으로 조망하며 자녀에게 의존하지 않는 존재로 살다가 자연스럽게 죽음을 맞이하기를 바라는 것으로 확인되었다.

3. 최종 분석 단계에서 나타난 허약노인이 인지하는 건강한 노화 영역, 속성과 정의

1) 최종 분석된 허약노인이 인지하는 건강한 노화 영역과 속성

혼종모형의 이론적 단계에서 시행한 문헌 고찰의 결과와 현장작업 단계의 실증적 결과를 통합하여 허약노인이 인지하는 건강한 노화에 대한 정의를 내리고, 영역과 속성을 확인 후 재정리하여 최종적으로 5개 영역과 11개 속성을 확정하였다 (Table 2).

인지적 영역에서 자신에 대한 긍정적인 믿음을 유지하는 '자신에 대한 긍정적인 정체성 유지'의 속성은 자기효능감에 따라 긍정적인 자아상을 가지는 것으로, 그대로 유지하였다. 스스로 젊다고 느끼며 다른 사람과 비교하여 잘 늙어가고 있다고 인식하는 것을 ' 스스로 바람직하다고 여기는 상대적 건강'으로 통합하였다. '허약함을 자연스럽게 수용하는 것'의 속성은 '현재의 건강에 대한 수용'에서 허약함을 받아들이는 속성을 통합하여 '허약함을 수용하는 건강'으로 재정리하여, 인지적 영역에서는 '자신에 대한 긍정적인 정체성 유지', 스스로 바람직하다고 여기는 상대적 건강과 '허약함을 수용하는 건강'의 3가지 속성이 확정되었다. 행동적 영역에서 스스로 조절하며 건강관리를 할 수 있는 ' 스스로 자기관리를 할 수 있는 능력 보유'의 속성은 스스로 건강관리를 위해 노력함의 속성을 반영하여 '자기관리를 통한 건강 유지'의 속성으로 재정리하였다. 일상생활능력 수준을 유지하는 '독립적인 일상생활이 가능한 상황'의 속성은 남부끄러운 모습을 보이지 않는 능력 보유의 속성과 통합하여 '정한 자립과 자기 존엄'의 속성으로 재정리하였다. ' 더 나온 건강을 위한 노력'의 속성은 직관적인 건강을 추구할 것으로, 그대로 확정하였다. 행동적 영역은 '자기관리를 통한 건강 유지', '정한 자립과 자기 존엄', '더 나온 건강을 위한 노력'의 3가지 속성이 확정되었다. 심리적 영역에서 '심리적 웰빙'은 '심리적 상호관계'의 속성을 반영하여 '심리적 웰빙'의 속성으로 재정리하였다. 우울한 증상을 보이지 않는 '신체적 건강에 대한 수용'의 속성은 반복되는 일상의 소중함을 통해 즐거움을 느끼는 것을 의미한다. '사회적 유대감 형성'의 속성은 적극적인 사회참여를 유지하여 사회적 유대감을 갖는 것을 의미한다. '자녀에게 의존하지 않는 삶'은 자식에게 피해가 되지 않는 삶을 바라는 것을 의미하였다. '자연스러운 죽음'의 속성은 가볍고 부드럽게 살기를 바라는 것을 의미한다. 경험적 준거는 현장에서 존재하는 개념의 속성을 보여주는 것으로, Schwartz-Barcott와 Kim [14]은 혼종모형 방법의 현장작업의 결과에 따라 주어진 현상에 대해 상호 관계이 있는 개념을 정확한 관찰이 가능한 지표로 제시할 수 있게 말하고 있다. 이에 따라 최종 분석 단계에서 허약노인이 인지하는 건강한 노화 측정도구로 활용할 수 있는 각 영역별 속성을 Table 3에 제시하였다.

2) 최종 분석된 허약노인이 인지하는 건강한 노화 정의

허약노인이 인지하는 건강한 노화는 현재의 건강 상태를 받아들이는 과정에서 스스로 건강을 인식하는 것으로, 삶을 긍정적으로 조망하면서 삶에 대한 긍정적 수용, 타인과 관계를 유지하며 자녀에게 부담이 되지 않는 존재로 남아달라고 가벼운 죽음을 바라는 것이 다. 이러한 허약노인의 건강한 노화는 노화에 따른 변화에도 허약하지 않는 주체적인 인지를 통해 자신에 대한 긍정적인 정체성을 유지하며, 더 나온 건강을 위한 노력을 통해 노년의 풍부를 유지함으로써 삶을 긍정적으로 수용하는 특성을 갖는다. 또한, 자녀에게 피해를 주지 않으므로 자연스럽게 죽음을 받아들이기를 바라는 허약노인의 염원이 담겨있다고 할 수 있다. 

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<td>• Thinking not being frailty • Thinking as young</td>
<td>Cognitive</td>
<td>Relative health state</td>
<td>• Health in the past or compared to others • Awareness that I’m aging well • Acceptance of frailty</td>
<td>Cognitive</td>
<td>Maintaining a positive identity about oneself Relative health you consider desirable</td>
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<td>Maintaining a positive identity</td>
<td>• Perception of self-efficacy • Maintaining of positive identity</td>
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<td>Acceptance of current health</td>
<td>• Acceptance of frailty</td>
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<td>Having a self-management skills</td>
<td>• Ability to take care of one’s own health • Ability of self-control</td>
<td>Behavioral</td>
<td>Maintenance dignity in old age</td>
<td>• Not ashamed of life</td>
<td>Behavioral</td>
<td>Maintenance of health through self-management True self-reliance and self-dignity</td>
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<td>Independent daily life</td>
<td>• Maintaining functional ability levels • No difficulty in performing activities of daily living • Maintaining functional ability levels</td>
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<td>Effort to better health</td>
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<td>• Having a psychological well-being • Having a resilience to stress • No depressive condition • No depressive symptoms</td>
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<td>• Relaxed and positive mind • Importance of repeated daily life</td>
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<td>Life without dependence on children Natural death</td>
<td>• A life without harm to children • Just live and going</td>
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<td>Life without dependence on children Natural death</td>
</tr>
</tbody>
</table>
논의

본 연구는 혼종모형을 사용하여 허약노인이 인지하는 건강한 노화를 이해하고, 개념의 본질과 속성을 규명하고자 수행되었다. 허약노인이 인지하는 건강한 노화는 이론적 단계와 현장작업 단계에서 모두 인지적 영역, 행동적 영역, 심리적 영역이 확인되었으며, 사회적 영역의 속성은 이론적 단계에서만 확인되었고, 독립적 영역은 현장작업 단계에서 새롭게 확인되었다. 최종적으로 도출된 영역과 속성을 중심으로 혼종모형 개념분석의 각 결과를 논의하고자 한다.

본 연구의 인지적 영역에서 허약노인은 허약함을 받아들이는 과정에서 긍정적으로 건강을 인식하는 속성이 뚜렷이 나타나고 있었다. 허약노인이 인지하는 건강은 스스로 바람직하다고 여기는 건강에 더불어 타인과 비교·평가한 상대적 건강의 속성을 포함하고 있었는데, 이는 건강한 노화가 자신의 인식뿐만이 아니라 타인에 대한 인식도 함께 포함됨을 나타낸다. 본 연구에서 허약노인은 자신보다 더 건강 상태가 좋지 않다고 여겨지는 타인과 비교하여 건강에 대한 공정적인 믿음을 형성하였으며, 이는 기존의 연구에서 허약노인이 자신보다 못하다고 느껴하는 대상과 하향 비교를 통해 심리적 안정감을 얻는다는 결과와 일치하였다[20]. 또한 신체적 허약함에도 불구하고 스스로 젊다고 인식함을 강조하였다. 즉, 허약함에 대한 임상적 이해와 허약함을 인식하는 방식의 불일치는 건강한 노화를 위해 허약노인 스스로 인지하는 건강에 대한 태도와 인식이 주요한 점이라는 것을 시사한다[21]. 이는 한국 노인들이 인식하는 성공적 노화 속성인 ‘가족을 포함한 다른 사람들과의 관계를 통한 존재 의미’, ‘자신이 소속한 집단의 평가를 통해 삶의 가치를 가능함’, ‘자녀와의 상호작용을 자신의 성공적 노화에 결부시키며 훈련한다’[22]가 성공적 노화 개념의 본질적 요소로 보이며, 이는 본 연구에서 확인된 일상활동에서 반복되는 일들을 통해 심리적 안정감을 얻는 속성은 허약노인이 일상생활을 통해 마음의 균형을 이루고 안정 상태를 유지하기 위해서로 이해할 수 있다. 특히, 심리적 헤파와 ‘상에 대한 공정적 수용’의 속성은 지혜롭게 나이드는 것으로, 정서적 헤파를 유지하며 관을 가지는 태도로 허악노인의 건강한 노화 개념을 이해하는 것이 타당한 것으로 판단된다[25].

사회적 영역과 통합적 영역은 이론적 단계에서만 확인되었다. 노인에게 있어 건강한 노화는 신체 건강과 기능, 여가 및 사회활동, 사회적 관계 및 접촉을 유지하는 것으로 여겨지기도 한다[26], 따라서 본 연구에서 사회적 영역의 ‘사회적 유대감 형성’의 속성이 이론적 단계에서만 확인되었음에도 불구하고 본 연구에서는 이에 포함시켰으며, 현장작업 단계에서 확인되지 않아 한국적 맥락에서 차이가 있는지 추후 연구가 필요할 것으로 생각된다.

독립적 영역에서는 자식에게 피해가 되지 않기를 원하며, 자연스러운 죽음을 바라는 속성을 확인할 수 있었다. 기존의 연구에서도 성공적 노화와 좋은 죽음을 함께 언급하고 있었는데[27], 본 연구에서도 허약노인들이 건강한 노화에 대해 건강하게 나이드는 것 너머의 죽음과 연관된 것은 준비가 되었다는 점이 보고되었고, 특히 본 연구에서는 허약노인들에게 적용되는 허약노인이 인지하는 건강한 노화의 임상적 특성과 속성을 규명하기위해 애를 쓰기로 결정하였다. 특히 모든 삶과 죽음이 자녀와 연관되어 건강한 노화의 중요한 요소로 작용하는 것은 한국 사회의 문화적 가치와 일치할 것으로 확인할 수 있다[28]. 즉, 허약노인들이 건강한 노화를 통해 자식에게 부담이 되지 않고 자연스럽게 맞이하기를 원하는 부모의 마음을 표현하고 있으며, 이는 한국적 특성을 반영하여 현장작업단계에서 새롭게 확인된 속성으로 추가하였다.

본 연구는 혼종모형 개념분석을 활용하여 허약노인이 인지하는 건강한 노화의 대차원적인 특성과 속성을 규명하고 개념에 대한 정의와 속성별 경험적 준거를 제시하여 허약노인이 인지하는 건강한 노화의 개념적 기반을 제공한 의의가 있다. 본 연구에서는 새로운 개념과 특성으로 나타나는 부분은 조사 및 자료수집을 통해 규명하고 있는 단계로 본 연구 결과 홍종모형 개념분석을 통해 허약노인이 인지하는 건강한 노화의 속성이 확인되었으며, 허약노인이 인지하는 건강한 노화의 본질과 속성을 확인하였고 기존 연구에서 노인에게 있어 중요하다고 알려진 사회적 영역의 속성의 보이다.
본 연구는 혼종모형을 이용하여 허약노인이 인지하는 건강한 노화의 본질과 속성을 확인하기 위하여 분석한 연구이다. 연구 결과 허약노인이 인지하는 건강한 노화 정의는 현재의 건강 상태를 받아들이는 과정에서 스스로 바람직하다고 건강을 인식하는 것으로, 삶을 긍정적으로 조망하면서 더 나은 건강을 소망하고, 타인과 관계를 유지하며 자녀에게 부담이 되지 않는 존재로 남아있다가 자연스러운 죽음을 맞이하는 것으로 나타났다. 허약노인이 인지하는 건강한 노화는 인지적 영역, 행동적 영역, 심리적 영역, 사회적 영역, 독립적 영역의 5개 영역과 11개 속성으로 구성된 다차원적 개념으로 인지적 영역은 자기존중과 자기성장, 행동적 영역은 자기관리를 통한 건강 유지, 정신적 자립과 자기 존중, 사회적 영역은 사회적 유대감 형성의 1개 속성을 포함한다. 향후 허약노인이 인지하는 건강한 노화 개념의 다차원적 속성에 대해 더욱 깊이 있는 연구를 실시하여 개념의 속성을 반영하는 측정도구 개발에 이르기까지 허약노인이 인지하는 건강에 맞춘 중재 프로그램 개발에 기초자료로 활용할 것을 제언한다.

REFERENCES

고혈압 노인을 위한 노인복지관 중심 통합 복약관리 프로그램의 개발 및 효과: 횡단적 단면연구
문희정1,2, 정덕유3
1시립서울노인복지센터 간호사, 2이화여자대학교 일반대학원 노인간호학 전공 대학원생, 3이화여자대학교 간호대학 교수

Purpose: The purposes of this study were to develop an integrated online and offline medication management program and to examine the program’s effects of the program for older adults with hypertension residing in the community. Methods: A nonequivalent control group pretest-posttest design was used. Participants were 57 older adults with hypertension (intervention group: 29, control group: 28). The experimental group participated in the medication management program, which included the following: verbal and video education, individual counseling, and using medication note over 3 weeks. Collected data were analyzed using the SPSS/WIN 22.0 program. The data were analyzed by Generalized Estimation Equation. Results: Statistically significant differences were found between the experimental and control groups in terms of their knowledge of hypertension and self-efficacy for appropriate medication. Conclusion: The integrated medication management program was effective as indicated in knowledge of hypertension and self-efficacy for appropriate medication. Future studies are required to explore the medication management program’s effects on older adults with hypertension using more rigorous research methods.

Keywords: Hypertension; Aged; Medication adherence; Medication therapy management

서론
1. 연구의 필요성

국내 65세 이상 노인의 고혈압 추정 유병자는 약 495만 명이며 [1], 2021년 조사에 따르면 국내 70세 이상 노인의 66.4%가 고혈압으로 진단도 대비 6.3% 증가하였고[2]. 노인에게 고혈압은 혼란 중요한 건강 문제로, 고혈압 노인이 혈압을 적정수준으로 관리하지 않으면 뇌졸중, 관상동맥질환과 같은 심뇌혈관 질환 합병증으로 인한 사망 위험이 증가한다[3]. 고혈압 치료는 목표혈압 달성을 위해 적극적인 생활요법 및 약물치료가 필요하며, 고혈압 약물을 잘 복용하는 환자의 혈압이 조절된다는 점을 복용하지 않는 환자보다


국내 고혈압 환자의 복약 행정 증진과 관련한 선행연구들에서 교육, 개별상담, 복약보조도구의 활용, 약물목록 작성 등을 복합적용하였을 때 약물치료 이행도와 관련하여 긍정적인 결과를 확인하였다[8,10,11]. 따라서 한 가지의 방법만을 적용하는 단일요소보다는 복합적 인 복약관리 증진이 더욱 효과적임을 알 수 있으며, 교육의 제공 방식은 COVID-19로 인한 볼테리코스 정기화되면서 감염 예방을 위해 노인을 대상으로 한 건강교육 또는 온라인 방식이 활성화되고 있는 추세이다. 시간과 장소에 구애받지 않고 반복학습이 가능한 장점 을 가진 온라인방식을 여러 선행연구들에서 증명된 개별상담과 복약교육, 보조도구의 활용 등을 통합한 프로그램에 적용한다면 고혈압 노인의 복약 행정 증진에 더욱 효과적인 것이라 기대되나 이와 관련한 증례 연구는 찾아보기 어려웠다.

지역사회에 거주하는 노인들은 지속적 전장관리를 위해 노인복지관을 방문하고 있으며, 2023년 기준 노인복지관은 전국 366개소에 69,786명의 노인이 이용하고 있는 실정이다[15]. 많은 수의 노인이 이용하는 노인복지관의 접근성을 통해 지역사회 노인에게 효과적인 복약관리 프로그램을 제공할 수 있을 것이라 기대한다.

이에 따라 본 연구는 노인복지관을 중심으로 한 통합 복약관리 프로그램을 개발·적용한 뒤, 그 효과를 확인하고 노인복지관 간호사에 의한 만성질환관리 프로그램의 질적 향상을 위한 기초자료를 제공하고자 시도되었다.

2. 연구목적

본 연구의 목적은 노인복지관을 이용하는 고혈압 노인을 대상으로 노인복지관 중심 통합 복약관리 프로그램을 적용한 후 고혈압 지식, 복약자기효능감, 의료진과의 의사소통 자신감, 고혈압 약물치료 이행도에 미치는 효과를 확인하고자 하며, 구체적인 목적이 아래와 같다.

이에 따라 본 연구는 노인복지관을 중심으로 한 통합 복약관리 프로그램을 개발한다. 노인복지관 중심 통합 복약관리 프로그램이 지역사회 고혈압 노인의 고혈압 지식, 복약자기효능감, 의료진과의 의사소통 자신감, 고혈압 약물치료 이행도에 미치는 효과를 검증한다.

3. 연구가설

본 연구를 통해 검증할 가설은 아래와 같다.

가설 1. 노인복지관 중심 통합 복약관리 프로그램에 참여한 실험군은 프로그램에 참여하지 않은 대조군에 비해 고혈압 지식 점수가 높을 것이다.

가설 2. 노인복지관 중심 통합 복약관리 프로그램에 참여한 실험군은 프로그램에 참여하지 않은 대조군에 비해 복약자기효능감 점수가 높을 것이다.

가설 3. 노인복지관 중심 통합 복약관리 프로그램에 참여한 실험군은 프로그램에 참여하지 않은 대조군에 비해 의료진과의 의사소통 자신감 점수가 높을 것이다.

가설 4. 노인복지관 중심 통합 복약관리 프로그램에 참여한 실험군은 프로그램에 참여하지 않은 대조군에 비해 고혈압 약물치료 이행도 점수가 높을 것이다.

가설 5. 노인복지관 중심 통합 복약관리 프로그램에 참여한 실험군은 프로그램에 참여하지 않은 대조군에 비해 고혈압 약물치료 이행도 점수가 높을 것이다.
연구방법

Ethic statement: This study was approved by the Institutional Review Board (IRB) of Ewha Womans University (IRB No. ewha-202301-0018-01). Informed consent was obtained from the participants.

1. 연구설계

본 연구는 노인복지관 중심 통합 복약관리 프로그램이 고혈압이 있는 노인의 고혈압 지식, 복약자기효능감, 의료진과의 의사소통 자 신감, 고혈압 약물치료 이행도에 미치는 효과를 검증하기 위한 비동 등성 대조군 전후설계를 적용한 유사실험연구이다.

2. 연구대상

본 연구의 대상은 서울특별시에 소재한 1개의 노인복지관 및 이르 신체지역센터를 통해 모집 공고 후 의사로부터 고혈압 진단을 받 고 항고혈압제를 1년 이상 복용하고 있는 만 65세 이상 노인 중 연구 목적을 이해하고 인지장애, 기질적 정신질환이나 정신질환이 없이 의 사소통이 가능하며 읽고 쓰기가 가능한 자를 근접 모집단으로 표집 하였다. 확산효과를 방지하기 위해 노인복지관 이용자를 실험군, 어르신취업지원센터 이용자를 대조군에 편의 표집하였다. 표본의 크기는 G*power 3.1.9.4 프로그램을 이용하였으며 연구에서 필요한 대상자 수는 두 집단의 평균차이를 비교하는 실험연구[16]를 근거로 효과크기 .4, 유의수준 .05, 검정력 .80을 기준으로 산출한 결과 실험군과 대조군 각각 26명으로 총 52명이었다. 그러나 20%의 탈락률 을 고려하여 실험군, 대조군 각각 33명, 총 66명으로 연구대상을 산 정하였다. 본 연구에서 탈락자는 3회의 중재프로그램과 3회의 조사 중 1회라도 불참한 경우 제외하였으며 전장의 약화(3명) 및 개인사정 (5명), 불문명한 단체(1명)으로 실험군 4명, 대조군 5명이 탈락하여 실험군 29명, 대조군 28명 총 57명이 최종 통계분석에 이용되었다 (Figure 1).

3. 연구도구

본 연구는 구조화된 설문지를 사용하여 자료수집하였으며, 일반적 특성과 의료진과의 의사소통 자 신감, 고혈압 지식, 복약자기효능감, 고혈압 약물치료 이행도를 파악할 수 있는 내용을 포함한 56문항으 로 구성되었다. 각 도구는 사용 전 도구 개발자에게 사용에 대한 허락을 받은 이후 사용하였다. 본 연구도구의 내용을 구체적으로 살펴 보면 다음과 같다.

1) 일반적 특성

사전 문헌고찰을 통해 약물 복용에 영향을 주는 요인으로 보고되 었던 성별, 연령, 최종학력, 혼인상태, 평균 월수입을 포함하였으며, 약물 복용 개수, 약물 처방 의사 수, 약물 부작용의 경험, 고혈압 진단받은 기간과 같은 약물 및 질병 관련 특성을 조사하였다.

2) 고혈압 지식

Park과 Hong [17]이 개발한 도구에 의해 측정하였으며 고혈압과 자기 조절의 인지적 수준을 파악하기 위한 18문항으로 구성되었다. 각 문항에 대해 대상자는 ‘그렇다’와 ‘아니다’로 응답하였다. 정답일 경우 1점, 오답일 경우 0점으로 측정하여 정답 수가 높음수록 고혈압에 대한 지식수준이 높은 것을 의미한다. 개발 당시 도구의 신뢰도 Cronbach’s α 값은 .72였고, 본 연구에서는 .71이었다.

