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# A Scale for Continuity of Care in Home Health Care: A Development and Validation Study

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**Purpose:** This study aims to develop and test the psychometric properties of a scale for measuring the continuity of care specific to home health care patients in the context of Korean long-term care insurance services.
**Methods:** In phase 1, the initial item pool was created based on the concept analysis results using a literature review and in-depth interviews. Phase 2 evaluated the psychometric properties of the scale in the survey conducted in 2021 using a sample of 202 receiving long-term care visiting nursing services. Exploratory factor analysis (EFA) was used to examine the construct validity. An internal consistency was examined using Cronbach's α. Known group validity and criterion validity were assessed.
**Results:** The EFA suggested five factors: therapeutic relationship, coordination of care, service availability, customized care plan, and consistency in service provision. The internal consistency reliability of the continuity of care scale was satisfactory (Cronbach's α=.96). Known-group validity was established by comparing the continuity of care scores for high utilizers of home-visiting nursing services and low utilizers of home-visiting nursing services. Criterion validity was confirmed through the correlation between the developed scale and the performance of the visiting nurse service scale.
**Conclusion:** The developed scale was found to be reliable and relatively valid for measuring the patient's perceived continuity of care within the Korean long-term care visiting nursing system.

**Keywords:** Continuity of patient care; Home care services; Long-Term care; Psychometrics; Patient reported outcome measures

## Introduction

### Background

As rapid population ageing is occurring around the world, there is growing interest in policies to promote aging in place for the elderly to improve their quality of life and achieve sustainable social development [1]. As a result, there has been the continuous evolvement of the home-visiting health care services of the public long-term care insurance for the elderly, which were introduced in 2008 to provide social care services for elderly people who have difficulty in independently performing activities of daily living due to geriatric diseases and to suppress the growth of medical expenses. Recently, the Ministry of Health and Welfare announced plans to reform the current home care services focused on home care services providing support for activities of daily living, and change home care services into an integrated system of medical services and care by activating home-visiting nursing services and expanding the home-based medical care pilot project through the 3rd Master Plan for Long-Term Care (2023-2027) [2].

The users of long-term care visiting nursing services who have continuous medical needs and experience difficulty in activities of daily living are in a situation where they need to deal with health care service utilization, health risk management, and disease prevention on their own, which makes them more vulnerable in health management. According to the 2022 Long-Term

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Care Survey, the users of long-term care services have 3.5 chronic diseases and take 8.3 medications per day on average, and 17.6% of them have a functional health status that allows them to independently move without the help of others [3]. These survey results suggest that in order to maintain their state of living in their own homes, it is necessary to provide integrated medical and nursing care services.

Home-visiting nursing services are the only services providing medical care among the home health care services of the national long-term care insurance, and they have been reported to have the effects of delaying the deterioration of the health function status of the users of home health care services [4] and reducing unnecessary medical uses [5] through the integrated linkage of medical services and care. However, the current utilization rate of home-visiting nursing services among the long-term care services for the elderly was found to be only 1.9%, while the utilization rate of home care services focused on support for daily activities was 59.9%, showing that the utilization of home care services under the long-term care system tends to be focused on home care services [6].

In order to reform the current home-based care services into the integrated home care service provision system for providing medical services and care through the activation of visiting nursing services, it is necessary to investigate and understand the integration of medical services and care that is perceived and experienced by the users of home-visiting nursing services from their perspectives. The integration of organizations providing services at the level of the care provider is experienced as continuity of care from the user's perspective [7]. Haggerty et al. [8] defined 'continuity of care' as continuously receiving services necessary for the user from the perspective of individual users without the overlap or omission of services in a timely manner through a review of the literature on continuity of care in all the fields of health care published from 1966 to 2001. In addition, Haggerty et al. [8] explained that it is commonly observed in various health care fields such as primary care, mental health, nursing, and disease management in three forms: management continuity, informational continuity, and relational continuity [8]. According to Haggerty et al. [8], management continuity refers to providing consistent and flexible services according to changes in the user's health status, and informational continuity means sharing information on the user's health status, values, preferences, and personal circumstances that is accumulated through interactions between the user and the care provider or utilizing the information in health management plans [8]. Relational continuity refers to maintaining a therapeutic relationship between the care provider and the user over the continuum of care over time [8]. Thus, unlike service quality management, continuity of care is not designed only for evaluation of service provision behaviors at a specific time point, but it is a concept that aims at personalization of service provision by reflecting changing health needs and consistency in care services between care service providers through maintaining a long-term relationship with the users of care services, and this concept emphasizes connectivity between sporadically disconnected elements along the path of care [8,9].