![Figure 1. Flow chart of the study.](https://doi.org/10.17079/jkgn.2023.00052)
3) 복약자기효능감

Risser 등 [18]이 개발한 약물 자기효능감 도구(Self-efficacy for Appropriate Medication Use Scale, SEAMS)를 Park [19]이 변양한 도구에 의해 측정하였다. 약을 복용하기 어려운 상황에서 약을 복용하는 자기효능감과 다양한 상황에서 약물을 올바르게 복용하는 자신감의 수준을 확인할 수 있는 13문항으로 구성되었으며 각 문항에 대해 그렇지 않다(1점), 그저 그렇다(2점), 매우 그렇다(3점)의 Likert 척도로 응답하였다. 점수가 높을수록 복약자기효능감이 높음을 의미한다. 개발 당시 SEAMS 도구의 신뢰도 Cronbach's α값은 .90이었고, 본 연구에서는 .93이었다.

4) 의료진과의 의사소통 자신감


5) 고혈압 약물치료 이행도

Kim 등 [21]이 개발한 고혈압 약물치료 이행도 측정 도구(Hill-Bone Medication Adherence Scale, HBMA)를 Song 등 [22]이 변양한 도구에 의해 측정하였다. 고혈압 약물치료 이행도를 확인할 수 있는 8문항으로 구성되었으며 각 문항에 대해 전혀(1점), 보통(2점), 매우 그렇다(3점)의 Likert 척도로 응답하였다. 점수가 높을수록 고혈압 약물치료 이행도가 높음을 의미한다. 개발 당시 HBMA 도구의 신뢰도 Cronbach's α값은 .80이었고, 본 연구에서는 .85이었다.

4. 연구결과

1) 프로그램 개발과정

Analysis, Design, Development, Implementation, Evaluation (ADDIE) model을 이용하여 5단계의 과정(분석, 설계, 개발, 실행, 평가)으로 진행하였다.

(1) 분석


(2) 설계

본 프로그램은 복약교육(대면 및 동영상 교육 3회), 개별상담(대면 1회, 전화 2회), 복약보조도구인 복약노트의 활용으로 구성되었다. 개별화된 개입과 복약수첩과 같은 투약보조도구는 복약관리 교육의 이해증진에 긍정적 영향을 미치며 [8], 건강교육 시 동영상을 통한 교육이 의료진의 구두교육보다 대상자의 기억과 집중력을 높여, 건강행동 변화를 가져올 수 있는 효과적인 교육방법으로 확 인되어 왔다 [25]. 또한 선행연구 [8, 16]에서 3주간의 프로그램 제공으로 복약증진과 관련한 유의미한 효과를 검증하였으며 이를 근거로 본 교육프로그램도 주 1회, 3주간의 교육프로그램을 설계하였다.

(3) 개발

프로그램 내용 구성을 위해 선행연구에서 효과적이었던 방법과 전략을 기반으로 세부 중재내용을 구성하였다. 회차별 교육내용은 '1회차 고혈압 바로알기', '2회차 고혈압 알약 바로알기', '3회차 의료진과의 의사소통 증진하기'로, 교육매체는 파워포인트와 동영상자료를 활용하기로 하였다(Table 1). 특히 노인 대상자에게 효과적인 고혈압 지식제공을 위해 동영상 자료는 시각적 자료를 중심으로 활용하여 명확하고 단순하게 제작하였으며 회차별 대면 복약교육에서는 주제에 부합하는 정확한 정보와 측면에 대해 상기할 수 있는 기회를 제공할 수 있도록 하였다. 이는 선행연구 [10]에서 효과적이었던 성취 경험, 타인의 성공담을 통한 자기효능증진자원을 활용한 것을 근거로 하였다. 복약노트의 구성에 있어서는 의료진과의 의사소통 증진을 위해 미리 질문사항을 메모하고 약물목록을 지참하여 병원에 갈 수 있도록 하는 것이 효과적이었다는 선행연구 [11]을 근거로 차량전을 부착할 수 있는 페이지를 별도 구성하고 최근 혈압측정 수치, 약물 복용을 위한 기록부를 사용하였으며 노인들의 시각적 특성을 고려하여 글자크기 16포인트 이상으로 제작하였다. 개별상담은 약물치료 이행도 측정하는 고혈압 약물 부작용과 특이사항을 관리할 수 있도록 하는 내용으로 구성하였고, 일반성과 전문성을 높이기 위해 상담 매뉴얼을 제작하였다.
<table>
<thead>
<tr>
<th>Session</th>
<th>Topic</th>
<th>Content</th>
<th>Time (minute)</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Understanding hypertension</td>
<td>1. Individual counseling in early phase - Check the current phenomenon of taking medication and difficulties - Hand out a medication note and guide how to use</td>
<td>20</td>
<td>Face-to-face</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Face-to-face medication education session - Orientation: introduction of purpose and contents of program - Causes, diagnoses, complications, and management about hypertension - Learn how to take video class - Summary of lesson and Introduction of the next session</td>
<td>30</td>
<td>Group lecture</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Video medication education session - Watch the training video uploaded in YouTube - Iterative learning about face-to-face medication session</td>
<td>10</td>
<td>Video</td>
</tr>
<tr>
<td>2</td>
<td>Understanding hypertension</td>
<td>1. Face-to-face medication education session - Importance of medication for hypertension - Types of hypertension medicines - Side effects of hypertension medicines and interactions - The right use of hypertension medicines - Discussion and Q&amp;A sessions - Reinforce to use the medication note - Introduction of the next session</td>
<td>30</td>
<td>Group lecture</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Video medication education session - Watch the training video uploaded in YouTube - Iterative learning about face-to-face medication session</td>
<td>10</td>
<td>Video</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Telephone counseling - Checking of watching video training - Reaffirmation of contents about face-to-face medication session - Checking for medication use, side effects and difficulties of medication - Consultation on questionable content - Support and encouragement for the continuing medication use</td>
<td>10</td>
<td>Telephone</td>
</tr>
<tr>
<td>3</td>
<td>Enhancing communication with medical staff</td>
<td>1. Face-to-face medication education session - Importance of communication with medical staffs - Who should we communicate with? - Communication contents with medical staffs - How to communicate with medical staffs - Reinforce to use a medication note - Summary of medication management program - Closing</td>
<td>30</td>
<td>Group lecture</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Video medication education session - Watch the training video uploaded in YouTube - Iterative learning about face-to-face medication session</td>
<td>10</td>
<td>Video</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Telephone counseling - Checking of watching video training - Reaffirmation of contents about face-to-face medication session - Checking for medication use, side effects and difficulties of medication - Consultation on questionable content - Support and encouragement for the continuing medication use</td>
<td>10</td>
<td>Telephone</td>
</tr>
</tbody>
</table>
(4) 수행
본 프로그램을 진행하기 전, 프로그램에서 활용할 강의록, 복약노트, 동영상 제작 기획안 등을 간호대학 교수 1인, 노인복지관 간호사 1인, 약사 1인, 총 3인의 전문가 집단에게 자문을 받아 프로그램을 수정·보완하였다. 위 과정을 토대로 수정한 프로그램을 가장 구현한 본 결과 노인인 대상자 특성, 문자로 방송한 유튜브 링크를 통해 동영상 교육을 시청하는 것에 어려움을 느낄 수 있어 이에 대한 안내를 심층사례에 포함하는 것으로 프로그램을 수정하였다. 동영상 시청 안내로 인해 프로그램 시간에 피로도를 느낄 수 있어 프로그램 시간은 10분 줄이는 것으로 재차 수정하였다. 또한 복약노트에 현재 복약중인 약물을 대상자가 기재할 때 다양한 어려움을 느낄 수 있어 처방전이나 약봉투를 붙여서 현재 복용중인 약물을 파악할 수 있도록 하였다.

(5) 평가
통합 복약관리 프로그램의 가장 구현 이후 수정 보완된 최종안에 대해 고혈압을 진단받은 노인 2인에게 의견을 수렴하였고, 간호대학 교수 1인, 노인복지관 간호사 1인, 약사 1인, 총 3인의 전문가에게 프로그램에 대해 최종 자문을 받은 이후 대상자에게 적용할 자료를 제작하였다.

2) 프로그램 적용
본 프로그램은 복약교육(대면, 동영상)과 개별상담 및 복약노트를 활용하여 주 1회, 총 3주간 진행되었다. 복약교육에 앞서 개별상담을 10분씩 진행하였으며, 이때 대상자의 복약과 관련한 상황과 어려움을 확인한 후 복약노트를 배부하여 활용할 수 있도록 지지하였다. 대면방식의 복약교육은 회당 30분간 시행하였으며, 다음 날 동일한 주제의 10분 길이의 동영상을 개별 참여자에게 문자로 전송한 후 전화상담을 진행하였다. 전화상담의 내용은 동영상 시청에 어려움이 없는지, 복약과 관련한 어려움이 없는지, 이전 학습 내용에 대한 상기 등이었다. 단 첫 주의 경우는 대면 개별상담을 진행하였기에 별도의 전화상담은 진행하지 않았으며, 동영상 시청에 어려움이 있는 경우 연구자에게 연락할 수 있도록 문자통신하였다.

5. 자료수집
본 연구의 자료수집 기간은 2022년 3월부터 4월까지 약 두 달간 시행되었으며 사전조사, 프로그램 적용, 사후조사 1차, 사후조사 2차 순으로 진행되었다. 본 프로그램을 시작하기 전에 사전조사로 일반적 사항(12문항), 의료진과의 의사소통 자신감(5문항), 고혈압 지식(18문항), 복약기능능(13문항), 고혈압 약물치료 이행도(8문항)의 총 56문항으로 구성된 설문지를 통해 시행하였다. 프로그램 중재는 3주간 적용하였으며, 종료 후에 사전조사 1차로 실험군 및 대조군 모두 사전조사에서 일반적 특성을 제외한 내용의 설문지를 동일하게 시행하였다. 효과의 지속성 확인을 위해 진행한 사후조사 2차는 대조군에서 탈락률이 낮을 것이라 예상되는 사후조사 1차가 종료된 2주 후에 측정하였으며 사전조사 1차와 동일한 방법으로 자료를 수집하였다. 연구자가 1:1 면담을 통해 설문지 작성과를 안내하였으며, 대면상담을 진행하였던 장소에서 실시하였다.

6. 자료 분석
수집된 자료는 IBM SPSS/WIN 22.0 프로그램(IBM Corp.)을 이용하여 통계분석을 시행하였다. 실험군과 대조군의 일반적 특성은 심수와 백분율, 평균과 표준편차로 산출하였으며 정규성 검정은 Shapiro-Wilk로 분석하였다. 실험군과 대조군의 종속변수에 대한 동질성 검증을 위해 정규성을 충족한 고혈압 지식은 Independent t-test, 정규성을 충족하지 않은 의료진과 의사소통 자신감, 복약기능능, 고혈압 약물치료 이행도는 Mann-Whitney U-test를 실시하였다. 실험군과 대조군의 종속변수에 대한 동질성 검증을 위해 정규성을 충족한 고혈압 지식은 Independent t-test, 정규성을 충족하지 않은 의료진과 의사소통 자신감, 복약기능능, 고혈압 약물치료 이행도는 Mann-Whitney U-test를 실시하였다.

7. 윤리적 고려
본 연구는 이화여자대학교 생명윤리위원회(IRB)의 승인(ewha-202301-0018-01)을 받은 후 시행되었다. 연구대상자에게 연구의 목적과 방법, 실험군과 대조군 배정에 대한 설명을 하고 동의서에 서명으로 동의를 받았다. 익명성 보장과 면담 내용은 연구목적 이외에 사용되지 않을 것을 설명하였고 연구 설명문에 대상자의 권리의 존중을 공식화하여 동의권자의 의사를 최대한 반영할 수 있도록 하였다. 대상자가 연구참여를 고려하여 동의서는 11-14포인트로 작성되었으며 시력 저하자에 인한 동의서를 확인하기 어려운 경우 돛보기를 준비하여 충분히 동의서 내용을 검토할 수 있도록 지원하였다. 또한 연구 과정 중 참여를 원하지 않을 경우에는 언제든지 불이익 없이 중단할 수 있도록 그에 대해서 설명하고 문의사항이 있을 경우 연락처를 알려주었다. 프로그램에 참여하지 않은 대조군에게는 실험군과 동일한 복약노트를 제공하고 3회의 교육을 시행하였다.
연구결과

1. 실험군과 대조군의 동질성 검사

본 연구에 참여한 실험군과 대조군은 성별, 연령, 최종학력, 혼인 상태, 평균 월수입, 복용 약물개수, 약물 처방 의사 수, 부작용 경험, 고혈압을 진단받은 기간에서 통계적으로 유의미한 차이가 나타나지 않아 실험군과 대조군의 일반적 특성에 대한 동질성이 검정되었다 (Table 2).

교육 전 실험군과 대조군은 고혈압 지식, 복약자기효능감, 의료진과의 의사소통 자신감에서 유의한 차이가 없이 동질하였으나 고혈압 약물치료 이행도에서는 집단 간에 통계적으로 유의한 차이가 확인되었다 (Z = -3.39, p ≤ .001) (Table 3).

2. 가설검정

1) 제1 가설

‘노인복지관 중심 통합 복약관리 프로그램에 참여한 실험군은 프로그램에 참여하지 않은 대조군에 비해 고혈압 지식 점수가 높을 것이다.’는 지지되었다.

일반화 추정방정식을 시행한 결과 실험군과 대조군 간 고혈압 지식 점수에 통계적으로 유의한 차이가 있었다 (χ² = 6.89, p = .009), 시간의 흐름에 따라 사전과 사후검사 1차, 2차에서도 고혈압 지식 점수의 유의한 차이가 있었다 (χ² = 26.43, p < .001). 세부적으로 살펴보면, 실험군의 고혈압 지식은 사전검사 23.37점에서 사후검사 1차에서 27.03점, 사후검사 2차에서 30.82점으로 점차적으로 증가하였으며 대조군은 사전검사

<table>
<thead>
<tr>
<th>Table 2. General Characteristics of Participants and Homogeneity Test Between Groups (N=57)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Characteristic</td>
</tr>
<tr>
<td>----------------</td>
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<tr>
<td>Sex</td>
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<td>Marital status*</td>
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<tr>
<td>Average monthly income (Korean won)*</td>
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<tr>
<td>Number of medications*</td>
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<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td>Number of doctors prescribing drugs*</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Experience of drug side effects</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Period of hypertension diagnosed (year)</td>
</tr>
</tbody>
</table>

Values are presented as n (%) or mean±standard deviation. *Fisher’s exact result; Cont.=Control group; Exp.=Experimental group.
24.14점에서 사후검사 1차에서 25.07점으로 증가한 후 사후검사 2차에서 24.17점으로 감소하였다(Table 4).

2) 제2 가설

'노인복지관 중심 통합 복약관리 프로그램에 참여한 실험군은 프로그램에 참여하지 않은 대조군에 비해 복약자기효능감 점수가 높을 것이다.'는 지지되었다.

복약자기효능감 점수는 실험군과 대조군 간 통계적으로 유의한 차이가 없었고(χ² = 2.93, p = .086), 시간의 흐름에 따라 사전검사와 사후검사 1차, 2차 측정에서도 통계적으로 유의한 차이가 없었다(χ² = 3.36, p = .067). 그로 인해 집단과 시점의 교호작용 결과 통계적으로 유의한 것으로 확인되어(χ² = 4.06, p = .044), 제2 가설은 지지되었다. 복약자기효능감 점수에 대해 세부적으로 살펴보면 실험군은 사전검사에서 23.37±4.27점, 사후검사 1차에서 27.03±4.73점, 사후검사 2차에서 30.82±4.48점으로 점차적으로 증가하였고, 대조군은 사전검사에서 24.14±5.10점, 사후검사 1차에서 25.07±4.53점, 사후검사 2차에서 24.17±5.61점으로 증가하였다(Table 4).

3) 제3 가설

'노인복지관 중심 통합 복약관리 프로그램에 참여한 실험군은 프로그램에 참여하지 않은 대조군에 비해 의료진과의 의사소통 자신감 점수가 높을 것이다.'는 기각되었다.

의료진과의 의사소통 자신감에 대한 사전 동질성 검사에서 통계적으로 유의한 차이가 없었고 (χ² = 2.01, p = .156), 실험군과 대조군간의 사후검사 1차, 2차를 통계적 검증에 사용하여 집단, 시점, 교호작용 모두 통계적으로 유의한 차이가 없었다(χ² = 2.77, p = .096) (Table 4).

4) 제4 가설

'노인복지관 중심 통합 복약관리 프로그램에 참여한 실험군은 프로그램에 참여하지 않은 대조군에 비해 고혈압 약물치료 이행도 점수가 높을 것이다.'는 기각되었다.

고혈압 약물치료 이행도는 사전검사에서 실험군과 대조군 간 통계적으로 유의한 차이가 없었고(χ² = 3.11, p = .078), 사후검사 1차, 2차를 통계적 검증에 사용하여 집단, 시점, 교호작용 모두 통계적으로 유의한 차이가 없었다(χ² = 2.05, p = .152). 실험군과 대조군간의 사후검사 1차, 2차를 통계적 검증에 사용하여 모두 통계적으로 유의한 차이가 없었다(χ² = 3.65, p = .056) (Table 4).

논의

본 연구는 고혈압 노인에게 노인복지관 중심 통합 복약관리 프로그램을 개발 후 적용하고 그 효과를 확인하고자 시도하였다. 프로그램은 복약교육(대면, 동영상)과 대면과 전화를 통한 개별상담 및 복약노트 활용으로 구성되었으며, 고혈압 지식, 복약자기효능감 및 의료진과의 의사소통 자신감을 증진하여 고혈압 약물치료 이행도를 높이고자 하였다. 개발된 프로그램의 효과를 통계적 방법을 이용하여 실험군과 대조군간의 사후검사 1차, 2차를 통계적 검증에 사용하여 집단, 시점, 교호작용 모두 통계적으로 유의한 차이가 없었다(χ² = 2.77, p = .096) (Table 4).

Table 3. Homogeneity Test of Dependent Variables Between Group (N=57)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Overall (n=57)</th>
<th>Exp. (n=29)</th>
<th>Cont. (n=28)</th>
<th>t/Z</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge of hypertension</td>
<td>23.75±4.67</td>
<td>23.37±4.27</td>
<td>24.14±5.10</td>
<td>-0.61</td>
<td>.543</td>
</tr>
<tr>
<td>Self-efficacy for appropriate medication</td>
<td>31.08±5.51</td>
<td>30.27±4.80</td>
<td>31.92±6.13</td>
<td>-0.32</td>
<td>.747</td>
</tr>
<tr>
<td>Confidence in communication with medical staff</td>
<td>15.50±3.10</td>
<td>11.86±3.11</td>
<td>13.17±3.00</td>
<td>-1.90</td>
<td>.057</td>
</tr>
<tr>
<td>Medication adherence</td>
<td>10.78±2.47</td>
<td>11.51±2.63</td>
<td>10.03±2.96</td>
<td>-3.39</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

Values are presented as mean±standard deviation. Cont.=Control group; Exp.=Experimental group.

Table 4. Effects of Medication Education on Dependent Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Knowledge of hypertension</th>
<th>Self-efficacy for appropriate medication</th>
<th>Confidence in communication with medical staff</th>
<th>Medication adherence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>23.37±4.27</td>
<td>30.27±4.80</td>
<td>11.86±3.11</td>
<td>3.28 (0.070)</td>
</tr>
<tr>
<td>Post-test 1</td>
<td>27.03±4.73</td>
<td>33.86±5.20</td>
<td>13.82±1.13</td>
<td>3.81 (0.072)</td>
</tr>
<tr>
<td>Post-test 2</td>
<td>30.82±4.48</td>
<td>34.86±3.97</td>
<td>13.89±2.09</td>
<td>3.81 (0.072)</td>
</tr>
<tr>
<td>Group*Time</td>
<td>6.89 (.009)</td>
<td>2.93 (.086)</td>
<td>3.28 (0.070)</td>
<td>3.11 (0.078)</td>
</tr>
<tr>
<td>Time</td>
<td>0.96 (.002)</td>
<td>3.36 (.067)</td>
<td>2.01 (.156)</td>
<td>2.05 (.152)</td>
</tr>
<tr>
<td>Group<em>Time</em>Control</td>
<td>26.43 (.&lt;.001)</td>
<td>4.06 (.044)</td>
<td>2.77 (.096)</td>
<td>3.65 (.056)</td>
</tr>
</tbody>
</table>

Values are presented as mean±standard deviation or χ² (p-value). Cont.=Control group; Exp.=Experimental group.
식과 복약자기효능감이 프로그램에 참여하지 않은 대조군보다 유의하게 향상된 것으로 나타났다. 이러한 연구결과를 토대로 통합 복약 관리 프로그램의 효과에 대해 논의하고자 한다.

연구결과 고혈압 지식 점수는 실험군과 대조군의 집단 간 유의한 차이가 있었으며 시간의 흐름에 따라 사전과 사후검사 1차, 2차에서 유의한 차이가 확인되었다. 또한 실험군과 대조군 간에 시간의 흐름에 따른 차이가 통계적으로 유의하였다. 실험군의 경우 사전검사, 사후검사 1차, 사후검사 2차 세 시점 모두 시간이 지남수록 점수가 유의하게 높아 교육의 효과가 지속되었음을 확인하였다. 이는 본진료소에 등록된 본태성 고혈압 대상자 120명을 대상으로 4회의 집단교육과 1회의 개별교육을 실시한 선행연구[26]에서 프로그램에 참여하지 않은 대조군과 비교했을 때 실험군의 고혈압 지식에 효과가 있었다는 결과와 일치한다. 또한 실험군의 경우 사전검사, 사후검사 1차, 사후검사 2차 세 시점 모두 시간이 지남수록 점수가 유의하게 높아 교육의 효과가 지속되었음을 확인하였다. 이는 보건진료소에 등록된 본태성 고혈압 대상자 120명을 대상으로 4회의 집단교육과 1회의 개별교육을 실시한 선행연구[26]에서 프로그램에 참여하지 않은 대조군과 비교했을 때 실험군의 고혈압 지식에 효과가 있었다는 결과와 일치한다.

복약자기효능감은 집단과 시점의 교호작용 결과 통계적으로 유의한 것으로 확인되었다. 본 프로그램에서 복약자기효능감 증진을 위해 실험군에서는 사전과 사후검사 1차, 2차에서 유의한 차이가 확인되었다. 또한 실험군의 경우 사전과 사후검사 1차, 2차 간에 사전과 사후검사 1차, 2차 간에 유의한 차이가 확인되었다. 실험군의 경우 사전과 사후검사 1차, 2차 간에 사전과 사후검사 1차, 2차 간에 유의한 차이가 확인되었다. 실험군의 경우 사전과 사후검사 1차, 2차 간에 사전과 사후검사 1차, 2차 간에 유의한 차이가 확인되었다. 실험군의 경우 사전과 사후검사 1차, 2차 간에 사전과 사후검사 1차, 2차 간에 유의한 차이가 확인되었다.

의료진과의 의사소통 자신감은 프로그램 증진을 통해 실험군의 사전조사, 사후조사 1차, 사후조사 2차에 집단적인 점수 증가가 있으면 통계적으로 유의하지 않았다. 지역사회에 거주하는 노인들을 대상으로 병원 방문 전 질문사항을 미리 작성할 수 있도록 하고, 복용 약물을 목록화하여 병원 내방 시 지참할 수 있도록 한 것이 의료진과의 의사소통 자신감 증진에 효과적이었다는 선행연구[10]와 같은 결과, 자기효능감자원을 활용하는 중재도 통계적으로 유의한 차이를 보였다고 한다.

결론 및 제언

본 연구는 지역사회에 거주하는 고혈압 노인을 대상으로 복약관리 프로그램을 개발하고 적용하여 노인들의 고혈압 지식, 복약자기효능감, 의료진과 의사소통, 고혈압 약물치료 이행도를 높이기 위한 중재로 만성질환을 동반하는 노인의 특성을 고려하여 다양한 요인을 함께 고려하는 것이 필요하였다.
향상시켰으나 통계적으로 유의하지는 않았다. 해당 결과를 통해 대면 및 동영상 복약교육과 개별상담, 복약노트를 활용을 통합한 복약 관리 프로그램이 노인복지관을 이용하는 지역사회 거주 노인들의 고혈압과 관련한 지식과 복약자기효능감을 증진하는 것에 기여할 수 있을 것으로 사료된다.

본 연구결과를 토대로 다음과 같이 제언하고자 한다.

첫째, 본 연구의 대상자는 일개 지역의 노인복지관을 이용하는 노인들을 편의표집을 하여 진행하였으므로 다수의 노인을 대상으로 무작위 추출 설계를 통한 반복 연구가 필요함을 제언한다.

둘째, 노인의 특성과 다양한 복약 이행요인을 고려한 중재 연구를 제언한다.

셋째, 노인복지관 간호사에 의한 약물관리 프로그램 효과를 검증하는 반복연구를 제언한다.

마지막으로 노인복지관 간호사들을 위한 약물관리 중재 지침의 개발을 제언하는 바이다.

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I would like to express my gratitude to Nurse Eun-Young Lee from Senior Welfare Center of Seoul and Su-Hwan Oh from Oz Pharmacy for their advice in the development of the integrated medication management program in this research as well as Madam Se-Jung Yoon and Madam Soon-Rye Choi for their active feedback.

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The role of nurses in shared decision-making about caring for older adults with chronic disease: A qualitative descriptive study

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Purpose: The objective of this study was to explore nurses’ perception of their roles in shared decision-making about caring for older adults with a chronic disease. Methods: This study was a qualitative descriptive study. Ten nurses participated in the focus group interviews. The collected data were analyzed using qualitative content analysis to explore nurses’ roles in shared decision-making about caring for older adults with a chronic disease. Results: Nurses’ shared decision-making experiences about caring for older adults with a chronic disease yielded four main themes and ten categories including ‘facilitating involvement in decision-making’, ‘providing information for decision-making’, ‘respecting patient values and preferences’, ‘evaluating the outcome of decision-making’. Conclusion: This study explored nurses’ roles in shared decision-making about caring for older adults with a chronic disease. Nurses can enhance the shared decision-making process by identifying the decision needs and facilitating decision-making.

Keywords: Decision making, Shared; Nurses; Aged; Chronic disease
근거를 제공하고, 환자가 의료진이 제공한 정보에 입각하여 자신의 가치와 선호도에 입각하여 자신의 가치와 선호도를 고려할 수 있도록 지원하는 접근법이다 [7]. 즉, 공유적 의사결정은 최선의 결정을 내리기 위해 의료진과 환자 간의 정보 교환 및 의사소통을 포함하는 협력 과정이다 [8]. 미국 의학연구소(Institute Of Medicine)에서는 21세기 의료서비스 질 향상의 여섯 가지 주요 목표 중 하나로 환자와 의료진의 공유적 의사 결정을 권장하였으며 [9], 세계보건기구(World Health Organization)는 진강과 관련된 의사결정에 대한 개인의 자율성을 보장할 목적으로 제계의 핵심지표로 강조하였다 [10]. 환자와 의사결정을 공유하는 것은 환자의 자율성을 보장하는 중요한 방법이며 개인의 기본적인 가치결정권을 실천하는 수단이다 [3,11].

치료과정에 환자가 적극적으로 참여하는 것은 자신의 건강 상태에 대한 인식을 높이게 하며 의료를 위한 책임감과 통제력을 높이고, 환자 본인의 선호도 및 가치와 일치하는 치료를 선택하는 데 도움이 된다 [12]. 치료과정에 환자가 적극적으로 참여하는 것은 환자의 자율성과, 의사결정의 정당성을 보장하는 중요한 방법이다 [13]. 치료과정에 환자가 적극적으로 참여하는 것은 환자의 자율성과, 의사결정의 정당성을 보장하는 중요한 방법이다 [14].

환자 참여는 건강상태와 더불어 만성질환과 관련된 만성병의 위험요소에 의한 예방 전략에도 긍정적인 영향을 미친다 [15]. 의료진과 환자 간의 공유된 의사결정 과정을 통해 환자의 선호도를 포함하여 목표를 설정하는 것은 만성질환을 위한 환자의 자기관리 이행도를 높일 수 있다 [12]. 의사결정을 공유하는 것은 치료에 대한 환자 중심성을 향상시키며, 환자 본인의 선호도 및 가치와 일치하는 치료를 선택하는 데 도움이 된다 [16].

만성질환의 웰빙과 합병증 발생에 취약한 노인은 건강과 관련된 의사결정에 있어서도 본인의 감정, 이전의 경험 및 가치에 더 많이 의존하는 경향이 있다 [5]. 노인에게 중요한 건강 결과는 기능적 상태, 독립성, 일상생활을 수행할 수 있도록 하는 것이며, 그러한 건강결과에 대한 인식을 높이는 것은 환자에게 더 적극적으로 참여할 수 있는 기회를 제공하게 한다 [17].

만성질환의 유병과 합병증 발생에 취약한 노인은 건강과 관련된 의사결정에 있어서도 본인의 감정, 이전의 경험 및 가치에 더 많이 의존하는 경향이 있다 [5]. 노인에게 중요한 건강 결과는 기능적 상태, 독립성, 일상생활을 수행할 수 있도록 하는 것이며, 그러한 건강결과에 대한 인식을 높이는 것은 환자에게 더 적극적으로 참여할 수 있는 기회를 제공하게 한다 [17].

따라서 노인환자의 개별적 선호도와 요구, 가치에 부합하는 인간 중심 돌봄을 제공하기 위해서는 공유적 의사결정이 이루어져야 하며, 공유적 의사결정 과정에 있어 간호사의 역할도 파악하여야 할 필요가 있다 [18]. 하지만 국내에서는 공유적 의사결정 과정에서 간호사의 역할에 대한 연구가 이루어져 본 연구에서는 연명치료 [17,18], 암환자 [9,14,15], 류마티스관절염 환자 [19] 등 특정 상황에 서 간호사의 공유적 의사결정 역할에 대한 연구가 이루어졌다. 기존 연구를 종합해 볼 때, 만성질환 환자들의 공유적 의사결정을 어떻게 경험하고 있으며 어떤 역할을 수행하고 있는지에 대한 연구는 부족한 실정이다.

이에 따라 공유적 의사결정에 있어 만성질환 환자를 돌보는 간호사의 역할을 정확히 이해할 필요가 있으며 이를 위해서는 원기능 전반에서 의 경험을 기술하고 그 현상을 규명할 수 있는 질적 연구방법이 적합하다. 초점집단면접(focus group interview, FGI)은 참여자들의 상호작용을 활용하여 비교적 짧은 시간 동안 여러 참가자의 생각과 경험을 파악할 수 있는 집단면접 방법으로 [20] 참가자 및, 상황에 대한 깊이 있는 전후 맥락적 이해를 바탕으로 공유적 의사결정에서 간호사의 역할 경험을 도출하는 데 유용한 질적 연구방법이다. 이에 본 연구에서는 FGI를 통해 만성질환 환자를 돌보는 간호사가 경험한 공유적 의사결정 과정에서의 간호사의 역할에 대한 인식을 파악함으로써, 만성질환 환자간호에 있어 공유적 의사결정을 효과적으로 추진하고 교육할 수 있는 기초자료로 제시하고자 한다.

2. 연구목적

본 연구의 목적은 간호사를 대상으로 만성질환 노인의 간호와 관련된 공유적 의사결정에 있어 간호사의 역할에 대한 인식을 파악하는 데 있다.

研究방법

Ethic statement: This study was approved by the Institutional Review Board (IRB) of Chungnam National University (IRB No. 202007-SB-094-01). Informed consent was obtained from the participants.

1. 연구설계

본 연구는 만성질환 노인을 돌보는 간호사를 대상으로 공유적 의사결정 과정에서 환자와 간호사의 역할을 탐색하기 위해 FGI를 시행하고 수집된 면담 내용을 분석하는 질적 서술적 연구(qualitative descriptive study)이다.
연구참여자

본 연구참여자는 종합병원 및 병원에서 근무하며 임상경력이 1년 이상인 간호사로 만성질환 노인을 간호할 경험이 있는 자를 대상으로 목적이 편의추출(purposeful sampling)하였다. 대전광역시 상급종합병원 및 종합병원에서 근무하는 간호사 중 본 연구의 목적과 방법을 이해하고 만성질환 노인을 돌볼 경험이 있으며 공유적 의사 결정에 대해 진솔하고 풍부한 이야기를 해줄 수 있는 자를 녹색가글러기 방법(snowball sampling)을 사용하여 10명을 모집하였다.

자료수집

본 연구의 자료수집은 2022년 10월 31일부터 11월 30일까지 시행되었으며 연구참여자의 경험을 자유롭게 이야기할 수 있도록 반구조화된 질문을 사용하여 FGİ를 진행하였다. 동질성 확보과 분할 전략에 따라 집단의 동질성을 유지하면서 각 집단의 차이를 통해 서로 다른 시각과 견해를 얻을 수 있도록 상급종합병원 4명, 종합병원 6명으로 2그룹으로 구성하였다. 집단의 크기는 실용적, 현실적 측면을 고려할 때, 경험적으로 6~10명 정도가 적당한 것으로 알려져 있고, 이를 고려하였다. 연구참여자의 일반적인 정보로 나이, 성별, 결혼 유무, 교육정도, 근무부서, 근무병원의 병상 수, 총 임상경력, 현재 부서에서의 임상경력에 대한 정보를 확인하였다. 면담 시간은 회당 90~120분간 진행되었다. 연구참여자의 동의하에 면담 내용을 녹음하고 면담 직후 필사를 시행하였다. 공유적 의사결정에 대한 용어가 익숙치 않은 개념이므로 참여자 모집 시 공유적 의사결정에 대한 이해정도를 확인하고 해당 용어의 정의와 임상에서의 사례에 대해 면담을 진행하였다. 두 그룹의 면담 내용을 취합하여 녹취된 내용과 필사본을 확인하는 과정에서 부족한 점은 개별 연락을 통해 비대면 면담을 진행하였다.

자료분석


첫 번째 준비과정에서 연구진들은 각자 기록한 메모 내용을 서로 비교하여 면담에서 나타난 주요 주제 내용을 검토하였다. 연구진들은 녹음된 면담 내용을 반복적으로 들고 질문에 서술적 자료를 반복하여 입으면서 전체적인 내용과 맥락을 파악하고 분석단위를 결정하였다. 두 번째 조직과 과정에서 연구진들은 개별 코딩, 병주 형성, 상위화의 3단계를 수행하였다. 개별 코딩 단계는 연구진 각각이 개별 연구자로서 면담 내용을 반복적으로 듣고 연구참여자에 대한 내용을 수집하였다. 세 번째보고단계에서는 모든 연구진의 의견을 종합하여 도출된 핵심 주제를 보고하였다.

연구의 엄밀성

연구의 엄격성과 진실성 확보는 Lincoln와 Guba [23]가 제시한 신뢰성(credibility), 적용 가능성(applicability), 일관성(consistency), 중립성(neutrality)에 근거하였다. 첫째, 신뢰성을 확보하기 위해 연구장과 면담 내용의 전체를 필사하였으며, 녹음된 내용을 반복적으로 들고 누락된 자료가 있는지 확인하였다. 둘째, 적용 가능성을 확보하기 위해 만성질환 노인을 돌보면서 경험한 공유적 의사결정에 대해 풍부한 사례를 말해줄 수 있는 자를 목적으로 표집하였으며, 참여자 2명에게 연구결과를 공유하며 주제를 확인하고 공감할 수 있는지 확인하였다. 셋째, 일관성을 확보하기 위해 수집된 자료를 분석할 때 연구진들 간 수치 토론과 집단과정을 거쳐 일관된 결과를 도출하였다. 연구진들은 연구의 전 과정 동안 연구의 주 질문을 지속적으로 생각하면서 자료수집과 분석이 이루어지도록 하였으며, 자료분석 과정에서 집적 연구의 경험이 있는 3인의 간호
학 교수에게 개념과 범주에 대한 피드백을 받는 과정을 거침으로써 자료분석의 일관성을 확보하고자 하였다. 넷째, 중립성을 확보하기 위해 면담 중 참여자의 이야기에 관여하거나 의도적으로 상황을 이끄지 않았다. 또한 자료 분석 중 원자료와 지속적인 비교를 통해 연구자의 편견과 가정을 의식적으로 배제하고 연구참여자가 진술한 내용으로만 분석하려 노력하였다.

6. 윤리적 고려

본 연구는 충남대학교 생명윤리위원회로부터 연구윤리를 검토와 승인받았으며(IRB No: 202007-SB-094-01), 한국연구재단의 지원을 받아 수행되었다. 연구참여자에게 연구목적과 절차, 연구방법 및 면담 내용이 녹취될 것임을 설명하고 연구에 자발적으로 참여할 원하는 자에 한해서 동의서를 받은 뒤 면담을 진행하였다. 면담은 90~120분 정도 소요될 것이며 면담 시 수집한 자료는 연구목적 이외에 다른 목적으로 사용되지 않을 것임을 연구참여자에게 설명하였다. 연구참여에 따른 이익과 위험은 없을 것으로 예상되고, 연구참여 중 연구참여자가 원하지 않으면 언제든지 연구참여를 중단할 수 있으며 이때 수집한 자료는 모두 폐기될 것임을 설명하였다. 연구를 위해 수집한 개인정보는 개인정보보호법에 따라 관리할 것이며, 연구에서 얻어진 개인정보가 학회지나 학회에 공개될 수 있으나 참여자의 식별이 불가능하도록 고유번호를 부여할 것이다.

7. 연구자 준비

본 연구를 위해 연구자는 대학원 박사과정에서 질적 연구방법론을 수강하였다. 평소 만성질환 노인을 돌보는 간호사와 관련된 국내외 문헌을 폭넓게 고찰하고 숙독하였다. 또한 질적연구 관련한 워크숍에 참여하였으며, FGI 과정에 참여하여 면담내용 분석과 범주를 추출하는 방법을 숙지하였다.

## 연구결과

### 1. 연구참여자의 일반적 특성

<table>
<thead>
<tr>
<th>Group</th>
<th>No.</th>
<th>Age (year)</th>
<th>Sex</th>
<th>Marital status</th>
<th>Education level</th>
<th>Current department</th>
<th>Size of the hospital</th>
<th>Total clinical experience (year)</th>
<th>Current department experience (year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FG 1</td>
<td>1</td>
<td>26</td>
<td>F</td>
<td>Unmarried</td>
<td>University</td>
<td>General</td>
<td>General</td>
<td>3.6</td>
<td>3.6</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>33</td>
<td>F</td>
<td>Married</td>
<td>University</td>
<td>General</td>
<td>General</td>
<td>10.0</td>
<td>5.0</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>36</td>
<td>F</td>
<td>Unmarried</td>
<td>University</td>
<td>Comprehensive</td>
<td>General</td>
<td>14.6</td>
<td>2.2</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>39</td>
<td>F</td>
<td>Married</td>
<td>University</td>
<td>Comprehensive</td>
<td>General</td>
<td>13.9</td>
<td>3.9</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>31</td>
<td>F</td>
<td>Married</td>
<td>University</td>
<td>Comprehensive</td>
<td>General</td>
<td>9.6</td>
<td>2.1</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>34</td>
<td>F</td>
<td>Married</td>
<td>Master</td>
<td>General</td>
<td>General</td>
<td>10.0</td>
<td>3.0</td>
</tr>
<tr>
<td>FG 2</td>
<td>7</td>
<td>31</td>
<td>F</td>
<td>Married</td>
<td>Master</td>
<td>General</td>
<td>General</td>
<td>9.8</td>
<td>9.8</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>27</td>
<td>F</td>
<td>Married</td>
<td>University</td>
<td>General</td>
<td>General</td>
<td>4.0</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>26</td>
<td>M</td>
<td>Unmarried</td>
<td>University</td>
<td>General</td>
<td>General</td>
<td>2.9</td>
<td>2.9</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>27</td>
<td>F</td>
<td>Unmarried</td>
<td>University</td>
<td>General</td>
<td>General</td>
<td>4.8</td>
<td>4.8</td>
</tr>
</tbody>
</table>

F=Female; FG=Focus group; M=Male.

Table 1. General Characteristics (N=10)

https://doi.org/10.17079/jkgn.2023.00087
존중', '의사결정의 결과 평가'이다.

1) 주제 1. 의사결정 참여 촉진

만성질환 노인을 돌보는 간호사의 공유적 의사결정 역할은 노인환자와의 의사결정 참여 여부를 확인하는 것이었다. 공유적 의사결정에 간호대상자를 참여시키는 것은 환자의 자기결정권을 존중하는 것을 의미한다. 간호사는 노인환자에게 의사결정이 필요하다는 것을 알리고, 노인환자의 의사결정 참여 의지를 확인하였다. 간호사는 이 과정에서 의사결정과노인환자뿐만 아니라 가족과 의료진 등 다양한 주체들이 함께함을 경험하였다. 이에 대한 범주는 '환자의 의사결정에 대한 참여의지 확인'과 '의사결정의 주체와 의사결정 능력 확인', '협력적 문화 조성'이 포함된다.

(1) 환자의 의사결정에 대한 참여의지 확인

간호사는 노인환자와 가족에게 의사결정 참여에 대한 의지를 물음으로써 의사결정 과정이 시작될 수 있도록 도와주는 역할을 담당하였다. 진단받은 만성질환에 대한 정보가 많은 노인환자와 가족은 의사결정 과정에도 적극 참여하고 싶어 하는 것에 반해 만성질환에 대한 정보가 부족한 노인환자와 가족은 의사결정에 참여하기를 주저하거나 의사결정 관련 결정을 내려주지 않으려 했다.

85세 이상이고 진단받은 질환이 많은 환자가 입원하면 간호정보조사를 하면서 환자와 가족에게 의사를 물어보는 것이 필요하다. (중간 생략) 진단받은 만성질환 관리에 대한 결정이 필요할 때 환자와 가족들이 진단받은 만성질환에 대해 이미 정보를 가지고 있고 관심이 많으면 의사결정에 적극적으로 참여하고 싶어 하시려라고. (A1)

만성질환 환자가 진행되어 호스피스 치료가 필요한 환자였을 때 그 해 환자와 보호자가 어디까지 치료를 하실 것인지 생각해 보는지 여쭈어 보았어. (중간 생략) 환자와 보호자가 입상에서의 (질병에 대한) 전문적인 지식도 부족하고 처음 겪는 상황에 대한 결과에 대한 결론이라 의사가 모든 걸 알아서 결정해주길 원하시는 분도 있어요. (A5)

(2) 의사결정의 주체와 의사결정 능력 확인

간호사는 해당 의사결정에 참여하는 대상이 누구인지 확인하고, 참여가 필요한 대상에게 이를 알리는 역할을 담당하였다. 노인환자를 돌보는 주된 역할을 하고 있는 가족은 노인환자의 건강관련 의사결정에 있어서도 중요한 결정권자가 되거나 의료진이 주도적으로 의사결정을 내리는 경우 간호사는 노인환자의 참여주체로서의 역할을 상기시켰다. 또한 노인환자가 질병으로 인한 기능저하나 의사소통 능력 제한으로 인해 가족 또는 의료진이 의사결정을 내리는 것을 경험한 간호사는 노인의 의사결정 능력을 다시 평가하고 이를 제고하도록 촉진하는 역할을 담당하였다.