Continuity of care is an essential requirement for the health management of patients with chronic conditions such as the users of visiting nursing services, who are at high risk of occasional interruptions of services as they get to come into contact with various service providers over a long-term period [10]. In the case of the users of home-visiting nursing services among the long-term care services for the elderly in Korea, unlike patients requiring temporary acute post-discharge care, they require long-term, continuous health care within the community [11]. Meanwhile, they have a broad range of needs in the environmental, psychosocial, physiological, and health behavior areas, which can be classified according to the problem classification scheme of the Omaha System [12]. Therefore, the role of visiting nurses is important in planning and arranging integrated services along a continuum of home-visiting nursing services to avoid the occasional interruptions or omission of services needed by the users. Some foreign previous studies on continuity of care reported that continuity of care in services for the users of home-visiting nursing services had positive effects on the service experience of the users, such as the improvement of overall service satisfaction and communications among medical staff [13], and continuity of care in home-visiting nursing services was also found to be associated with a significant reduction in hospital readmissions [14].

However, although the three dimensions of continuity of care (management continuity, informational continuity, and relational continuity) suggested by Haggerty et al. [8] are common aspects of all healthcare fields, existing studies on continuity of care in visiting nursing services only addressed some of the three dimensions of continuity of care, such as the proportion of visits by the same nurse [13,14] and information transfer or communication and cooperation upon discharge from acute care hospitals [15-17]. Thus, previous studies on continuity of care in visiting nursing services have limitations such as the incomprehensive measurement of continuity of care or a lack of consistency of the measurement concept. Haggerty et al. [9] developed a comprehensive continuity of care assessment tool that includes communication and relational continuity among medical staff as well as

care planning and care coordination, which are essential for the continuous health management of patients with a wide range of complex morbidities, based on three conceptual dimensions of continuity of care [8]. However, the scale proposed by Haggerty et al. [9] was developed with a focus on the role of primary care outpatient service providers, and thus there are limitations in applying it to long-term care visiting nursing services in Korea, which has different institutional and environmental characteristics. Therefore, this study aimed to develop a scale to measure the conceptual constructs of continuity of care experienced from the user's perspective by specifically reflecting the characteristics of long-term care visiting nursing services in Korea. Through the development of a measure of continuity of care in visiting nursing services, this research sought to provide basic data for strengthening the role of visiting nurses and for developing interventions in order to support stable and sustainable aging in place of the users of home health care services.

### Aims

This study aimed to identify the constructs of continuity of care in long-term care visiting nursing services, develop a preliminary multidimensional scale to measure the constructs of continuity of care experienced by the users of long-term visiting nursing services, and verify the reliability and validity of the developed scale.

## Methods

### Study design

This study is a methodological study to develop a scale for continuity of care experienced by the users of long-term care home-visiting nursing services, and verify its reliability and validity. In the phase of scale development, preliminary survey questions were created by clarifying the concepts through a literature review and in-depth interviews, and then they were revised through the evaluation of content validity by experts and a preliminary survey. In the stage of the verification of the reliability and validity of the scale, a questionnaire survey was conducted.

### Phase of scale development

*1. Identification of the main attributes of constructs and creation of preliminary items*

In this study, the core definitions of the three conceptual dimensions of continuity of care (management continuity, informational continuity, and relational continuity) suggested by Haggerty et al. [8] were set as the conceptual framework of the study. Then, in order to derive the main attributes of continuity of care experienced by the users of long-term care visiting nursing services for each conceptual dimension, this study conducted a literature review and in-depth interviews with the users of long-term care visiting nursing services as well as visiting nurses. First, in the phase of a literature review, five domestic and international academic search engines, including Pubmed, CINHAL, PsychInfo, Research Information Sharing Service (RISS), and Korean studies Information Service System (KISS), were employed. Through the literature search process, 37 articles suitable for the research topic were finally selected for a literature review among the articles that included both the two search terms of 'continuity of patient care' and 'home care service', which are terms representing the key concepts of this study. Second, a qualitative analysis was conducted after collecting data by conducting in-depth interviews with the users of long-term care visiting nursing services as well as visiting nurses. In selecting the participants, the inclusion criteria for the users of visiting nursing services were as follows: people aged 65 or older; long-term care grade 1 to 5; people who recently used home-visiting nursing services four or more times. Based on a similar previous study [18], when a participant was able to communicate verbally in everyday, easy-to-understand language, the individual personally participated in an in-depth interview, but when a participant was unable to communicate verbally due to their physical or mental health conditions, the primary family caregiver participated in an in-depth interview instead. Regarding the selection of visiting nurses among the participants, visiting nurses were selected from nurses with at least one year of experience in long-term care visiting nursing services. At the time of data saturation, the total participants included five users of visiting nursing services (three elderly users of the service, two primary family caregivers) and five visiting nurses.