환자분이 고령이시따 보면 보통 자식들이 경제권을 가지고 있어 환자의 의사결정에 있어 아무래도 가족의 의견이 가장 큰 것 같아요. 환자분들의 가족이 하지만 대로만 하세요. (중간 생략) 가족이 여러 명일 때는 가족들에게 누가 의사결정을 내리는 주보호자인지 확인하고 주보호자가 의사결정을 내릴 것인지 가족이 함께 내릴 것인지 여두고 환자의 의견을 수렴의도 필요함을 말하셨어요. (A9)

임원 초기부터 환자와 가족이 DNR (Do not resuscitate, 심폐소생술 금지)를 희망한 상황이었는데 무조건 의사가 ICU (intensive care unit, 집중치료실)로 가라고 하니 환자와 아드님도 아무말도 못했어요. 의사가 가라고 하니 가는 상황이었고, 아드님도 아무말도 못하고 의사가 가라고 한다니 그냥 따라가 한다는 말을 하시더라구요. 아드님께 DNR의 범위와 환자의 필요에 대한 의사를 다시 한 번 확인하고 아드님에게 전달했어요. (A5)

(3) 협력적 문화 조성

간호사, 환자와 가족을 의사결정에 적극적으로 참여시키는 협력적

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인 문화를 조성해야 공유적 의사결정이 촉진된다고 하였다. 노인환자와 가족의 참여에 대한 의료진의 선입견과 편견을 극복하여 공감과 이해를 바탕으로 의사결정에 참여하는 것이 중요함을 경험하였다.

공유적 의사결정이라는 단어 자체가 간호사한테 부담스러운 것 같아요. (중간 생략) 하지만 간호사가 공유적 의사결정이 간호사에게도 필요한 거지만 환자도 필요한 거고, 내가 만약 환자라면 의사결정에 참여하기를 원하지 않았을까 하는 마음과 공유적 의사결정에서 오는 긍정적 영향을 의료진들이 다함께 인지해 놓는 것이 중요하다. (A6)

환자가 모든 걸 알고 있어야 한다는 편견이나 인식 개선이 필요할 것 같아요. 이 정도는 말 안 해도 알겠지만 식으로 대충 설명하고 진행하지만 환자와 가족은 의료로 모르는 게 많으니까 그런 선입견, 편견 같은 걸 바꿀 필요도 있지 않나 싶어요. (A9)

2) 주제 2. 의사결정을 위한 정보 제공

간호사는 노인환자와 가족이 의사결정을 할 수 있도록 정보를 제공하는 역할을 담당하고 있었다. 간호사는 노인환자와 가족이 의사 결정을 할 수 있도록 충분한 정보를 제공하고 설명을 하여 노인환자와 가족의 알 권리를 보장하였다. 또한 간호사는 노인환자와 가족이 가지고 있는 정보를 평가하였으며, 과학적 근거를 바탕으로 의사결정을 할 수 있도록 관련 정보를 제공하여 의료진들이 고려해야 할 정보를 제공하는 범주로 '환자와 가족이 가진 정보의 정확성 확인', '합리적 의사결정을 돕는 정보 제공'이 포함된다.

(1) 환자와 가족이 가진 정보의 정확성 확인

간호사는 노인환자와 가족이 어떠한 경로를 통해 질환에 대한 정보를 얻는지 확인하였다. 노인환자와 가족이 의료진이 정보를 제공하지 않아도 다양한 매체를 통해 사전에 지식을 얻어 의사결정을 내리기도 하는 것과 가지고 있는 정보가 틀리지 않아 의사결정이 잘못 내려지지 않게 해야 할 수 있는 범위로 제공하여 노인환자와 가족이 의사결정의 정확성 확인, '합리적 의사결정을 돕는 정보 제공'이 포함된다.

최근에는 매체가 다양하게 환자와 보호자분들이 CPR (cardiopulmonary resuscitation, 심폐소생술)이란 ICU가 되기로 하자라고도 많이 알고 계시다고 보시죠. 우산은 고별인 환자가 입원해서 큰 수술을 받게 될 경우에는 사전에 동의서 받으셔서 그런 것들(사전명의결) 벌이까지도 확정을 받고 동의를 구하시다 보니 보호자분들도 어느 정도 마음의 준비를 먼저 하고 오시는 분들도 많았어요. (A3)

요즘은 인터넷에서 많이 발달ミニ한 정보가 많아요. 근데 잘못된 정보를 가지고 ‘이렇게 치료하는 게 맞나?’라고 하고, 또 병원마다 치료 방법이 다르니까요. 그러나 왜 다른 병원은 이렇게 뭔데 이 병원은 왜 다른 방법을 하나라고 비교하면서 결정하는 데 있어 지역이 발생하기도 해요. 그러면 어디서 확인한 정보인지 등을 여두워 보고 병원의 안내서 등을 제공하기도 해요. (A10)

(2) 합리적 의사결정을 돕는 정보 제공

간호사는 자신의 경험을 바탕으로 비슷한 상황에 있는 다른 노인환자들이 어떻게 선택을 내렸는지에 대한 정보를 노인환자와 가족에게 제공하였다. 또한 선택자의 장단점을 함께 설명하여 노인환자와 가족이 최적의 선택을 할 수 있도록 도왔다. 노인환자와 가족이 가진 정보가 잘못된 경우 간호사는 정확히 선별하고 신뢰할 수 있는 정보를 대체할 수 있도록 도와 결정을 합리적으로 이루어질 수 있도록 지원하였다.

저희 링에서도 선별하는 경우(환자와 같은 상황에 놓인) 다른 분들은 어떤 결과를 봤는지 궁금해 하시는 거요. 그러면 제가 경험했던 환자들에 대해 말씀드리는 편이에요. (A11)

보통 복부목관을 갖고 되돌아가는 분들이 소독법, 관리 방법을 모르시기 때문에 어려움이 많이 발생하죠. 가끔 환자분께서 인터넷에서 찾아 잘못된 정보(한약 패치를 붙이면 복부목관이 좋아진다)를 말씀해주시면, 잘못된 정보를 해주고 잘못된 의료지식을 고쳐주는 그런 의료상담을 했어요. (A9)

3) 주제 3. 환자의 가치 및 선호도 존중

간호사는 노인환자의 가치 및 선호도를 확인하고 이를 가족 및 의료진과 공유하였다. 노인환자와 가족의 가치와 선호도를 반영한 의사결정이 내려지도록 서로 논의할 시간을 가지도록 권유하였으며, 의사결정을 조율할 수 있는 환경을 조성하였다. 또한 노인환자의 가치관에 근거한 개인의 요구를 존중하고 이를 노인환자의 입장에서 이해하며 노력하였다. 관련 범주로 '의사결정을 위한 심사숙고의 시간 제공', '의사결정의 조정과 중재', '환자의 가치와 선호도 이해'가 포함되었다.

(1) 의사결정을 위한 심사숙고의 시간 제공

간호사는 노인환자와 가족이 직접한 의사결정에 대해 제출하지 않고 충분히 상의할 수 있도록 시간을 제공하였다. 간호사는 노인환자와 가족이 의사결정 상황을 이해하고 노인환자의 가치와 선호도를 확인하는 데 시간이 필요할 때 이해하였다고 하여, 노인환자와 가족이 정급하게 결정을 내리지 않고 주어진 시간 동안 자신의 가치와 선택지를 비교해 보도록 지원하였다.

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Myonghwa Park, et al.
(노인환자와 가족이 선택할 수 있는 선택지의) 장단점을 제공하고 다른 환자가 어려워한 부분에 대해 알려드리고 최종 선택은 환자분과 보호자분이 상의하게 하실 수 있도록 충분한 시간을 드리는 편이 좋습니다. 시간을 들이면 환자분과 보호자분이 이것저것 이야기를 나누며 결정을 하시서 저희(의료진)에게 전달해주셔요. (A3)

환자분은 치료받고 싶어 하는데 보호자분들이 안 한다고 하는 경우도 있지만, 이런 경우는 더욱 상담에 소요할 수 있는 시간을 드리고 의견을 듣시고 싶으시면 저희의 편이에요. 시간을 드리면 환자분과 보호자분이 이것저것 이야기를 나누며 결정을 하셔서 저희(의료진)에게 전달해주세요. (A2)

(2) 의사결정의 조정과 중재

노인환자는 간호사와 단둘이 있을 때 가족에게 하지 않았던 속마음을 말하기도 하고 간호사는 노인환자가 원하는 방향으로 결정할 수 있도록 도왔다. 간호사는 노인환자의 의견을 가족에게 전달하거나 노인환자와 가족의 의견이 상충할 경우 양쪽의 의견을 듣고 합의점을 제시하였다. 또한 의사와 노인환자, 가족의 의견을 조율하고 환자에게 최선의 이익이 되는 방향으로 의사결정을 조정하는 중재자 역할을 담당하였다.

환자와 단둘이 얘기할 기회가 생겼을 때 일단 환자분이 원하는 것이 무엇인지 경청을 해주고자 했어요. 환자분이 원하는 것이 무엇인지 경청을 해주고자 했어요. 그래서 그게 무엇인지 경청을 해주고자 했어요. 그러니 환자와 가족의 의견이 상충할 경우 양쪽의 의견을 듣고 합의점을 제시하였다. 또한 의사와 노인환자, 가족의 의견을 조율하고 환자에게 최선의 이익이 되는 방향으로 의사결정을 조정하는 중재자 역할을 담당하였다. (A2)

환자 얘기요를 먼저 들어보이고 보호자한테 전달을 하죠. 환자분은 이렇게 생각하시는는데 보호자분들은 어쩌면 이런 행동을 하지도 못한데 환자분들이 이런 행동을 하지도 못한데 환자분들이 이런 행동을 하지도 못한데 해드리려고 해요. (중간 생각) 일단은 환자의 입장부터 생각을 하고 환자에 대한 결정이 되도록 하고 있어요. (A2)

환자 얘기요를 먼저 들어보이고 보호자한테 전달을 하죠. 환자분은 이렇게 생각하시는는데 보호자분들은 어쩌면 이런 행동을 하지도 못한데 환자분들이 이런 행동을 하지도 못한데 해드리려고 해요. (중간 생각) 일단은 환자의 입장부터 생각을 하고 환자에 대한 결정이 되도록 하고 있어요. (A2)

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(3) 환자의 가치와 선호도 이해

간호사는 노인환자의 삶의 목표와 가치관에 귀를 기울이고 이를 바탕으로 노인환자의 의사결정의 방향을 이해하여 노력하였다. 간호사는 노인환자가 다른 영향력에는 달리 삶의 경험을 다르면, 노인환자의 건강 상태를 유도하고 결정하기 위해서는 개별적인 접근과 배려가 필요한 것을 경험하였다. 간호사는 환자가 질병과정에서 원하는 것을 말하게 하고 삶의 가치관과 치료방법의 균형을 이루는 과정을 함께 하였다.

환자와 단둘이 얘기할 기회가 생겼을 때 일단 환자분이 원하는 것이 무엇인지 경청을 해주고자 했어요. 환자분이 원하는 것이 무엇인지 경청을 해주고자 했어요. 그래서 그게 무엇인지 경청을 해주고자 했어요. (중간 생각) 일단은 환자의 입장부터 생각을 하고 환자에 대한 결정이 되도록 하고 있어요. (A2)

계속 투석이나 치료를 거부하락가 결육 복부투석을 하지 않고 따로 혈액투사를 할 것이라고 하셨어요. 그러면 왜 자꾸 진료 거부시나고 하니까 ‘가장이 아깝다 싶으니 말이 해야 할 수밖에 없기 때문에 두석을 하면 안을 못하니까 거부했다’라고 해서 ‘그 사람의 가장 최우선의 가치가 자신의 건강보다는 가족을 상당히 하기 때문에 우선적이었다’는 걸 이해할 수 있었어요. (A10)

노인환자는 삶의 경험이 다양해서 다른 연령대의 환자와는 다르게 행동할 수 있다. 간호사가 환자와 보호자와 라로 협상 과정을 통해 노인환자와 보호자와 의사소통을 하는 데 좋은 영향을 주는 것 같아요. (A6)

간호사가 제공하는 정보를 믿게 하는 것은 환자와 간호사의 관계 속에서 나오는 것 같아요. 신뢰가 있다면 더 잘 지내고 믿음이 더 가고 그런 것은 관계 속에서 나오지 않나 싶어요. (A5)

4) 주제 4. 의사결정의 결과 평가

간호사는 의료진이 제공한 선택지에 노인환자와 보호자의 가치관이 부합할 의견이 결정되고 의사결정 내용에 만족하는지, 결정한 의결에 변화가 있는지 확인하였다. 또한 의결결정은 언제든 다시 할 수 있었음을 설명하고 노인환자와 가족의 의결결정에 대한 역할과 범위를 확인시켰다. 이에 대한 범주는 ‘의결결정의 만족도 확인’, ‘환자의 의결결정 변화 수용’이 포함된다.

(1) 의사결정의 만족도 확인

노인환자와 가족, 의료진이 함께 노인환자의 건강관련 의사결정을 내려 후 간호사는 선택에 대해 어떻게 생각하는지 만족하는지를 확인하였다. 간호사는 노인환자와 가족의 의결결정을 지속적으로 지원하고 의사결정 후 환자와 가족이 해야 할 역할에 대해 알려주었다.

보호자와 의사(의료진)가 신체적상태를 향상시키는 데에 대해 결정하고, 할 수 있는 것을 가족에게 알도록 해주었다. 그러니 간호사가 환자에게 만족도를 제공하는 데에 대해 설명하였다.
시 논의했어요. (A5)

환자에 대해 다 같이 결정했음에도 불구하고 '상태의 변동사항이나 추가적으로 추후 궁금한 것이 있으면 언제든지 말씀해주세요'라고 해요. (A5)

당뇨 환자가 당뇨조절이 되어서 퇴원결정이 나서 재가에서 관리할 수 있다고 해서 인슐린 투약을 자가교육하는데 환자가 고령이 보니까 스스로 하기 어렵다고 하거나 미숙한 부분을 저희(의료진) 쪽에서 보호자도 집에서는 힘들 것 같다고 할 때 다시 상의하여 서(환원을 미루고) 입원을 더 하는 경우도 있었어요. (A4)

(2) 환자의 의사결정 변화 수용
간호사는 노인환자와 가족의 의사결정에 변화가 없는지 확인했다. 노인환자와 가족의 의사에 변화가 생기면 이에 대해 알리는 것을 주저하지 않도록 안심시켰다. 다른 선택지에 대해 노인환자와 가족의 의견을 함께 다시 논의하여 새로운 결정을 다시 할 수 있음을 알렸다.

수술 날짜가 막상 다가오면 (환자와 보호자가) 고민을 하는 경우도 많았어요. 수술하기로 모두(환자, 보호자, 의사, 간호사)가 결정했는데 환자와 보호자가 고민하고 수술을 만다고 해서 수술 이외의 치료 방법에 대해 다시 의논했던 적이 있었어요. (A5)

DNR 결정할 때 그런 경우가 많은 것 같아요. 가족끼리 상의한 후 DNR 서명 후에도 (결정에 대한) 변동사항이나 승인하여 인투베이션, CPR 등 처치에 대해서 의견이 변하면 언제든지 말해달라고 해요. (A5)

논의

본 연구는 만성질환 노인을 돌보는 간호사의 공유적 의사결정에서의 역할에 대한 인식을 파악하기 위해 시도되었다. 만성질환 노인을 돌보는 간호사의 분야적 의사결정에 대한 역할은 의료결정 참여 촉진, 의사결정을 위한 정보 제공, 환자의 가치 및 신호도 존중, 의사결정의 결과 평가의 4가지 주제로 확인되었다. 간호사는 환자와 가족의 의사결정에 참여하고, 이를 통해 환자의 가치와 선호도에 근거한 의사결정을 할 수 있도록 돕는 역할을 하고 있다. 또한, 환자와 가족의 의사결정을 위한 정보 제공과 의사결정 결과 평가의 2가지 주제에서의 역할을 파악하였다. 본 연구에서 확인된 결과는 간호사의 역할을 통해 환자의 원하는 건강상태와 목표가 명확하지 않을 수 있고, 환자와 가족의 의견이 통합되지 못할 때도 있고, 환자와 가족의 의사결정이 혼란스러울 때도 있다는 도출되었다. 본 연구는 간호사의 역할에 대한 인식을 높이고, 환자와 가족의 의견을 중시하고, 환자의 가치와 선호도에 근거한 의사결정을 지원하는 데 도움이 될 것으로 기대된다.
에게 자세한 설명을 하고 다양한 질문에 답해야 하므로 의사결정과 관련된 전문지식을 가지고 정보를 전달해야 한다고 하였다. 간호사는 노인환자와 가족에게 간호사의 이전 경험과 더불어 노인환자와 가족이 선호할 수 있는 선택지의 장단점을 설명하여 환자와 가족의 현재 상황에서 최선의 선택을 할 수 있도록 정확한 정보를 제공할 필요가 있다. 환자에 대해서는 개별화된 치료를 계획하고 제공하고 질병과 관련된 정보를 알려주는 것은 간호사의 대상자에 대한 전문적 올리 의무에도 해당된다[5].

세 번째 주제인 환자의 가치 및 선호도 존중에서는 '의사결정을 위한 심사숙고의 시간 제공', '의사결정의 조정과 중재', '환자의 가치와 선호도 이해'의 3가지 범주가 도출되었다. 환자가 의사결정에 있어 시간적 압박을 경험하면 자신의 가치를 고려한 선택지를 생각할 시간을 충분히 가지지 못할 수 있으며, 가족과 필요한 의사소통을 하지 못해 자신의 선택지를 정확하게 전달하지 못할 수 있다. 따라서 간호사는 노인환자와 가족에게 주어진 선택지를 알리고 이에 대해 가치 및 선호도를 바탕으로 결정을 내릴 수 있도록 인내심을 가지고 충분한 시간을 제공해야 한다. 공유적 의사결정을 지원하는 도구가 입원환자의 건강결과에 미치는 영향을 조사한 Dobler 등[26]의 연구에서는 환자와 가족의 요구사항을 논의하고 의료인 간 정보 전달을 하는데 있어 시간 부족이 공유적 의사결정 과정에 부정적 영향을 미쳤다. 공유적 의사결정에서 환자의 역할을 양지치기 위해 암환자 또는 만성질환자와 의료인을 대상으로 면담을 시행한 Keij 등[27]의 연구에서도 환자는 잠재적으로 생명을 위협하는 영향을 좀 더 체계적으로 환자간호간호 현장에 적용되어야 할 것이다. 하지만 본 연구에서 참여한 간호사는 일부 지역의 종합병원 및 병원에 근무하며 병원 환경에 있는 만성질환 노인을 돌보는 과정에서 경험한 공유적 의사결정을 10명의 간호사를 대상으로 탐색한 것으로 요양병원이나 지역사회 환경에서의 간호사의 역할을 확인하는 데는 한계가 있다. 추후연구에서 대상자의 수와 활동환경을 더 확대하여 연구할 필요가 있다.

네 번째 주제인 의사결정의 결과 평가에서는 '의사결정의 만족도 확인', '환자의 의사결정 변화 수용'의 2가지 범주가 도출되었다. 간호사는 노인환자와 가족이 의사결정을 내린 후 결과에 대한 의견을 확인하였고, 후속 상담을 계획하였다. 간호사는 공유적 의사결정의 결과에 대한 노인환자와 가족의 만족 여부를 확인하고, 필요한 조치를 취함으로써 노인환자와 가족이 스스로 결정을 재고할 수 있도록 인지시켜야 한다. 이를 통해 간호사는 결정으로 인해 최선의 결과를 얻을 수 있도록 노인환자와 가족을 지원하며, 의사결정의 평가를 지속적으로 평가하고 개선하는 데 참여할 수 있다. 간호사가 의사결정의 결과를 확인하고 상호관리를 하는 것은 의사결정의 평가를 유지하고 개선하기 위한 필수적인 단계이다[28].


결론 및 제언

본 연구는 만성질환 노인을 돌보는 간호사의 진술을 바탕으로 공유적 의사결정 과정에서의 의사결정의 역할을 탐색하기 위해 FGI를 시행하였다. 10명의 간호사의 면담 내용을 분석한 결과, 의사결정 참여, 의사결정을 위한 정보 제공, 환자의 가치 및 선호도 존중, 의사결정의 결과 평가의 4가지 주제가 도출되었다. 본 연구의 결과를 토대로 만성질환 노인을 위한 공유적 의사결정을 촉진할 수 있는 선행조건과 환경적 지원에 대한 연구를 제언한다. 또한 본 연구는 만성질환 노인을 돌보는 간호사의 대상으로 한 연구이며, 공유적 의사결정의 주제인 만성질환 노인환자와 가족의 경험과 요구에 대한 추가연구가 필요하다.

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Conflict of interest

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Data availability

Please contact the corresponding author for data availability.

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Factors influencing falls in the community-dwelling elderly: Data from the 2020 national survey of older people: A secondary analysis study

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Purpose: This study was performed to identify the factors influencing falls in the community-dwelling elderly using the raw data of the 2020 National Survey of Older People. Methods: The study included 9,920 community-dwelling seniors aged 65 years and older. The data were analyzed using a complex sampling design univariate logistic regression analysis. Results: Although the subjects of this study were 9,920 people, it can be generalized to 7,617,710 people because it is a probability sample using the stratified systematic sampling with cluster plots. As a result of this study, the fall rate of community-dwelling elderly was 6.4% and the weighted percentage was 7.1%. Satisfaction with economic status, number of chronic diseases, use of medical facilities, smoking, limitation of lower muscle strength, decreased visual acuity, limitation of daily living function, and housing type were identified as factors influencing falls in older people dwelling in the community. Conclusion: Based on the variables identified in this study, it is necessary for nurses to select high-risk groups for falls and to actively develop and implement nursing interventions to prevent falls.

Keywords: Aged; Accidental falls; Independent living
부담을 가중시키는 노인의 낙상을 예방하는 것은 지역사회 거주 노인에게 있어 중요한 건강관리의 요소이다.


그러나 지역사회에 거주하는 노인의 낙상 위험요인에 관한 연구는 이들 위험요인을 부분적으로 포함하고 있으며 대부분의 연구가 일부 지역에 거주하는 노인을 대상으로 하여[7,12-14], 영향요인을 규명하는 데 한계가 있다. 한편 노인실태조사는 일반 주거시설에 거주하는 만 65세 이상 노인을 모집단으로 하는 우리나라 지역사회 거주 노인의 대표성 있는 자료이며 노인의 생활 여건 및 수준, 건강상태와 건강행위 등을 포함하고 있어 낙상 관련요인에 대한 분석 및 대책 수립이 가능하다는 측면에서 매우 가치 있는 자료로 나아가 같은 국가 수준에서 수집된 자료를 이용한 경우에도 확률분포에서 수집된 전국적인 대표성을 확보하기 위해서는 복합표본설계(complex designs)로 분석하여야 한다. 일부 논문의 경우에는 단순일의추출법에 사용하는 일반 procedure를 사용하고 있어 잘못된 결과를 도출할 수 있는 결측값이 있는 대상자는 없어서 9,920명을 최종 분석에 포함하였다.

이에 본 연구에서는 가장 최근에 시행된 노인실태조사 원시자료를 이용하여 선행연구에서 참고하신 모집단으로 본 연구 대상자인 만 65세 이상 노인으로, 2020년도 노인실태조사 전반대상자 10,097명 중 본인 응답으로 조사를 완료한 9,920명을 대상으로 하여 낙상경험을 파악하기 위해 노인실태조사 결과를 바탕으로 분석하였다. 본 연구의 종속변수는 낙상경험으로 선정하였다. 독립변수는 선행연구에서 노인의 낙상 영향요인으로 보고된 변수 중 노인실태조사 [1]에서 활용 가능한 변수들을 추출하여 인구사회학적, 건강상태, 건강행위, 정신건강과 환경적 요인으로 구분하였으며, 각 변수의 범주는 다음과 같이 분류하였다.

1) 낙상실태
낙상실태는 낙상경험, 낙상횟수, 낙상후 병원치료, 낙상이유를 포함한다. 낙상경험은 "귀하께서는 지난 1년간 낙상(넘어짐, 미끄러짐 또는 주저앉음) 경험이 있습니까?"의 단일 문항에 대해 '예', '아니오'로, 지난 1년간 낙상횟수는 평균 및 표준오차와 분포를 확인한 후, 1회, 2회, 3회 및 4회 이상으로 구분하였다. 낙상 후 병원치료는 '예', '아니오'로 분류하였다. 낙상이유는 환경적 요인(바닥 미끄러움, 바닥, 도로 경사나 문턱, 어두운 조명 등)과 신체적 요인(발을 헛디딤, 어지러움, 다리에 힘이 풀림)로 구분하였다.
2) 인구 사회학적 요인

인구 사회학적 요인에는 성별, 연령, 결혼상태, 교육수준, 취업, 가구소득, 자산을 포함하였다. 연령은 '65-74세', '75-84세', '85세 이상'으로 제분류하였다[5]. 결혼상태는 배우자 '있음'과 '없음'으로 분류하였다. 교육수준은 '초졸 이하', '중졸', '고졸', '대학 이상'으로, 취업은 '예', '아니오'로, 가구소득은 노인생활비조사 오분위기 기준에 따라 제1오분위 945.96만 원 미만, 제2오분위 945.96만 원 이상 -1,582.20만 원 이하, 제3오분위 1,582.20만 원 초과 -2,660만 원 미만, 제4오분위 2,660만 원 이상 -4,324.58만 원 이하, 제5오분위 4,324.58만 원 초과로 분류하였다. 자산은 부동산 자산 유무로 응답한 자료를 이용하였다.

3) 건강상태 요인

건강상태 요인은 시력장애, 청력장애, 하지근력 제한[5,16], 반성 절환[5,10], 약물복용[10,12], 기능상태[5,6,10,11], 주관적 건강상
태[10-12], 의료 이용[11]을 포함하였다. 시력장애와 청력장애는 일상생활의 문제에 대해 '없음'과 '있음'으로 제분류하였다. 하지근
력 제한은 5회 이상이던 일어서기를 수행한 경우는 '아니오', 못한 경우는 '예'로 제분류하였다. 반성절환은 '의사진단을 받고 3개월 이상 경과된 질환의 건수'로 1개, '1-2개', '3-4개', '5개 이상'으로, 약물복용은 '의사의 처방 약물의 종류를' 1개, '1-2개', '3-4개', '5개 이상'으로 범주화하였다. 기능상태는 일상생활수행능력(activities of daily living), 즉 잠기, 세수-양치질-머리간기를, 목욕 또는 수영, 차려 놓은 음식 먹기, 누웠다 일어나 방 밖으로 나가기, 화장실 출입과 대소변 후 닦고 옷 입기, 대소변 조절하기 등의 7개 항목으로, 도구적 일상생활수행능력(instrumental activity of daily livings)은 목욕, 집안일, 식사준비, 병원, 재시가 연에 해당한 양의 악

4) 건강행위요인

건강행위요인은 흡연, 음주, 운동[5], 영양관리를 포함하였다. 흡연은 '예', '아니오'로, 음주는 '지난 1년간 전혀 마시지 않음', '한 달 에 1회', '한 달에 2~3회 이상'으로 제분류하였다. 운동은 지속적으 로 10분 이상 운동 여부에 대해 '예', '아니오'로, 운동빈도는 주당 운 동일수를 '안함', '1~2회', '3회 이상'으로, 운동시간은 회당 '안 함', '10~20분', '30분 이상'으로 제분류하였다. 영양관리는 지역사회 노인의 영양위험당도를 파악하기 위하여 개발된 간이영양위험지표(Nutrition Screening Initiative)를 이용하였다. 간이영양위험지표 의 내용(가중치)은 질병(2점), 불량한 식사(3점), 과일-채소(2점), 음 주(2점), 지안순환-구강통증(2점), 경제적 어려움(4점), 감소된 사회 적 접촉(1점), 여러 약물복용(1점), 의료비가 많은 경우(2점), 식 사관련 도움 필요(2점)의 총 10개 항목으로 구성되어 있다. 0~2점 은 '양호', 3~5점은 '보통', 6점 이상은 '불량'으로 구분하였다[17].

5) 정신건강 요인

정신건강 요인은 우울, 인지기능[10] 및 삶의 만족도와 불만족을 포함하였다. 우울은 단축형 노인우울척도(Short Form of Geriatric Depression Scale)을 사용하였다. 총 15개 문항에 대해 '예(1점)', '아니오(0점)'의 양분석로 구성되어 있으며 금정분위점 1, 5, 7, 11, 13번의 5문항은 역코딩하여 점수가 높을수록 우울 정도가 높은 것을 나타낸다. 0~7점은 우울 '없음'으로, 8~15점은 우울 '있음'으로 제분류하였다[18]. 인지기능은 최신판정용 한국어판 간이정신상태검사(Korean version of Mini-Mental State Examination for Dementia Screening)로 측정하였다. 남자력 10문항, 기억력 2문항, 주의집중 및 계산능력 1문항, 언어기능 4문항, 이해 및 판단기능 2문항 의 총 19문항에 대해 품목은 '0점', 맞은 '1점'을 부여하며, 최고점 수는 30점이다. 성별, 연령 및 교육수준을 고려하여 산출된 점수를 기준 점수와 비교하여 인지기능 저하 '아니오'와 '있음'으로 제분류하였 다[19]. 삶의 만족도는 건강상태, 경제상태, 배우자와의 관계, 자녀와의 관계, 친구 및 지역사회와의 관계, 사회생활활동과 삶 전반에 대하여 '매우 만족함'과 '만족함'은 '예', '그저 그렇다', '만족하지 않음', '전혀 만족하지 않음'은 '아니오'로 제분류하였다. 불만족은 의 사진단 후 3개월 경과 여부에 대해 '예', '아니오'로 구분하였다.

6) 환경적 요인

환경적 요인으로는 주거환경 요인(거주주택에 대한 만족, 주택중 류, 생활하기에 편리함)을 포함하였다. 거주주택에 대한 만족은 '매 우 만족', '만족'은 '예', '그저 그렇다', '만족하지 않는 것', '전혀 만족하지 않는 것'은 '아니오'로 제분류하였다. 주택중류는 '단독주택', '아파트', '연립-다세대 주택', 기타에 응답한 고시전, 오벌움은 '오피스텔', 비거주용 건물, 판자집 비닐하우스 는 '비거주용 건물'으로 제분류하였다. 생활하기에 편리함은 '생활하기에 불편한 구조'에 대해 '예', '아니오'로 구분하였다.
손잡이 설치 등)를 갖추고 있다’에 대해 조사원이 직접 확인한 자료를 이용하였다.

4. 자료수집


5. 자료분석

IBM SPSS Statistics 26 프로그램(IBM Corp.)을 사용하였다. 낙상실태는 빈도, 백분율, 평균 및 표준오차로, 낙상 관련요인(인구사회학적, 건강상태, 건강행위, 정신건강, 환경적 요인)은 서술적 통계분석을 하여 가중치를 반영하지 않은 결과(\(n, \%\))와 가중치를 반영한 결과인 가중퍼센트(\(W, \%\))로 제시하였다. 낙상경험 유무 두 군에 대한 관련요인 분석은 복합표본설계 단변량 단순 로지스틱 회귀분석을, 낙상에 대한 영향요인 분석은 복합표본설계 단변량 다중 로지스틱 회귀분석을 하였다.

Table 1. Distribution of the Eldery According to Fall Experience (\(n=9,920, N=7,617,710\))

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>(n)</th>
<th>(%)</th>
<th>(N)</th>
<th>(W (%))</th>
<th>Mean±SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experience of fall (for 1 year)</td>
<td>Yes</td>
<td>633</td>
<td>6.4</td>
<td>542,961</td>
<td>7.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>9,287</td>
<td>93.6</td>
<td>7,074,748</td>
<td>92.9</td>
<td></td>
</tr>
<tr>
<td>Number of fall per year</td>
<td>1</td>
<td>426</td>
<td>67.3</td>
<td>358,856</td>
<td>66.1</td>
<td></td>
</tr>
<tr>
<td>(n=633, N=542,961)</td>
<td>2</td>
<td>151</td>
<td>23.9</td>
<td>131,682</td>
<td>24.3</td>
<td>1.56±1.26</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>26</td>
<td>4.1</td>
<td>27,607</td>
<td>5.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4~10</td>
<td>30</td>
<td>4.7</td>
<td>24,814</td>
<td>4.6</td>
<td></td>
</tr>
<tr>
<td>Hospital treatment</td>
<td>Yes</td>
<td>440</td>
<td>69.5</td>
<td>391,431</td>
<td>72.1</td>
<td></td>
</tr>
<tr>
<td>(n=633, N=542,961)</td>
<td>No</td>
<td>193</td>
<td>30.5</td>
<td>151,529</td>
<td>27.9</td>
<td></td>
</tr>
<tr>
<td>Reasons of fall (n=633, N=542,961)</td>
<td>Environmental factors</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Slippery floor</td>
<td>192</td>
<td>30.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bumped into something</td>
<td>52</td>
<td>8.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Uneven road</td>
<td>79</td>
<td>12.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Steep road</td>
<td>19</td>
<td>3.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dark lighting</td>
<td>16</td>
<td>2.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Physical factors</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sprained leg (stumbled)</td>
<td>127</td>
<td>20.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Suddenly dizziness</td>
<td>26</td>
<td>4.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Legs weakened (suddenly sat down)</td>
<td>116</td>
<td>18.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>6</td>
<td>0.9</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(n=\)Unweighted sample size; \(N=\)Weighted sample size; \(SE=\)Standard error; \(W (\%)=\)Weighted percentage.

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연구결과

1. 낙상실태

본 연구에서 지난 1년간 낙상경험이 있는 대상자는 6.4%이고 가중치를 반영한 결과인 가중퍼센트는 7.1%였다. 낙상경험이 있는 대상자의 지난 1년간 낙상횟수는 평균 1.56±1.26회였고 낙상횟수는 1회가 67.3%로 가장 많았으며 3~10회인 경우도 8.8%이나 되었다. 낙상 후 병원 치료를 받은 경우는 69.5%였다. 낙상이유는 환경적 요인으로 바닥 미끄러움 30.3%, 바닥이나 도로의 문턱 12.5%, 사람이나 사물에 부딪힘 8.2%, 도로 경사 3.0%, 어두운 조명 등 2.5% 순이었으며 신체적 요인으로는 발을 헛디딤 20.1%, 다리에 힘이 풀림 18.3%, 갑자기 어지럼 4.1%였다(Table 1).

2. 대상자의 특성 및 낙상 관련요인 실태

대상자의 인구 사회학적 특성을 살펴보면 성별은 여자가 60.0%, 연령은 65~74세가 60.3%, 결혼상태는 배우자 있음이 59.0%, 가구 소득은 제1분위가 24.6%로 가장 많았다(Table 2). 건강상태 요인은 시력장애 있음 33.1%, 하지근력 제한 있음이 21.9%로 가장 많았다. 만성질환원이 1~2개 있는 경우가 56.8%, 복용약물의 종류가 1~2가지인 경우가 56.3%, 외래나 입원 등 의료시설 이용은 응답적이 68.9%로 가장 많았다.
3. 낙상경험 유무에 따른 낙상 관련요인

인구 사회학적 요인에서 낙상경험 유무 두 군간에 유의한 차이를 보인 요인은 \( \chi^2 \) test에서는 성별, 연령, 교육수준, 결혼상태, 직업이 있고 낙상이 없는 군을 기준으로 한 단변량 로지스틱 회귀분석에서 유의한 차이를 보인 인구사회학적 요인은 없었다(Table 2).

유의한 차이를 보인 건강상태 요인은 단변량 로지스틱 회귀분석에서는만족도에서만 유의한 차이를 보였다. 낙상이 없는 군에 비해 만족도는 95% 요인은 단변량 로지스틱 회귀분석에서는

| Table 2. Univariate Simple Logistic Regression of Socio-Demographic Factors According to Fall Experience of the Subjects (n=9,920, N=7,617,710) |
|----|----|----|----|----|
| Variable | Category | n (%) | Experience of fall | \( \chi^2 \) (p-value) | Yes (ref: no), OR (95% CI) |
| Gender | Men | 3,971 (40.0) | 4.8 | 95.2 | 13.01 (0.007)** | 1 |
| | Women | 5,949 (60.0) | 7.4 | 92.6 | 1.10 (0.78-1.57) | 1 |
| Age (year) | 65-74 | 5,977 (60.3) | 5.2 | 94.8 | 38.45 (<.001)** | 1 |
| | 75-84 | 3,333 (33.6) | 7.9 | 92.1 | 0.97 (0.69-1.37) | 1 |
| | ≥85 | 610 (6.1) | 10.3 | 89.7 | 1.12 (0.50-2.50) | 1 |
| Education | Below elementary school | 4,431 (44.7) | 8.0 | 92.0 | 20.64 (0.001)** | 1 |
| | Middle school | 2,330 (23.5) | 6.0 | 94.0 | 0.86 (0.59-1.25) | 1 |
| | High school | 2,654 (26.8) | 4.9 | 95.1 | 0.72 (0.49-1.08) | 1 |
| | Above college | 505 (5.1) | 3.3 | 96.1 | 0.56 (0.26-1.19) | 1 |
| Marriage | With spouse | 5,849 (59.0) | 4.6 | 95.4 | 48.94 (<.001)** | 1 |
| | Without spouse | 4,071 (41.0) | 9.0 | 91.0 | 2.07 (1.75-2.43) | 1 |
| Current job | Yes | 3,773 (38.0) | 4.8 | 95.2 | 18.86 (<.001)** | 1.28 (0.71-1.79) |
| | No | 6,147 (62.0) | 7.4 | 92.6 | 1.00 (1.00-1.00) | 1 |
| Household income | 1st quartile | 2,440 (24.6) | 7.5 | 92.5 | 5.40 (248) | 1 |
| | 2nd quartile | 2,069 (20.9) | 6.5 | 93.5 | 0.86 (0.68-1.08) | 1 |
| | 3rd quartile | 1,924 (19.4) | 5.4 | 94.6 | 0.71 (0.55-0.90) | 1 |
| | 4th quartile | 1,834 (18.5) | 5.3 | 94.7 | 0.70 (0.54-0.90) | 1 |
| | 5th quartile | 1,653 (16.7) | 6.8 | 93.2 | 0.91 (0.71-1.15) | 1 |
| Assets | Yes | 9,461 (95.4) | 6.4 | 93.6 | 0.89 (.345) | 2.36 (0.84-6.60) |
| | No | 459 (4.6) | 8.0 | 92.0 | 1.00 (1.00-1.00) | 1 |

**p<.010; CI=Confidence interval; n=Unweighted sample size; N=Weighted sample size; OR=Odds ratio; W (%)=Weighted percentage.
Table 3. Univariate Simple Logistic Regression of Health Status and Health Behavior Factors According to Falls Experience of the Subjects (n=9,920, N=7,617,710)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>n (%)</th>
<th>Experience of fall</th>
<th>( \chi^2 ) (p-value)</th>
<th>Yes (ref: no), OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Yes (n=633, N=542,961), W (%)</td>
<td>No (n=9,287, N=7,074,749), W (%)</td>
<td></td>
</tr>
<tr>
<td>Health status factors</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vision impairment</td>
<td>Yes</td>
<td>3,286 (33.1)</td>
<td>9.3</td>
<td>90.7</td>
<td>43.71 (&lt;.001)** 1.87 (1.54~2.27)**</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>6,634 (66.9)</td>
<td>4.9</td>
<td>95.1</td>
<td>1</td>
</tr>
<tr>
<td>Hearing impairment</td>
<td>Yes</td>
<td>2,297 (23.2)</td>
<td>9.7</td>
<td>90.3</td>
<td>20.46 (&lt;.001)** 1.15 (0.93~1.42)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>7,623 (76.8)</td>
<td>5.6</td>
<td>94.4</td>
<td>1</td>
</tr>
<tr>
<td>Limitation of lower extremity muscle</td>
<td>Yes</td>
<td>2,175 (21.9)</td>
<td>11.0</td>
<td>89.0</td>
<td>61.12 (&lt;.001)** 1.81 (1.28~2.56)**</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>7,285 (73.4)</td>
<td>4.9</td>
<td>95.1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Missing</td>
<td>460 (4.6)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of chronic disease</td>
<td>0</td>
<td>1,678 (16.9)</td>
<td>3.0</td>
<td>97.0</td>
<td>129.78 (&lt;.001)** 1</td>
</tr>
<tr>
<td></td>
<td>1–2</td>
<td>5,634 (56.8)</td>
<td>5.2</td>
<td>94.8</td>
<td>1.74 (1.28–2.35)**</td>
</tr>
<tr>
<td></td>
<td>3–4</td>
<td>2,124 (21.4)</td>
<td>9.4</td>
<td>90.6</td>
<td>3.32 (2.42–4.54)**</td>
</tr>
<tr>
<td></td>
<td>≥5</td>
<td>484 (4.9)</td>
<td>18.8</td>
<td>81.2</td>
<td>7.39 (5.15–10.59)**</td>
</tr>
<tr>
<td>Number of medications class/day</td>
<td>0</td>
<td>1,856 (18.7)</td>
<td>3.2</td>
<td>96.8</td>
<td>102.12 (&lt;.001)** 1</td>
</tr>
<tr>
<td></td>
<td>1–2</td>
<td>5,583 (56.3)</td>
<td>5.5</td>
<td>94.5</td>
<td>2.90 (0.84–9.99)</td>
</tr>
<tr>
<td></td>
<td>3–4</td>
<td>2,065 (20.8)</td>
<td>9.4</td>
<td>90.6</td>
<td>1.54 (0.38–6.35)</td>
</tr>
<tr>
<td></td>
<td>≥5</td>
<td>416 (4.2)</td>
<td>17.0</td>
<td>83.0</td>
<td>2.67 (0.54–13.25)</td>
</tr>
<tr>
<td>Medical utilization</td>
<td>Yes</td>
<td>6,832 (68.9)</td>
<td>7.4</td>
<td>92.6</td>
<td>61.18 (&lt;.001)** 1.90 (1.56–2.33)**</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>3,088 (31.1)</td>
<td>4.0</td>
<td>96.0</td>
<td>1</td>
</tr>
<tr>
<td>Limitation of ADL</td>
<td>Yes</td>
<td>421 (4.2)</td>
<td>23.0</td>
<td>77.0</td>
<td>133.13 (&lt;.001)** 1.75 (0.97–3.16)*</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>9,499 (95.8)</td>
<td>5.6</td>
<td>94.4</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>1,002 (10.1)</td>
<td>16.3</td>
<td>83.7</td>
<td>127.52 (&lt;.001)** 1.39 (0.83–2.32)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>8,918 (89.9)</td>
<td>5.3</td>
<td>94.7</td>
<td>1</td>
</tr>
<tr>
<td>Subjective health status</td>
<td>Good</td>
<td>4,940 (49.8)</td>
<td>3.7</td>
<td>96.3</td>
<td>75.98 (&lt;.001)** 1</td>
</tr>
<tr>
<td></td>
<td>Bad</td>
<td>4,980 (50.2)</td>
<td>9.0</td>
<td>91.0</td>
<td>1.25 (0.86–1.83)</td>
</tr>
<tr>
<td>Health behavior factor</td>
<td>Smoking</td>
<td>Yes</td>
<td>1,089 (11.0)</td>
<td>6.9</td>
<td>93.1</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>8,831 (89.0)</td>
<td>6.3</td>
<td>93.7</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Drinking (frequency)</td>
<td>No</td>
<td>6,243 (62.9)</td>
<td>7.1</td>
<td>92.9</td>
</tr>
<tr>
<td></td>
<td>1/mo</td>
<td>1,389 (14.0)</td>
<td>6.3</td>
<td>93.7</td>
<td>1.07 (0.70–1.63)</td>
</tr>
<tr>
<td></td>
<td>≥2–3/mo</td>
<td>2,288 (23.1)</td>
<td>4.4</td>
<td>95.6</td>
<td>0.76 (0.49–1.16)</td>
</tr>
<tr>
<td></td>
<td>Exercise</td>
<td>Yes</td>
<td>5,187 (52.3)</td>
<td>5.9</td>
<td>94.1</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>4,733 (47.7)</td>
<td>6.9</td>
<td>93.1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Frequency of exercise (week)</td>
<td>No exercise</td>
<td>4,733 (47.7)</td>
<td>6.9</td>
<td>93.1</td>
</tr>
<tr>
<td></td>
<td>1–2</td>
<td>576 (5.8)</td>
<td>5.9</td>
<td>94.1</td>
<td>0.85 (0.59–1.22)</td>
</tr>
<tr>
<td></td>
<td>≥3</td>
<td>4,611 (46.5)</td>
<td>5.9</td>
<td>94.1</td>
<td>0.85 (0.72–1.00)</td>
</tr>
<tr>
<td></td>
<td>Duration of exercise (minute)</td>
<td>No</td>
<td>4,733 (47.7)</td>
<td>6.9</td>
<td>93.1</td>
</tr>
<tr>
<td></td>
<td>10–20</td>
<td>535 (5.4)</td>
<td>6.9</td>
<td>93.1</td>
<td>1.00 (0.70–1.42)</td>
</tr>
<tr>
<td></td>
<td>≥30</td>
<td>4,652 (46.9)</td>
<td>5.8</td>
<td>94.2</td>
<td>0.82 (0.70–0.98)</td>
</tr>
<tr>
<td></td>
<td>Nutrition management</td>
<td>Good</td>
<td>7,639 (77.0)</td>
<td>4.7</td>
<td>95.3</td>
</tr>
<tr>
<td></td>
<td>Not bad</td>
<td>1,561 (15.7)</td>
<td>11.5</td>
<td>88.5</td>
<td>1.33 (0.89–2.01)</td>
</tr>
<tr>
<td></td>
<td>Poor</td>
<td>720 (7.3)</td>
<td>13.3</td>
<td>86.7</td>
<td>1.20 (0.66–2.19)</td>
</tr>
</tbody>
</table>

*p<.050; **p<.010; CI=Confidence interval; ADL=Activities of daily living; IADL=Instrumental activity of daily living; n=Unweighted sample size; N=Weighted sample size; OR=Odds ratio; W (%)=Weighted percentage.