In-depth interviews were performed using semi-structured, open-ended questions. Based on a previous study [19], the questions used in the interviews with the users of visiting nursing services included questions about the experience of using visiting nursing services, the meaning of the term 'continuity of care' for the participant, important aspects of continuity of care to the user, and the roles of visiting nurses required to achieve continuity of care. In addition, considering that the participants were elderly people, in order to help them clearly understand the questions, explained the meaning of the term of continuity of care to them, based on the definition of continuity of care by Haggerty et al. [8]. In other words, the term was explained by describing it as the extent to which necessary health services are continuously provided in a timely manner without any delay, omission, or overlap of services. In-depth interviews were conducted using

specific questions related to the three conceptual dimensions of care continuity in visiting nursing services (management, continuity, informational continuity, and relational continuity) to help the participants clearly understand interview questions and lead them to talk about their own experiences. More specifically, interviews were carried out by asking the participants specific questions about their experience of using home-visiting nursing services, such as experiences regarding continuous timely provision of necessary services by visiting nurses without the omission, overlap, or delay of services, appropriate delivery of health information without omission when visiting nurses communicate with other providers such as doctors, and continuous relationships with visiting nurses continuous without interruption. In-depth interviews with visiting nurses were conducted by asking questions regarding the meaning of the term 'continuity of care' for them, characteristics, examples, and key elements of continuity of care, 'continuity of care' experienced by users as they use visiting nursing services, and aspects of continuity of care that are important to users. The in-depth interviews were recorded with the consent of the participants, and then recordings of interviews were transcribed along with field observations. After the transcription process, the interview data were analyzed to derive and classify the main themes of the key concepts according to the grounded theory methodology of Corbin & Strauss [20]. Then, the processes of classifying the main themes of the data and intentionally extracting samples related to the research questions were repeatedly performed, and the results of the qualitative analysis were compared and reviewed with the results of the literature review for an integrated analysis of data. As a result, the conceptual attributes comprising continuity of care in visiting nursing were derived as eight factors (customized care plan, care coordination, availability of care, consistency in service provision, nurse-user communication, nurse-provider communication, longitudinal care, and therapeutic relationship) in a total of three dimensions (management continuity, informational continuity, and relational continuity) (Figure 1). Based on the derived subfactors of continuity of care, a total of 31 preliminary items were developed. Each item was rated using a 5-point Likert scale ranging from 1 point (='Strongly disagree') to 5 points (='Strongly agree').

*2. Verification of content validity*

To verify the content validity of the preliminary questionnaire, an expert panel composed of five experts (two nursing professors, one professor with experience in psychometric evaluation, and two directors of long-term care visiting nursing institutions)