CI = 1.22–2.34. 오피스텔은 11.60배(95% CI = 3.91–34.39)가 증 가하였다. 생활하기에 불편함은 ‘생활하기에 불편한 구조이다’에 비 해 ‘생활하기에 불편한 구조는 아니지만, 노인을 배려한 설비는 없 다’에서 낙상할 가능성이 1.38배(95% CI = 0.78–2.42) 증가하였다 (Table 4).
Table 4. Univariate Simple Logistic Regression of Mental health and Environmental Factors According to Fall Experience of the Subjects ($n=9,920$, $N=7,617,710$)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>n (%)</th>
<th>Experience of fall</th>
<th>$\chi^2$ (p-value)</th>
<th>Yes (ref: no), OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mental health factors</strong></td>
<td></td>
<td></td>
<td>Yes (n=633, $N=542,961$), W (%)</td>
<td>No (n=9,287, $N=7,074,749$), W (%)</td>
<td></td>
</tr>
<tr>
<td>Satisfaction of health conditions</td>
<td>Yes</td>
<td>5,212 (52.5)</td>
<td>3.7</td>
<td>96.3</td>
<td>96.49 (&lt;.001)**</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>4,708 (47.5)</td>
<td>9.3</td>
<td>90.7</td>
<td>1.09 (0.72–1.63)</td>
</tr>
<tr>
<td>Satisfaction of economic conditions</td>
<td>Yes</td>
<td>3,892 (39.2)</td>
<td>4.0</td>
<td>96.0</td>
<td>45.27 (&lt;.01)**</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>5,550 (55.9)</td>
<td>7.9</td>
<td>92.1</td>
<td>1.71 (1.12–2.44)**</td>
</tr>
<tr>
<td>Satisfaction with spouse</td>
<td>Yes</td>
<td>4,282 (43.2)</td>
<td>3.5</td>
<td>96.5</td>
<td>16.22 (&lt;.001)**</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>1,566 (15.8)</td>
<td>7.5</td>
<td>92.5</td>
<td>1.26 (0.91–1.77)</td>
</tr>
<tr>
<td>Satisfaction with child</td>
<td>Yes</td>
<td>7,054 (71.1)</td>
<td>5.6</td>
<td>94.4</td>
<td>7.56 (0.006)**</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>2,497 (25.2)</td>
<td>8.0</td>
<td>92.0</td>
<td>1.18 (0.84–1.65)</td>
</tr>
<tr>
<td>Satisfaction with cultural activities</td>
<td>Yes</td>
<td>4,394 (44.3)</td>
<td>4.6</td>
<td>95.4</td>
<td>13.51 (.002)**</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>5,526 (55.7)</td>
<td>7.9</td>
<td>92.1</td>
<td>0.96 (0.69–1.34)</td>
</tr>
<tr>
<td>Satisfaction with friends and community</td>
<td>Yes</td>
<td>5,928 (59.8)</td>
<td>5.0</td>
<td>95.0</td>
<td>16.19 (&lt;.001)**</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>3,992 (40.2)</td>
<td>8.4</td>
<td>91.6</td>
<td>1.14 (0.80–1.65)</td>
</tr>
<tr>
<td>Overall satisfaction of life</td>
<td>Yes</td>
<td>5,140 (51.8)</td>
<td>4.3</td>
<td>95.7</td>
<td>47.88 (&lt;.001)**</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>4,780 (48.2)</td>
<td>9.4</td>
<td>90.6</td>
<td>0.75 (0.48–1.15)</td>
</tr>
<tr>
<td>Depression</td>
<td>Yes</td>
<td>1,293 (13.0)</td>
<td>13.4</td>
<td>86.6</td>
<td>78.46 (&lt;.001)**</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>8,627 (87.0)</td>
<td>5.3</td>
<td>94.7</td>
<td>1.14 (0.74–1.76)</td>
</tr>
<tr>
<td>Impairment of cognitive function</td>
<td>Yes</td>
<td>2,561 (25.8)</td>
<td>7.1</td>
<td>92.9</td>
<td>5.01 (.025)*</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>7,359 (74.2)</td>
<td>6.1</td>
<td>93.9</td>
<td>1.02 (0.74–1.40)</td>
</tr>
<tr>
<td>Insomnia</td>
<td>Yes</td>
<td>187 (1.9)</td>
<td>15.0</td>
<td>85.0</td>
<td>15.35 (&lt;.01)**</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>9,733 (98.1)</td>
<td>6.2</td>
<td>93.8</td>
<td>1.60 (0.75–3.42)</td>
</tr>
<tr>
<td><strong>Environmental factors</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Satisfaction of residential housing</td>
<td>Yes</td>
<td>7,460 (75.2)</td>
<td>5.9</td>
<td>94.1</td>
<td>5.46 (.020)**</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>2,460 (24.8)</td>
<td>7.7</td>
<td>92.3</td>
<td>0.98 (0.69–1.41)</td>
</tr>
<tr>
<td>Housing types</td>
<td>Detached house</td>
<td>3,931 (39.6)</td>
<td>5.5</td>
<td>94.5</td>
<td>28.13 (&lt;.001)**</td>
</tr>
<tr>
<td></td>
<td>Apartment</td>
<td>4,700 (47.4)</td>
<td>6.4</td>
<td>93.6</td>
<td>1.69 (1.22–2.34)*</td>
</tr>
<tr>
<td></td>
<td>Row · multi-family house</td>
<td>1,205 (12.1)</td>
<td>8.6</td>
<td>91.4</td>
<td>2.20 (1.40–3.46)</td>
</tr>
<tr>
<td></td>
<td>Officetels</td>
<td>55 (0.6)</td>
<td>16.4</td>
<td>83.6</td>
<td>11.60 (3.91–34.39)**</td>
</tr>
<tr>
<td></td>
<td>Non-residential accommodation</td>
<td>29 (0.3)</td>
<td>6.9</td>
<td>93.1</td>
<td>3.39 (0.64–18.03)</td>
</tr>
<tr>
<td>Convenience for living</td>
<td>Uncomfortable for living</td>
<td>975 (9.8)</td>
<td>7.4</td>
<td>92.6</td>
<td>1.87 (.393)</td>
</tr>
<tr>
<td></td>
<td>No facilities for the elderly</td>
<td>7,078 (71.4)</td>
<td>6.5</td>
<td>93.5</td>
<td>1.38 (0.78–2.42)**</td>
</tr>
<tr>
<td></td>
<td>Having facilities for the elderly</td>
<td>1,867 (18.8)</td>
<td>5.4</td>
<td>94.6</td>
<td>0.89 (0.46–1.72)</td>
</tr>
</tbody>
</table>

* $p<.050$; ** $p<.010$; CI=Confidence interval; n=Unweighted sample size; N=Weighted sample size; OR=Odds ratio; W (%)=Weighted percentage.

4. 낙상에 대한 영향요인

낙상에 대한 영향요인을 파악하기 위해 종속변수는 낙상경험을, 독립변수는 단변량 로지스틱 회귀분석에서 낙상 두 군 간에 유의한 차이를 보인 시력장애, 하지근력 제한, 만성질환 수, 의료 이용, 일상생활기능 제한, 흡연, 경제상태 만족도, 주택종류, 생활하기에 편리함을 투입하여 낙상이 없는 군을 기준 변수로 하여 분석한 결과는 Table 5와 같다. 낙상이 없는 군에 비해 낙상이 발생할 가능성이 유의하게 영향을 준 변수는 경제상태 만족도, 만성질환 수, 의료 이용, 흡연, 하지근력 제한, 시력장애, 일상생활기능 제한, 주택종류였다. 구체적으로는 낙상이 없는 군에 비해 낙상할 가능성이 경제상태에

https://doi.org/10.17079/jkgn.2023.00094
Table 5. Univariate Multiple Logistic Regression Analysis of Influencing Factors According to Falls Experience of the Subjects (n=9,920, N=7,617,710)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>Yes (ref: no) (n=633, N=542,961)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Adjusted OR (95% CI)</td>
<td></td>
</tr>
<tr>
<td>Satisfaction of economic conditions</td>
<td>Yes</td>
<td>1.59 (1.25~1.93)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Number of chronic disease</td>
<td>0</td>
<td>1.20 (0.88~1.64)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td>1~2</td>
<td>1.85 (1.33~2.57)</td>
<td>.043</td>
</tr>
<tr>
<td></td>
<td>3~4</td>
<td>2.64 (1.76~3.94)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td>≥5</td>
<td>2.05 (1.42~2.67)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Medical utilization</td>
<td>Yes</td>
<td>1.38 (1.05~1.81)</td>
<td>.017</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Smoking</td>
<td>Yes</td>
<td>1.75 (1.44~2.11)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>limitation of lower extremity</td>
<td>Yes</td>
<td>1.43 (1.20~1.71)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>muscle strength</td>
<td>No</td>
<td>1.85 (1.35~2.47)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Housing types</td>
<td>Detached house</td>
<td>1.38 (1.13~1.68)</td>
<td>.256</td>
</tr>
<tr>
<td></td>
<td>Apartment</td>
<td>1.77 (1.33~2.27)</td>
<td>.912</td>
</tr>
<tr>
<td></td>
<td>Row · multi-family house</td>
<td>5.82 (2.90~12.88)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td>Officetels</td>
<td>1.12 (0.20~7.59)</td>
<td>.515</td>
</tr>
<tr>
<td></td>
<td>Non-residential accommodation</td>
<td>1.00 (0.20~7.59)</td>
<td></td>
</tr>
<tr>
<td>Convenience for living</td>
<td>No facilities for the elderly</td>
<td>0.99 (0.75~1.32)</td>
<td>.354</td>
</tr>
<tr>
<td></td>
<td>Uncomfortable for living</td>
<td>0.83 (0.59~1.18)</td>
<td>.129</td>
</tr>
</tbody>
</table>

ADL=Activities of daily living; CI=Confidence interval; n=Unweighted sample size; N=Weighted sample size; OR=Odds ratio.

먼저 노인의 지각에 비해 불만족군에서 1.59배(95% CI = 1.25~1.93), 만족성의 두 수치는 없음에 비해 1~2개 있는 군에서 1.20배(95% CI = 0.88~1.64), 3~4개 있는 군은 1.85배(95% CI = 1.33~2.57), 5개 이상의 군은 2.64배(95% CI = 1.76~3.94)가 증가하였다. 이에 따른 노인의 만족도는 이용하지 않은 군에 비해 이용한 군에서 1.38배(95% CI = 1.05~1.81), 하지근력 제한은 없음에 비해 있음에서 1.75배(95% CI = 1.44~2.11) 낙상 가능성이 증가하였다. 시각저하 가 없음에 비해 있음에서 1.43배(95% CI = 1.20~1.71), 일상생활기능 제한이 없음에 비해 있음에서 1.85배(95% CI = 1.35~2.47), 주택종류는 단독주택에 비해 오피스텔 거주 군에서 낙상 가능성이 5.82배(95% CI = 2.90~12.88) 증가하였다(Table 5).

논의

본 연구는 지역사회에 거주하는 노인의 낙상 및 낙상 관련요인의 실태를 파악하고 낙상에 미치는 영향요인을 확인하고자 시도되었다. 본 연구결과 지난 1년간 낙상률은 6.4%였으며 이를 노인실태조사에서 제시한 가중치(weight_0)를 주어 가중 평균을 구한 결과는 7.1%로, 이는 우리나라 일반 주거시설에 거주하는 만 65세 이상 노인의 낙상률로 일반화할 수 있다. 이를 성인성과 비교해보면 최근 1년간 낙상률이 우리나라 일부 지역사회 노인 대상 연구에서 16.3% [12], 51.2% [20], 51.5% [4]와 미국의 국가규모의 연구에서 16.4% [21] 및 23% [22]와 브라질의 37.1% [11]에 비해 크게 낮은 수치였고, 노인실태조사 자료를 이용한 실험연구의 경우에도 2014년 24.8% [5,10]와 2017년 15.7% [16]에 비해도 낮았다. 특히 본 연구에서 낙상률이 급격히 감소하여 한 자리 숫자인 6.4%를 보였는데 이러한 결과는 노인실태조사가 2020년 9월 14일부터 11월 20일까지의 COVID-19 상황에서 이루어진 결과로, 노인의 생활습관의 변화와 보호 기간이 있을 것으로 사료된다. 실제로 일부 지역사회 노인 대상 연구에서 71.6% [12]에서 낙상이 발생한 장소가 실외인 것으로 나타나 이를 지지한다. 본 연구에서 1년간 낙상을 경험한 횟수는 평균 1.56회로, 1회 낙상한 경우가 63.7%로 가장 많았고 2회 10회까지 낙상한 경우도 있어 우려할 수 있다. 이는 2017년 노인실태조사 자료를 이용한 연구에서 낙상횟수 1회인 경우가 65.2%인 결과 [16]와 유사하나, 일부 지역사회 연구의 44.4% [13], 43.2% [20], 22.5%
교육수준과 주관적 건강상태에 따라 낙상률에 차이가 있는지를 확인하였고, 이러한 결과는 노인실태조사에서도 교육수준에 따른 차이를 보였다. 또한 일부 지역사회 대상 연구에서 교육수준, 이가 없는 연구결과를 분석하여 반복연구가 필요하다. 성별, 배우자 유무에 따른 낙상률은 각각 54.6%, 45.3%인 결과[16]과 유사하다. 이러한 결과는 노화로 인한 신체적 요인에 비해 개선 효과가 빠르게 나타날 수 있는 바다 미끄러짐이나 보도 또는 문턱 등의 환경적 요인의 시간에 대한 적극적인 대처는 여전히 부족한 것으로 생각된다.

본 연구에서 낙상이유로는 환경적 요인이 56.5%를 차지하여 43.4%의 신체적 요인보다 더 많은 영향을 미치는 것을 확인할 수 있다. 이는 2017년 노인실태조사 자료를 이용한 연구에서 환경적 요인과 신체적 요인의 각각 54.6%, 45.3%인 결과[16]와 유사하다. 이러한 결과는 노화로 인한 신체적 요인에 비해 개선 효과가 빠르게 나타날 수 있는 바다 미끄러짐이나 보도 또는 문턱 등의 환경적 요인이 시간에 따라 개선되어야 할 것을 제시한다.


경사상태 중 유의한 차이가 있었던 요인은 흡연이었다. 이는 85세 이상 노인실태조사에서 환경에 유의한 영향요인으로 나타난 결과[26]와 일치하며 흡연발병과 관련 친밀화의 위험도가 1.47배 높아진다는 연구결과[27]는 본 연구결과를 간접적으로 지지한다. 본 연구에서 운동을 하는 군은 하지 적도 낮은 군에 비해 낙상 발생 가능성이 감소하였으나 유의한 차이를 보이지 않았다. 노인실태조사에서 는 평소 10% 이상 운동을 하는 경우를 운동군으로 분류하고 있으 면, 운동의 효과가 영양을 주는 운동 지속 기간이나 운동의 종류에 대한 효과가 제공하고 있지 않는데, 운동의 효과를 파악하기에 운동의 기간 시간인 10분은 너무 짧았던 것으로 생각된다. 본 연구 결과는 평소 10% 이상 운동을 하지 않는 경우도 47.7%나 되었으며 운동실 헌의 경우 운동군에서 3회 이상, 30분 이상 운동을 한 달간 절반 이상의 46.5%가 달하였으나 이 경우에도 비운동군에 비해 낙상 발생률에 유의한 차이는 보이지 않았다. 최소 3회, 주 2회, 10~40분 이상 평균과 하지근력 운동중재가 하지의 근력과 근력향상에 도움이 된다고 한 연구결과를 따르면 보[28,29] 낙상예방을 위해서는 운동시간에 집중하기 어려운 지역사회 거주 노인에게 신체활동 및 운동의 중요성에 대한 교육과 노인의 신체상태에 적합한 운동 프로그램을 개발하여 제공할 것과 요구한다.

본 연구에서 지역사회 거주 노인의 낙상률은 6.4%였으며 가중평균은 7.1%でした. 이는 우리나라 지역사회에 거주하는 만 65세 이상 노인의 낙상률을 의미합니다. 낙상의 영향요인으로는 경제상태 만족도, 만성질환 수, 의료 이용, 흡연, 하지근력 제한, 시력저하, 일상생활 기능 제한이 규명되었습니다. 본 연구에서 규명된 변수를 기반으로 간호사가 낙상 고위험군을 조기 발견하고 선별하여 이들을 대상으로 특성화된 낙상예방 간호중재 전략을 적극적으로 개발하고 시행할 필요가 있습니다. 또한 본 연구에서 예방 가능한 영향요인으로 규명된 흡연 및 하지근력 제한에 대해 교육을 포함한 금연 중재 프로그램과 하지근력을 증진시킬 수 있는 운동 및 신체활동 프로그램이 제공되어야 합니다. 추후 연구를 위한 제언으로는 첫째, 앞으로 발표되는 노인실태조사 자료를 이용하여 본 연구에서 낙상의 관련요인으로 확인된 변수를 중심으로 본 연구의 분류 기준을 적용하여 지역사회 거주 노인의 낙상 영향요인을 규명할 필요가 있습니다. 둘째, 본 연구는 대규모 조사자료를 이용한 횡단연구이므로 향후 초기 낙상대상자를 대상으로 시간차를 둔 종단연구를 시행하여 인과관계를 규명하는 연구가 수행되어야 합니다. 셋째, 과거에 노인을 동일군으로 보았으나 최근 조사결과는 노인세대가 집단군별로 다양함을 보이고 있는데, 이러한 집단군별 특성을 파악하기 위하여 노인의 연령 또는 낙상과 재낙상 등 세밀한 분류에 따른 낙상 영향요인을 규명하는 추가 연구를 제언합니다.
Authors' contribution

The author fully participated in the work performed, documented truthfully, and will make corrections herself.

Conflict of interest

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

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Data availability

Please contact the corresponding author for data availability.

Acknowledgements

None.

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발간 목적 및 간기
2. 학회지는 연 4회(2월 28일, 5월 31일, 8월 31일, 11월 30일) 발간한다.
3. 본 학회지가 폐간하는 경우, 모든 정기간행물은 국립중앙도서관(https://nl.go.kr)에서 열람할 수 있다.

윤리규정
1. 1) 노인간호학회지에 투고하는 논문은 다음과의 윤리규정을 지켜 작성하여야 한다.
   계획 연구의 대상이 사람인 경우, 헬싱키 선언에 입각하여 환자 또는 보호자에게 연구의 목적과 연구참여 중 일어날 수 있는 정신적, 신체적 위해에 대하여 충분히 설명하여야 하고, 이에 대한 동의를 받은 을 명시하고, IRB의 심의를 통과한 논문에 한하여 투고 하는 것을 원칙으로 한다. 단, 문헌 고찰, 메타분석, 이차분석 등의 경우는 편집위원의 심의 후 IRB 검토 및 명시하여야 한다.
   2) 논문 투고자는 본 학회지에 게재된 논문의 저자이거나, 연구의 주요한 기여자로야 한다. 논문의 저자에 대해서는 다음의 규정에 따라야 한다. (1) 저자는 최소한 2명이어야 한다. (2) 연구의 대상이 사람인 경우, 헬싱키 선언에 입각하여 환자 또는 보호자에게 연구의 목적과 연구참여 중 일어날 수 있는 정신적, 신체적 위해에 대하여 충분히 설명하여야 하고, 이에 대한 동의를 받은 을 명시하고, IRB의 심의를 통과한 논문에 한하여 투고 하는 것을 원칙으로 한다. 단, 문헌 고찰, 메타분석, 이차분석 등의 경우는 편집위원의 심의 후 IRB 검토 및 명시하여야 한다.
   3) 논문의 저자는 본 학회지에 게재된 논문의 저자이거나, 연구의 주요한 기여자로야 한다. 논문의 저자에 대해서는 다음의 규정에 따라야 한다. (1) 저자는 최소한 2명이어야 한다. (2) 연구의 대상이 사람인 경우, 헬싱키 선언에 입각하여 환자 또는 보호자에게 연구의 목적과 연구참여 중 일어날 수 있는 정신적, 신체적 위해에 대하여 충분히 설명하여야 하고, 이에 대한 동의를 받은 을 명시하고, IRB의 심의를 통과한 논문에 한하여 투고 하는 것을 원칙으로 한다. 단, 문헌 고찰, 메타분석, 이차분석 등의 경우는 편집위원의 심의 후 IRB 검토 및 명시하여야 한다. 

2. 논문의 심사, 제척 및 회피
   1) 논문 투고자가 특정한 심사자에 대하여 공정한 심사를 기대하기 어려운 객관적 사유가 있는 때에는 기피의 신청을 할 수 있으며, 이에 대하여 편집위원회는 제3자에게 회피를 권장한다. 
   2) 특정 심사자가 공정한 심사를 하기 어려운 사유가 있는 때에는 해당 심사를 회피할 수 있으며, 이에 대하여 편집위원회는 제3자에게 회피를 권장한다. 
   3) 논문 심사자가 논문심사와 직접적인 이해관계가 있는 때에는 심사 절차에서 제척된다. 

3. 발행인과 편집인은 출판윤리 위반사항을 장려하거나 허락하지 않는다. 

4. 본 규정에 명시되지 않은 사항은 Committee on Publication Ethics (COPE) 가이드라인에 따라야 한다. 

이해관계 규정
이해관계는 저자(혹은 저자의 기관), 심사자나 편집자가 재정적, 개인적 관계가 있는 경우에 발생하게 되며 모든 저자는 다음과 같은 이해관계를 명시하여야 한다. (1) 재정적 관계(고용, 자문, 주식보유, 특정 단체로부터의 재정적 지원), (2) 특수관계인 공동저자: 미성년자(만 19세 이하인 자) 또는 가족(배우자, 자녀 및 4촌 이내의 혈족) 이외의 '특수관계인'이라 할 경우, 참여한 논문의 연구 및 논문작성에 대해 특수관계인의 명확한 기여가 있어야 한다. (3) 연구 경영(경리 관계의 저자와 전문가, 심사자의 관계 등), (4) 저작권 관리의 위과 간
운 이해관계는 표지나 공시사항에 반드시 포함되어야 하며 각 저자
는 저작권 및 이해관계명시에 대한 동의서와 '특수관계과 논문 공
저 시사전공개 양식'에 서명함으로써 이해관계를 밝혀야 한다.

저작권(Authorship)
저작권은 출판된 논문에 상당한 기여를 한 사람을 말하며 저작권은 학
문적, 사회적, 재정적인 권한을 계속하여 가지게 됨을 의미한다. 연
org/recommendations/browse/roles-and-responsibilities/
defining-the-role-of-authors-and-contributors.html)의 저자
자격 기준에 따라 아래 4가지 기준을 모두 충족하여야 한다.
1. 연구의 개념, 설계, 분석, 결과에 해석에 실질적인 기여
2. 문서의 초안을 작성하거나 학문적으로 중요한 부분에 대한 비평적 수정
3. 논문을 출판하기 전 최종본에 대한 확인
4. 연구의 정확성 또는 진실성에 관
련된 문제를 적절히 조사하고 해결할 것을 보증하며 연구의 모든 부
분에 책임을 지는 것에 동의. 이외의 기여자는 감사의 글에 기재한다.

원고 제출
1. 논문의 종류
본 학회지에 게재 가능한 논문의 종류는 다음과 같다.
1) 종설
2) 양적연구
3) 질적연구
4) 기타: 개념분석, Q방법론적 연구, 메타분석 등
2. 저자 자격은 노인간호과 관련 학문 분야에 관심 있는 모든 사람이
가능하다
3. 석, 박사 학위 논문의 경우 학위논문임을 명시해야 한다.
4. 원고는 온라인으로 제출한다.
   1) 투고 전 점검사항을 확인한 후 한국노인간호학회 홈페이지
http://gnursing.or.kr에 접속하여 온라인논문을 이용하여 투고한다. 국문 원고는 한글로, 영문
원고는 HWP 혹은 MS-word로 작성한다.
2) 원고를 투고할 때 저자명과 저작권에 관한 명시된 사항을
시스템 내에서 입력한다.
5. 투고된 논문은 유사도 검사를 실시하여 표절여부를 심사한다. 투
고된 논문의 유사도가 높은 경우, 재게제에 거부할 수 있다.
6. 본 투고규정에 부합되지 않는 원고는 접수하지 않으며 접수된 논문
은 특별한 사유 없이 저자를 바꾸거나, 추가 또는 제외할 수 없다.
7. 원고 투고 시에 소정의 투고료를 납부해야 한다(입금계좌 번호는
온라인 논문투고시스템에서 확인).
8. 영문 초록은 250단어 이내로 제목과 저자명을 제외하고 작성한다.
9. 본문의 첫 페이지는 상단에 주요 용어를 기재한다. 제목을 기재
하되, 저자명은 생략하고 각 페이지에 번호를 기재한다.
6. 국문 원고는 A4크기 용지에 한글(hwp)로 작성하고, 여백주기
(마리말, 꼬리말 포함)는 위쪽 30 mm, 아래쪽 25 mm, 왼쪽
25 mm, 오른쪽 25 mm로 주며, 서체는 신명조, 글자 크기는
10포인트, 줄 간격은 200%로 작성한다.
7. 초록이나 본문에 약어를 사용하는 경우, 처음에는 full name을
기재하고, 그 다음부터 약어를 사용한다. 예: 행동심리증상(Beh-
avioral and Psychological Symptoms in Dementia, BPSD)
8. 투고 시 원고의 분량은 표지, 초록, 참고문헌, 표, 그림 및 부록
을 제외하고, 급자수 6,000자 이내여야 한다.
9. 초록, 본문, 참고문헌, 표, 그림 및 부록을 포함하여 전체 페이지

원고 작성

■ 일반사항
1. 학회지에 투고하는 원고는 국문 또는 영문으로 작성하고 초록을
반드시 포함해야 하며, 국문원고의 초록, 표, 그림, 참고문헌은 영문
으로 작성한다.
2. 원고의 구성은 표지, 영문초록, 본문, 참고문헌, 표 혹은 그림의
순으로 하며, 각각은 별도의 페이지로 한다.
3. 표지를 다음과의 순서로 기재한다.
1) 제목을 기재한다.
2) 제1저자와 교신저자 및 공동저자를 구분하여 표기한다. 첫
번째 표기되는 저자가 제1저자이며, 공동저자는 그 다음에
표기한다.
3) 전체 저자의 국문 및 영문 성명, 소속, 직위를 기재한다.
4) 교신저자의 성명, 주소, 우편번호, 전화번호, Fax번호,
E-mail 주소를 국문과 영문으로 표기한다.
5) 연구방법(연구설계)을 기재한다.
6) 참고문헌의 수(30개 이하)를 기재한다.
7) 영문 초록의 단어 수 (250개 이내)를 기재한다.
8) 주요 용어(key word)를 5개 이내로 기재하며, 가능한 영문
주요어와 동일하게 기재한다.
9) 모든 저자의 ORCID ID를 기재한다. ORCID가입은
https://orcid.org/를 참조한다.
10) 공시사항: Authors’ contributions, Conflict of interest,
Funding, Data availability, Acknowledgements에 대하
여 영문으로 기술한다.

4. 영문 초록은 250단어 이내(제목과 저자명을 제외하고)로 작성한
다.
5. 본문의 첫 페이지는 상단에 주요 용어를 기재한다. 제목을 기재
하되, 저자명은 생략하고 각 페이지에 번호를 기재한다.
6. 국문 원고는 A4크기 용지에 한글(hwp)로 작성하고, 여백주기
(마리말, 꼬리말 포함)는 위쪽 30 mm, 아래쪽 25 mm, 왼쪽
25 mm, 오른쪽 25 mm로 주며, 서체는 신명조, 글자 크기는
10포인트, 줄 간격은 200%로 작성한다.
7. 초록이나 본문에 약어를 사용하는 경우, 처음에는 full name을
기재하고, 그 다음부터 약어를 사용한다. 예: 행동심리증상(Beh-
avioral and Psychological Symptoms in Dementia, BPSD)
8. 투고 시 원고의 분량은 표지, 초록, 참고문헌, 표, 그림 및 부록
을 제외하고, 급자수 6,000자 이내여야 한다.
9. 초록, 본문, 참고문헌, 표, 그림 및 부록을 포함하여 전체 페이지
가 20페이지를 넘지 않아야 한다.
10. 영문 원고는 별도의 영문 규정에 따른다.
11. 학술용어는 한국간호과학회 발행 간호학 표준용어집 및 대한의
사회협회 발행 의학용어집에 수록된 것을 준용한다.
12. 이상의 학회지 게재 요령 사항에 따른 원고만을 접수한다.
13. 출판 후 논문에 대한 요의 또는 오류가 발견되면, 편집담당자에
게 메일을 통해 논의할 수 있다. 논문에서 오류나 실수가 발견되
는 경우 사안의 경중에 따라 정오표, 본문 수정 또는 철회를 통해
수정할 수 있다.

■ 논문의 구성

1. 영문초록은 목적 (purpose), 방법 (methods), 결과 (results), 결
론(conclusion)을 구분 없이 줄을 바꾸지 않고 연결하여 기술한
다. 초록의 하단에 주요용어(key words)를 기재하지, MeSH
www.nlm.nih.gov/mesh/MBrowser.html에 등재된 용어
사용을 원칙으로 한다.
2. 논문의 구성은 서론, 연구방법, 연구결과, 논의, 결론 및 제언, 참
고문헌 순으로 하되 문헌고찰은 꼭 필요한 경우에만 제시한다. 질
적연구의 경우는 그 조직을 달리할 수 있다.

1) 서론에는 연구의 필요성과 목적을 포함한다.
2) 연구방법은 연구설계, 대상, 연구도구, 자료수집 및 분석방법
등을 순서대로 포함한다.
· Ethic statement는 상자 안에 영문으로 기술한다.
  예: *Ethic statement: This study was approved by the Institu-
tional Review Board (IRB) of XXXXX University (IRB-
201903-0002-01). Informed consent was obtained from
the participants.*

· 대상자 기술

연구대상이 사람인 경우 생물학적 성(sex)과 사회문화적 성
(gender) 중 적절한 표기를 선택해서 사용해야 하며, 생물학적
성(sex)과 사회문화적 성(gender)을 결정한 방법에 대해 기술해
야 한다. 단, 동물이나 세포의 경우 생물학적 성(sex)으로 명시해야
한다. 만약 연구자가 전립선암과 같은 특정 질병인 후반이나 면역학적
성(sex 또는 gender)이거나 특정 집단(인종 또는 민족)만 대
상으로 한 경우, 타당한 근거와 연구의 제한점을 명확히 기술하
야 한다.
· 논문 작성 시 EQUATOR Network (http://www.equator-
network.org/home/) 또는 미국 국립보건원(http://www.
nlm.nih.gov/services/research_report_guide.html) 등의
공인된 보 고지침에 따라 기술하도록 권고한다.

3) 연구결과 및 논의는 처리된 결과를 중심으로 기술, 논의, 해석한다.
4) 결론은 연구결과의 내용을 중복 기술하지 않으면 관찰소견의
의미를 제시한다.
3. 표, 그림, 사진 등을 별도의 페이지에 작성하고, 각 페이지에 한 개
의 표, 그림, 사진만을 제시한다.
1) 표, 그림, 사진의 제목과 내용은 자료와 설명을 병합하여
undyed으로 손쉽게 볼 수 있도록 기재한다. 표 및 그림은 출판
규격내의 A4 용지 크기 이하(가로 150mm × 세로 200mm)로 하여
흑색으로 선명하게 그리며 설명은 별도로 작성한다. 모든 선은 단선
(line)으로 하되 도표의 종선(세로줄)은 긋지 않는다.
3) 표의 제목은 표의 상단에 위치하며, 중요한 단어의 첫 자를 대
문자로 한다.
4) 표에서 설명이 필요한 경우 각주에서 설명한다. 표에 사용한 비
표준 약어는 모두 표의 하단 각주에서 설명한다.
예: HR = Heart rate; T = Temperature.
5) 인적사항에서 연령, 체중, 신장의 평균치와 단위의 크기는 소수
점 한 자리까지로 한다.
예: n(%) = 79(25.9)
6) 표본은 그 숫자가 ‘1’을 넘을 수 있는 경우에는 표본의 앞
에 0을 기입하고, ‘1’을 넘을 수 없는 경우에는 표본의 앞에 0을
기입하지 않는다.
예: t=0.26, F=0.92
7) 유의확률을 나타내는 p값은 각주를 붙이지 않고 값을 그대로
기술하는 것을 원칙으로 하며, 소수점 이하 3자리까지 기재한
다(예: p=.003)
8) p값이 .000으로 나올 경우에는 p<.001로 적는다.
5~7번 항목 외에 M±SD, t, x2, β, F, B, R2, SE, OR, CI 등
과 같은 통계값은 소수점 두 자리까지 로 한다.
9) 사진은 원본을 제시하는 것을 원칙으로 한다.
4. 그림과 사진 작성 원칙

1) 그림 제목은 그림의 하단에 위치하며, 첫 자만 대문자로 한다.
예: Figure 1. Mean responses to questions by student
grade categories.
2) 사진의 크기는 102×152 mm(4×6인치)이상이어야 하고 부득
이한 경우라도 203×254 mm(8×10인치)를 넘지 않아야 한다.
3) 동일 번호에서 2개 이상의 그림이 있는 경우, 아라비아 숫자로
후에 알파벳 글자를 기입한다. (예: Figure 1-A, Figure
1-B)
4) 그래프에 쓰이는 symbol은 ●, ■, ▲, ◆, ○, □, △, ◆의 순서
로 작성한다.
• 문헌의 인용

2. 본문 내에서 다른 저자가 같은 내용에서 인용될 때는 인용순서에 따라 번호를 붙인다.
3. 본문에 문헌을 인용한 경우 문헌인용 순서에 따라 숫자로 괄호 [ ] 안에 기입한다.
4. 한 참고문헌이 본문에서 계속 인용될 경우 같은 번호를 사용한다.
5. 동시에 여러 개의 번호가 들어갈 경우에는 ','.로 구분하고, 연속된 번호를 기입하는 경우에는 '-'로 표시한다.
예: 스트레스 관리 [1], 간호중재 [2,3], 중환자 간호 [4-6]

• 참고문헌목록

1. 참고문헌은 모두 영어로 표기한다.
2. 본문에 인용된 문헌은 반드시 참고문헌 목록에 포함되어야 한다.
3. 일반연구의 경우 참고문헌 수는 30개 이하로 하고 본문번호 순서 에 따라 번호를 기입하여 나열한다. 단, 체계적 문헌고찰, 구조모 형 등 다수의 문헌이 요구되는 연구는 참고문헌 개수를 제한하지 않는다.

1. 정기간행물

• 논문 제목의 처음 글자와 고유명사 이외는 소문자로 기입하고, 부 제의 처음 글자는 소문자로 기입한다.
• 학술지명의 단어마다 첫 자를 대문자로 표기하고, 학술지명은 full name을 그대로 기입한다.
• 처음 페이지는 완연한 숫자를, 끝 페이지는 앞부분의 중복되는 숫자를 생략하여 표기한다.

1) 학술지

• 저자명, 논문명, 학술지명, 출판연도;권(호)-시작페이지-마지막 페이지, DOI 순으로 기재한다.
예: 저자가 6인 이상인 경우

2) 출판 중인 학술지의 논문

• 저자명, 논문명, 학술지명, Forthcoming. 지면 출간예정일 일, 순으로 기재한다.
예: 지면 출간일을 아는 경우

3) 잡지기사

저자. 잡지기사명. 잡지명. 연도 날짜:페이지. 순으로 기재한다.

4) 신문기사

기자. 기사명. 신문명. 연도 날짜:Sect. 란, 순으로 기재한다.

2. 저서

1) 단행본

• 저자, 도서명, 판차사항. 출판도시: 출판사; 출판연도. 페이지 수 p. 순으로 기재한다.
2) 편저
• 편저자, editor(s). 서명. 출판자: 출판사; 연도. 순으로 기재한다.
예: Curley MAQ, Moloney-Harmon PA, editors. Critical
care nursing of infants and children. Philadelphia, PA:

3) 단행본 내의 장(chapter)
(1) Chapter of unedited book
저자. 제목. 출판사: 출판연도. 장(chapter).
예: Speroff, Leon; Fritz, Marc A. Clinical gynecologic endo-
crinology and infertility. 7th ed. Philadelphia: Lippin-
cott Williams & Wilkins; c2005. Chapter 29, Endometri-
osis: p. 1103-33.

(2) 편집된 책 내의 chapter (edited book)
장(chapter) 저자. 장(chapter) 제목. In: 편저자, editor(s). 서명. 출판사: 출판연도. 장(chapter), 
예: Sobell LC, Sobell MB. Alcoholic consumption mea-
problems: A guide for clinicians and researchers. 2nd ed. 
Bethesda (MD): National Institute on Alcohol Abuse and 
Alcoholism (US); 2003. p. 75-99.

4) 저자나 편집자가 없는 경우
서명. 출판사: 출판연도. 연도. 순으로 기재한다.
예: Resumes for Nursing Careers. New York, NY: Mc-

5) 백과사전, 사전
(번)저자. 서명. 출판사: 출판연도. 연도. 순으로 기재한 
다(편저자와의 기재방식에 의해서 작성).
예: Snodgrass, Mary Ellen. Historical encyclopedia of 
예: Fitzpatrick JJ, Wallace M, editors. Encyclopedia of 
nursing research. 3rd ed. New York, NY: Springer Pub-
lishing Company; 2012.

6) 번역된 책
원저자. 번역서명. 출판사: 출판연도. 연도. 페이지수. 순으로 기재한다.
예: Stein E. Anorectal and colon diseases: Textbook and 
color atlas of proctology. 1st Engl. ed. Burgdorf WH, 

3. 연구보고서
• 저자. 보고서 제목. 보고서 유형. 출판자: 기관 (대학); 출판연도. 보고 
서 번호. 순으로 기재한다.
pandemic influenza A (H1N1) virus exposure among inter-
nal medicine housestaff and fellows. Health Hazard Eval-
uation Report. Salt Lake City, Utah: University of Utah 
School of Medicine: 2010 Oct. Report No. HETA 2009-
0206-3117.

4. 학위논문
• 학위논문은 가급적 인용하지 않도록 하며, 단 필요한 경우 전체 인 
용문헌의 10%를 넘지 않는다.
• 저자, 논문명: 부제 [학위 유형]. [소재지]: 수여기관명: 수여일자. 
페이지수. 순으로 기재한다.

1) 박사학위 논문
예: Jin HY. A study on the analysis of risk factors and 
characteristics for nosocomial infection in intensive care 

2) 석사학위 논문
예: Kim JS. A study on fatigue, stress and burnout of 
pregnancy nurses [master’s thesis]. [Gwangju]: Chonnam 
National University; 2012. 111 p.

5. 학술의회나 심포지엄의 자료(Proceedings)
• 저자. 발표자료명: 부제. In: 편집자, editor(s). 모임명. 학술의회 
순으로 기재한다.
예: Dostovsky JO, Carr DB, Koltzenburg M, editors. Proceed-
ings of the 10th World Congress on Pain: 2002 Aug 
예: Bryar R. The primary health care workforce develop-
ment road-map. In: Bigbee J, editor. The public health 
nursing contribution to primary health care. Proceedings

https://www.jkgn.org
6. Web 자원

1) 전자저널

2) Web 자료
   • 저자. 제목[자료유형].출판자: 출판지. 출판일[update 날짜; 인용 일자]. Available from: URL

7. 이차 자료에서의 인용

• 이차 자료는 일차 자료를 찾을 수 없는 불가피한 상황에서만 사용하고, 일차자료에서 인용되었음을 참고문헌에 밝힌다.

■ 논문 심사

1. 투고된 원고의 1차 심사는 이중맹검법을 사용하여 3인의 심사위원이 심사하여 심사결과 '수정 후 재제'로 판정한 논문은 1인의 출판위원이 최종 재제를 한다. 심사학위 논문과 박사학위 논문은 심사를 받은 후 재제할 수 있다. 심사에 관한 세부사항은 별도의 규정에 따른다.

2. 원고제택 여부는 논문심사위원 및 출판위원회에서 결정한다. 채택된 논문의 재제 순서는 최종 편집 원고 완성일자와 접수된 순서를 감안하여 출판위원회에서 정한다. 출판에 관한 세부사항은 별도의 규정에 따른다.

3. 재제논문 인쇄의 교정은 저자가 하며, 재제료, 특수 조판대, 별책 대, DOI 부여비는 본 학회 규정에 따라 저자가 부담한다. 특정 논문 심사에 대하여 별도의 심사료를 부과할 수 있다.

4. 심사 결과에 이의가 있을 경우 대표저자는 심사 결과를 통보 받은 후 60일 이내에 이의를 제기할 수 있다. 편집위원장은 이의가 제기된 논문을 재심하여 결과를 대표저자에게 통보할 의무를 가진다.