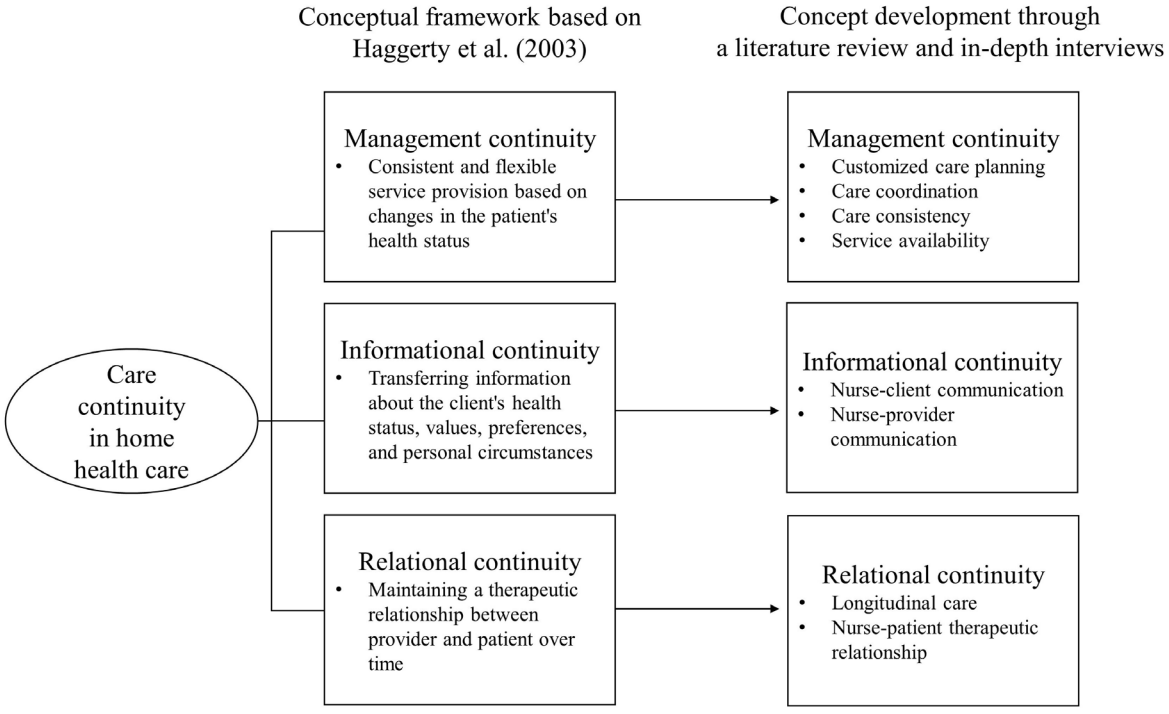


**Figure 1.** Concept development process.

was organized to ask for the evaluation of validity. The experts assessed the validity of each item on a 4-point scale from 1 point ('Not valid at all') to 4 points ('Very valid'), and they were also asked to provide their opinions on the composition of the tool or items that needed to be revised. As a result of computing the item-level content validity index (I-CVI), two items did not meet the criterion of 0.8 or higher [21]. Thus, according to experts' opinion, one item with overlapping meaning was deleted, some items were partially revised, and one item was added.

*3. Preliminary Survey*

In order to assess the face validity of the preliminary items through a preliminary survey, a preliminary survey was conducted from October 5 to 7, 2021. Finally, a total of 20 people (6 elderly people using home-visiting nursing services and 14 primary family caregivers) participated in the survey. In the preliminary survey, the average time required to complete the questionnaire was 18.20±7.23 minutes, and most of the respondents had no difficulty in understanding and responding to the preliminary items.

**Phase of scale evaluation: Verification of validity and reliability**

*1. Participants*

The inclusion criteria for selecting the participants of this study were as follows: 1) people aged 65 years or older; 2) long-term care grade 1 to 5 (excluding cognitive support grade); 3) experience of using long-term care visiting nursing services four or more times; 4) people who understood the purpose of the study and voluntarily agreed to participate in the study. Meanwhile, in the case of the users who were unable to communicate verbally due to physical or mental health conditions, their primary family caregivers were allowed to participate in the survey instead. Regarding the sample size for factor analysis, according to a previous study suggesting that if the number of items of a scale is 40 or less, the appropriate sample size is around 200 people [22], 207 participants were recruited in this study. Of the 207 participants, 202 participants' data were used for exploratory factor analysis after excluding two people who withdrew from the study during the survey and three people under 65 years of age.

*2. Data collection*

Data collection was conducted through the cooperation of the heads of long-term care visiting nursing centers located in Seoul, the Seoul Metropolitan Area, Chungcheong region, Jeolla region, Gyeongsang region, and Jeju Province. To recruit study participants, participant recruitment notices were distributed to the users of visiting nursing services who met the inclusion criteria and their primary family caregivers, and data collection was conducted only with those who voluntarily expressed their intention to participate. Prior to data collection, the researcher provided the elderly participants and their primary family caregivers with sufficient explanations about the purpose and content of the study, the risks and benefits of the study, the possibility of withdrawal from study participation without any disadvantages, the intended use of the collected data, guarantees of anonymity, and data confidentiality. Data collection was carried out from October 8 to November 18, 2021, and the data was collected personally by the researcher.

*3. Measure*

To verify the criterion validity of the scale, the Performance of Visiting Nursing Services Scale developed by Byeon & Hyun [23] was used with the permission of the developer. The Performance of Visiting Nursing Services Scale developed by Byeon & Hyun [23] consists of a total of 35 items on the following five determinants of service quality: 'tangibility', 'reliability', 'responsiveness', 'assurance', and 'empathy.' Each item is measured on a 5-point Likert scale. The value of Cronbach's α for each subfactor was reported as .85~.91 by the developer of the scale, and the value of Cronbach's α was .97 in this study.