부칙

1. 이 규정은 한국노인간호학회 이사회의 인준을 받은 날로부터 시행한다.

2. 이 규정은 2001년 12월부터 시행한다.

3. 이 규정은 2004년 4월부터 시행한다.


5. 이 규정은 2009년 12월부터 시행한다.

6. 이 규정은 2011년 1월부터 시행한다.

7. 이 규정은 2012년 1월부터 시행한다.

8. 이 규정은 2012년 5월부터 시행한다.

9. 이 규정은 2013년 1월부터 시행한다.

10. 이 규정은 2013년 8월부터 시행한다.

11. 이 규정은 2014년 1월부터 시행한다.

12. 이 규정은 2014년 8월부터 시행한다.

13. 이 규정은 2014년 12월부터 시행한다.

14. 이 규정은 2015년 1월부터 시행한다.

15. 이 규정은 2015년 5월부터 시행한다.

16. 이 규정은 2016년 1월부터 시행한다.

17. 이 규정은 2016년 9월부터 시행한다.

18. 이 규정은 2017년 5월부터 시행한다.

19. 이 규정은 2019년 2월부터 시행한다.
20. 이 규정은 2019년 5월부터 시행한다.
22. 이 규정은 2020년 1월부터 시행한다.
23. 이 규정은 2020년 3월부터 시행한다.
24. 이 규정은 2021년 9월부터 시행한다.
25. 이 규정은 2022년 8월부터 시행한다.
26. 이 규정은 2023년 8월부터 시행한다.
자기점검사항

논문을 투고하실 때는 반드시 다음의 사항들을 검토하시면서 ☐에 ∨로 표기하십시오.
투고 시 논문과 저자점검사항을 함께 보내시기 바랍니다.

☐ 이 논문은 중복투고 논문이 아니며, 노인간호학회지 윤리규정을 준수함
☐ 논문 1부 ☐ 저자점검사항 ☐ 저작권 이양동의서

[결표지]
☐ 제목, 논문의 종류, 공시사항(연구비 지원 등), 주요어, 저자의 논문에 대한 기여도 기재
☐ 저자: 모든 저자의 성명, 소속(직장), 직위를 한글과 영문으로 기재
☐ 저자: 모든 저자의 ORCID ID 기재
☐ 교신저자: 성명, 주소, 우편번호, 전화번호, FAX 번호, e-mail 주소를 한글과 영문으로 기재

[기본]
☐ A4, 10 point ☐ 줄간격 200% ☐ 쪽번호 ☐ 전체원고의 투고규정 준수
☐ 초록, 참고문헌, 표, 그림을 제외한 원고의 글자수 3,000~3,500자 이내
☐ 초록, 본문, 참고문헌, 표, 그림을 포함한 전체 페이지 20쪽 이하
☐ 논문파일에 저자 인적사항 삭제
☐ 연구대상자에 대한 윤리적 고려 관련 기술

[영문초록]
☐ 250 단어 이내
☐ Purpose, Methods, Results, Conclusion의 소제목 하에 구성
☐ 영문 주요어: MeSH에 등재된 용어를 원칙으로 5개 이내

[결론]
☐ 연구목적과 연관하여 최종 결론만을 간략히 기술함
☐ 연구방법이나 연구결과를 반복 기술하지 않음

[참고문헌]
☐ Original article의 경우 총 30개 이내
☐ 학위논문은 전체 10% 이내
☐ 참고문헌은 full name으로 기술
☐ 투고규정 준수

[표 및 그림]
☐ 표, 그림에 대한 투고 규정 준수 ☐ 약자 설명은 도표 밑에 기술 ☐ 수치가 본문의 내용과 일치하고 오자가 없음 ☐ 영문으로 표기

이상과 같은 투고 규정을 준수하지 않은 경우 투고한 논문의 반송을 허락합니다.

제1저자 또는 책임저자 (서명)

https://www.jkgn.org
저작권 이양 및 이해관계 명시에 대한 동의서

1. 저작권 이양

본 논문이 노인간호학회지에 출간될 경우 그 저작권을 한국노인간호학회에 이양합니다. 이에 노인간호학회지는 해당 논문에 대한 저작권과 디지털 자료에 대한 전송권을 갖게 됩니다.

저자는 저작권 이외의 모든 권한 즉, 특허신청이나 향후 논문을 작성하는데 있어 본 논문의 일부 혹은 전부를 사용하는 권한을 소유합니다. 저자는 서면허가를 받으면 다른 논문에 본 논문의 자료를 사용할 수 있습니다. 본 논문의 모든 저자는 본 논문에 실제적이고 지적인 공헌을 했으며 논문의 내용에 대해 공적인 책임을 공유합니다. 또한 본 논문은 과거에 출판된 적이 없으며 현재 다른 학술지에 제출되었거나 제출할 계획이 없습니다.

2. 이해관계 명시

본 논문의 저자(들)은 연구와 관련된 재정적 관계(연구비 수혜, 고용, 주식보유, 강연료나 자문료, 물질적 지원 등)와 개인적 이해관계(겸직, 이익 경쟁, 지적 재산권 경쟁 등)가 있는 것을 모두 명시하였습니다.

제1저자
제2저자
제3저자
제4저자
제5저자
제6저자
제7저자
제8저자

논문제목: __________________________________________

저자:

* 본 동의서에는 원고에 기술된 순서대로 모든 저자의 서명이 있어야 합니다.
제 1 조 (목적) 본 규정은 한국노인간호학회 회칙 제 9조 7항 학회임원의 임무규정에 따라 구성한 출판위원회(이하 위원회라 한다)의 운영에 관한 사항을 규정함을 목적으로 한다.

제 2 조 (구성 및 임기) 본 위원회는 위원장 1인, 부위원장 1인을 포함하여 10인 내외의 위원을 두며 위원의 임기는 2년으로 하고, 연임할 수 있다.
   1. 1인의 영문초록교정위원을 둔다.
   2. 위원장 소속대학에 편집간사를 둔다.

제 3 조 (절차) 위원회의 위원장은 한국노인간호학회 실형이사 중에서 호선하며, 위원장은 소관위원회 위원을 추천하여 이사회의 인준을 받는다.

제 4 조 (업무) 위원회는 학회지 질적 수준 향상을 위하여 다음의 사항을 검토, 결정하고 위원장은 그 결과를 이사회에 보고한다.
   1. 학회지 발간에 관한 사항
      (1) 편집에 관한 사항
      (2) 접수된 원고의 심사와 게재여부의 결정
      (3) 게재료의 결정
   2. 학술 자료의 발간
      (1) 편집 및 출판에 관한 사항
      3. 회원의 워크숍에 관한 사항
      (1) 출판위원 및 심사위원의 워크숍
      (2) 회원의 논문작성 능력 향상을 위한 워크숍
   3. 회원의 워크숍에 관한 사항
      (1) 학술지 평가에 관한 사항
      (2) 학술지 등재 및 평가
      5. 출판관련 규정의 정기적 검토
   4. 심사위원의 선정과 관리
      (1) 논문심사를 위해서는 일정 인원의 심사위원을 위촉하되 출판위원장은 심사위원장이 된다.
      심사위원 선정기준과 절차는 별도의 규정에 따른다.
      (2) 위원회는 논문 심사 규정에 의거하여 논문심사 절차를 관리한다.
   6. 기타 이사회에서 회부된 사항의 연구실의 및 결정

부칙
1. 이 규정은 한국노인간호학회 이사회의 인준을 받은 날로부터 시행한다.
2. 이 규정은 2007년 6월부터 시행한다.
3. 이 규정은 2012년 1월부터 시행한다.
4. 이 규정은 2015년 1월부터 시행한다.
5. 이 규정은 2019년 1월부터 시행한다.

https://www.jkgn.org
편집위원 및 논문심사위원의 선정기준과 절차

1. (자격) 논문심사위원은 다음의 기준에 의거하여 선정한다.
   □ 간호학 또는 관련 전공분야의 박사학위 소지자
   □ 대학 교수 또는 그와 동등한 논문 심사 능력이 있다고 인정된 자
   □ 각 분야에 대해 최신지견을 갖춘 자
   단, 위의 자격을 충족하지 못한 자 중에서 본 학회지의 논문 심사를 위해 필요하다고 인정되는 경우 출판위원장의 추천에 의하여 이사회 결의를 거쳐 심사위원으로 위촉할 수 있다.

2. (선정) 논문심사위원의 선정에서 세부 전공영역별, 개념별, 연구방법별, 지역별 안배를 고려한다.

3. (정원) 논문심사위원 수는 영문심사위원 및 영문교정위원을 포함하여 최소 30명 이상으로 한다.

4. (절차) 전국 간호대학 또는 간호학교 교수 중 논문심사위원 기준에 적합한 위원을 출판위원장이 추천하면 출판위원회에서 심의, 선정하여 실 행위원회의 인준을 거쳐 학회장이 선정된 위원을 위촉한다.

5. (임기) 논문심사위원의 임기는 2년으로 하며, 연임할 수 있다.

6. (특별심사위원) 논문의 주개념이 매우 독특하여, 보다 전문적인 심사가 필요하다고 인정될 경우에는 출판위원회에서 임의로 특별심사위원을 지정하여 의뢰할 수 있다.

7. (영문논문심사위원) 영문으로 작성된 논문심사를 위해 임정 수의 영문논문심사위원을 두며 국문심사위원을 겸할 수 있다. 위촉절차와 임기는 국문논문심사위원과 같다.
논문심사 규정

1. 한국노인간호학회 회칙 본회 출판위원회 규정 제 4조 6항에 따라 노인간호학회지에 투고된 논문의 심사를 위하여 본 규정을 둔다.
2. 논문의 심사 및 채택은 본 규정에 따른다.
3. 논문의 연구 개념이 노인간호학 영역과 관련된 경우 게재가능하다.
4. 논문은 간호학 연구 보고서를 원칙으로 하여 심사하며 간호학 식사 및 박사학위논문은 심사하고 게재할 수 있다.
5. 투고자적과 투고요령에 부합되지 않는 원고는 접수하지 않는다.
6. 논문 1편당 심사위원은 3인으로 하며, 심사위원은 복수위원장이 온라인으로 선정한다.
7. 각 논문의 심사위원은 공개하지 않는다.
8. 영문교정위원은 별도로 두며 심사위원은 출판위원회에서 위촉한다.
9. 영문초록의 심사는 임시적으로 심사위원이 검토하며, 영어로 모국어로 사용하는 자 또는 간호학 전공 외국학위 소지자에게 의뢰한다.
10. 논문은 양적 연구, 질적 연구, 개념분석, 종설, Q 방법론 평가 기준 양식에 의거하여 심사한다.
11. 심사결과는 심사총평 및 심사평가 세부 내용으로 작성하고 우수논문, 게재가능, 수정 후 게재가능 및 게재불가로 판정한다.
   가. '게재가능'으로 판정된 논문은 심사위원이 지적한 사항을 저자가 수정한 후 심사위원이나 혹은 출판위원이 최종 심사 후 이를 확인하고 채택한다.
   나. '수정 후 게재'로 판정된 논문은 심사위원이 지적한 사항을 저자가 수정한 후 심사위원이 다시 심사하여 채택 여부를 결정한다.
   라. '게재불가'의 판정기준은 논문의 내용이 다음 중 어느 항에 해당되는 것으로 인정될 경우에 한한다.
       (1) 연구주제가 독창적이지 않거나 간호학적 의의가 결여되는 경우
       (2) 이미 발표된 타인의 연구 내용을 표절한 경우
       (3) 연구결과가 신뢰성이나 타당성이 결여되거나 두-translate하지 않은 경우
       (4) 대폭적인 수정을 하여도 게재가 불가능하다고 판단되는 경우
       (5) 심사 결과에서 '매우 부족하다'로 평가된 항목이 30%이상인 경우
       (6) 본 학회지의 올바른 규정 및 기타의 연구 윤리를 위반한 경우
       (7) 기타(심사위원 및 출판위원이 타당한 게재불가 사유를 제시해야 함)
   마. (6)의 올바른 규정 위반 여부는 출판위원회에서 심의한 결과가 적용된다.
   바. 올바른 규정에 위반하여 게재불가 판정을 받은 원고에 대하여 저자에게 소명기회를 부여할 수 있다.
12. 3인의 심사위원 중 2인이 '게재불가'로 판정하였을 경우에는 게재할 수 없다.
13. 심사내용은 저자 이외의 사람에게는 공개하지 않는다.
14. 심사위원은 온라인상으로 논문심사를 실시하며 심사평가자, 본문수정사항을 포함한 심사결과를 기록한다. 일정 기일이 지나도 심사결과를 기록하지 않을 경우, 심사를 포기하는 것으로 간주하고 출판위원장은 다른 심사위원에게 심사를 의뢰한다.
15. 저자가 수정한 원고를 지시한 날짜까지 제출하지 못하는 경우에는 게재를 다음 호로 연기하거나 포기하는 것으로 간주한다.
16. 저자가 수정한 원고를 심사위원의 수정요청으로부터 1개월 이후까지 제출하지 못하는 경우에는 특별한 요청이 없는 한 저자회수로 간주한다.

부칙
1. 이 규정은 한국노인간호학회 이사회의 인준을 받아 날로부터 시행한다.
2. 이 규정은 2007년 6월부터 시행한다.
3. 이 규정은 2012년 1월부터 시행한다.
4. 이 규정은 2013년 3월부터 시행한다.
5. 이 규정은 2019년 2월부터 시행한다.
논문심사 절차

1. 논문이 온라인으로 접수되면 출판위원회에서 먼저 투고자에게 학회지 투고요령에 합당한지를 확인한 후 출판위원장 명의로 투고자에게 접수되었음을 통보한다.

2. 접수된 논문은 출판위원장이 온라인으로 논문 1편당 논문의 주개념 및 연구방법론에 합당한 3명의 심사위원을 선정한다.

3. 심사위원은 다음의 논문심사지침에 따라 온라인상으로 논문심사를 실시한다.
   1) 선정된 심사위원은 해당 논문과 이해관계가 없어야 한다.
   2) 논문심사결과는 수령 후 10일 이내에 기록한다.
   3) 심사평가지 해당란에 표시하고, 본문수정 및 보완 사항은 온라인상에 구체적으로 기록한다.
   4) 심사 시 투고요령을 참고하여 투고규정에 맞는지 엄격하게 심사한다.
   5) 심사 시 심사위원간의 상호의견 교환이 필요하다면 출판위원장에게 연락한다.
   6) 심사한 사실에 대하여는 어떠한 경우에도 비밀을 유지한다.

4. 저자는 수정한 논문과 수정표를 심사위원 별로 정리하여 10일 이내에 온라인으로 제출한다. 수정내용은 다음과 같은 형식으로 일목요연하게 정리한다.

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<th>심사내용</th>
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5. 최종 수정한 논문이 제출되면 편집위원장에 의해 선임된 편집위원은 저자가 심사위원의 지적사항에 따라 충실히 수정하였는지의 여부를 심의한다. 심사위원의 지적사항에 대한 수정이 미비한 경우, 추가 수정이 필요한 경우, 투고규정에 맞지 않는 경우에는 재제를 보류하고 저자에게 제수정을 요청한다.

6. 선임된 편집위원이 해당 논문에 대한심의를 마치면 편집위원장이 논문 게재 여부를 최종 결정한다.
General Information

Journal of Korean Gerontological Nursing is the official publication of the Korean Gerontological Nursing Society. This journal provides up-to-date knowledge for nursing educators, practitioners, and researchers of gerontological nursing field in Korea where seen as one of the fastest aging societies in the world. The journal emphasizes articles on the issues most important for addressing emerging clinical issues in acute and long-term care for older people. In addition, this journal aims to contribute to the exchange of information and the spread of knowledge at the national and international level on the future prospects and countermeasures for the care issues related to aging. The Journal accepts manuscripts reporting quantitative, qualitative, methodological, philosophical, and theoretical research, meta-analyses, integrative and systematic reviews, and instrument development, with the aims of improving the wellness and quality of care of the older adult population. Manuscripts in other categories will be considered by the Editorial Board.

The official title of the journal is 'Journal of Korean Gerontological Nursing' (pISSN 2384-1877, eISSN 2383-8086) and the abbreviated title is 'J Korean Gerontol Nurs'. The journal is published in February 28th, May 31th, August 31th, and November 30th. All submitted manuscripts are peer-reviewed by three reviewers. The text may be written in Korean or English. The abstracts, acknowledgements, tables, figures, and references should be written in English. The articles in this journal are indexed in National Research Foundation of Korea (NRF) database (Korea Citation Index). The circulation number is 500. Full text is available in the following URL address of the Journal: http://www.jkgn.org This Journal is indexed in SCOPUS, CINAHL, ScienceCentral, Google scholar and KCI. All rights reserved to the Korean Gerontological Nursing Society. No portion of the contents may be reproduced in any form without written permission of the publisher.

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The policies on the research and publication ethics of JKGN follow the guidelines set by Korean Association of Medical Journal Editors, the Committee on Publication Ethics (COPE, http://publicationethics.org/), Ministry of Education and National Research Foundation of Korea with respect to settlement of any misconduct.

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All manuscripts should be prepared in strict observation of research and publication ethics guidelines recommended by the Council of Science Editors (CSE, http://www.councilscienceeditors.org/), International Committee of Medical Journal Editors (ICMJE, http://www.icmje.org/), and Korean Association of Medical Journal Editors (KAMJE, http://www.kamje.or.kr/). Any study involving human subjects or human data must be reviewed and approved by a responsible institutional review board (IRB). Please refer to the principles embodied in the Declaration of Helsinki(https://www.wma.net/what-we-do/medical-ethics/declaration-of-helsinki/doh-oct2008/) for all investigations involving human subjects and materials. Experiments involving animals should be reviewed by an appropriate committee for the care and use of animals. The authors must be able to state that the research involving humans or animals has been approved by a responsible IRB and conducted in accordance with accepted national and international standards.

Authorship

An author is considered as an individual who has made substantive intellectual contributions to a published study and whose authorship continues to have important academic, social, and financial implications. Researchers should adhere to the authorship criteria of ICMJE, 2019 (http://www.icmje.org/recommendations/browse/roles-and-responsibilities/defining-the-role-of-authors-and-contributors.html), which state that
“authorship credit should be met on all of the following: 1) substantial contributions to conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; 2) drafting the work or revising it critically for important intellectual content; 3) final approval of the version to be published; and 4) agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are investigated and resolved appropriately.” All other contributors should be listed in the acknowledgments section. These authorship criteria are intended to reserve the status of authorship for those who deserve credit and can take responsibility for the work. The authors are obliged to participate in the peer review process for other submitters’ manuscripts.

Conflict of Interest

Conflict of interest exists when an author (or the author's institution), reviewer, or editor has financial or personal relationships that inappropriately influence his/her actions (such relationships are also known as dual commitments, competing interests, or competing royalties). All authors should disclose their conflicts of interest, i.e., (1) financial relationships, (2) personal relationship, (3) academic competition, and (4) intellectual passion. These conflicts of interest must be included as a footnote on the title page or in the acknowledgement section. Each author should certify the disclosure of any conflict of interest with his/her signature.

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Each manuscript must be accompanied by a statement that it has not been published elsewhere and that it has not been submitted simultaneously for publication elsewhere. Authors are responsible for obtaining permission to reproduce copyrighted material from other sources and are required to sign an agreement for the transfer of copyright to the publisher. All accepted manuscripts become the property of the publisher. Authors have a due to pay for publication. You may find the following websites to be helpful: https://www.gnursing.or.kr/info/doc.php?tkind=1&lkind=53. For the policies on the research and publication ethics not stated in these instructions, International standards for editors and authors by the Committee on Publication Ethics (COPE)(https://publicationethics.org/resources/resources-and-further-reading/international-standards-editors-and-authors) can be applied.

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When the Journal faces suspected cases of research and publication misconduct such as a redundant (duplicate) publication, plagiarism, fabricated data, changed in authorship, undisclosed conflicts of interest, an ethical problem discovered with the submitted data, complaints against editors, and other issues, the resolving process will follow the flowchart provided by the Committee on Publication Ethics (https://publicationethics.org/guidance/Flowcharts). The Editorial Board of JKGN will discuss the suspected cases to reach a decision. In no case shall the Editorial Board of JKGN encourage such misconduct, or knowingly allow such misconduct to take place. JKGN will not hesitate to publish errata, corrigenda, clarifications, retractions, and apologies when needed.

Submission of Manuscripts

1. Anyone with an interest in gerontological nursing and related disciplines can become an author.
2. The manuscript should be prepared using MS word or HWP and submitted using online system (https://submit.jkgn.org/) or journal website (https://www.jkgn.org). In addition, the Copyright Transfer Agreement, the Self-review Form, and cover letter should be uploaded in the online submission system

Editor-in-Chief

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3. Publication Type

**Original article:** These include full papers reporting original research, on gerontological nursing.

**Review articles:** Invited and submitted review papers are accepted. The body of review article should be a comprehensive, scholarly evidence-based review of the literature, accompanied by critical analysis and leading to reasonable conclusions.

**Editorials:** These include comments by organizations or individuals on topics of current interest, by invitation only.

**Case report:** Description of clinical cases should be unique and provide discussion that help advancement of nursing practice for better outcomes.

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### Manuscript Preparation

1. Manuscripts should be written in Korean or English. Manuscripts written in English should be submitted with a certificate of English editing.

2. Manuscripts should be typed in a 12-point font, double-spaced, in either Times New Roman or Courier, with a margin of at least one inch on all sides, and should be prepared according to the Citing Medicine: The NLM (National Library of Medicine) Style Guide for Authors, Editors, and Publishers, 2nd ed. If there are any discrepancies between the JKGN guidelines and the NLM Manual, the former has precedence.

3. The length of manuscript is limited to 6,000 words (excluding title page, abstract, references, tables, figures, and any supplemental digital content).

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