*4. Data analysis*

The collected data was analyzed using the SPSS 28.0 program. First, the general characteristics of the participants were analyzed by calculating the frequency, percentage, mean, and standard deviation. Second, item analysis was performed by calculating the mean, standard deviation, skewness, and kurtosis, and Pearson correlation analysis was also performed. Third, the Kaiser-Meyer-Olkin (KMO) test and Bartlett's test of sphericity were performed to determine if the sample was suitable for exploratory factor analysis. Fourth, exploratory factor analysis was conducted using the principal axis factoring method and the Promax rotation, which is an oblique rotation that allows factors to be correlated. The number of factors was determined by comparing the scree plot and parallel analysis results by applying an eigenvalue of 1.0 or higher according to Kaiser's criteria, and for factor loading, the criterion level of .40 or higher was applied [24]. Fifth, one-way ANOVA and the Scheffé test were used for verification through comparisons between group means. Sixth, Pearson correlation analysis was performed to verify criterion validity. Finally, the Cronbach's α value was calculated to verify the internal

consistency of the tool, and the Spearman-Brown coefficient, an estimate of the reliability of odd—numbered items or even-numbered items, was calculated to verify split-half reliability.

### Ethical considerations

This study received an exemption determination from the Institutional Review Board of the researcher's affiliated institution (IRB No.:162-4, EWHA-202109-0006-02). Before conducting in-depth interviews, a preliminary survey, and the main survey, the researcher explained to the participants the purpose and content of the study, as well as the risks (inconveniences) and benefits of the research in accordance with the Declaration of Helsinki, and informed them that they could withdraw from participation in the study at any time without any disadvantages if they wanted to. In addition, written informed consent for participation in the study was obtained from the participants after giving them sufficient explanations about personal information protection procedures, such as guaranteeing the confidentiality and anonymity of the collected data and the scope of the statistical use of the collected data.

## Results

### General characteristics of the participants

Out of the 202 participants, who were elderly people using home-visiting nursing services, the proportion of non-proxy respondents was 46.0%. Females accounted for 62.4% of the users of visiting nursing services, and the mean age of the participants was 82.63 ± 7.09 years. As for long-term care insurance grade, people with grade 4 accounted for the largest proportion at 40.6%, and the average number of chronic diseases was 4.73 ± 2.49. Regarding the duration and frequency of the use of visiting nursing services, the total duration of the use of the services was 2.12 ± 1.66 years, the average number of days of using the services in the past month was 6.77 ± 4.30 days, and the average length of time of using the services per session was 34.13 ± 11.52 minutes (Table 1).

### Item analysis

To determine the normality of the data for item analysis, it was checked whether the mean values of responses on a 5-point Likert scale were in the range from 1.5 to 4.5, whether the standard deviation was 0.75 or higher [25], and whether the absolute values of skewness and kurtosis were 2 and 7 or lower, respectively [26], and as a result, it was confirmed that the criterions were satisfied (Table 2). Item 17 was deleted because its standard deviation was 0.67. In the case of the other items, the mean scores ranged from 3.59 to 4.32, the standard deviations ranged from 0.75 to 0.97, the skewness value was -0.93~-0.25, and the kurtosis value was -1.11~0.41, indicating that the normality assumptions of the data were satisfied.

In order to determine the contribution of items to the scale, the correlation between the total score and the score of each item was examined, and the Cronbach's α value was calculated when each item was deleted (Table 2). The item-total correlation coefficients (ITC) for each of the 30 items ranged from .35 to .80, and there were no items with a ITC of .30 or lower [27]. The Cronbach's α value was .97, and this was not significantly different from the Cronbach's α value obtained when each item was deleted. Through the analysis of inter-item correlations, some items were deleted. In other words, based on the cutoff value for inter-item correlation coefficients that is judged to indicate low discriminatory power [27,28], items 19 and 30 were removed since the correlation coefficient with other items were above .80, and items 8 and 23 were also deleted since the correlation coefficient with other items were below .30.

### Verification of construct validity

To determine whether the 26 selected items were adequate for factor analysis, tests for sampling adequacy were conducted. As a result, the KMO measure was .94, and the Bartlett's test of sphericity value was $\chi^2 = 4501.56$ ($p < .001$), indicating that the data were suitable for exploratory factor analysis. Exploratory factor analysis was conducted using the principal axis factoring method

**Table 1.** General Characteristics of Participants (*N*=202)

| Variables | Categories | n (%) or M ± SD |
|---|---|---|
| Respondent | Patient | 93 (46.0) |
| | Family caregiver | 109 (54.0) |
| Gender | Male | 76 (37.6) |
| | Female | 126 (62.4) |
| Age (yr) | | 82.63 ± 7.09 |
| Long-term care grade | Grade 1 | 31 (15.4) |
| | Grade 2 | 21 (10.4) |
| | Grade 3 | 55 (27.2) |
| | Grade 4 | 82 (40.6) |
| | Grade 5 | 13 (6.4) |
| Number of chronic diseases | | 4.73 ± 2.49 |
| Home-visiting nursing use | Total duration (yr) | 2.12 ± 1.66 |
| | Days with nurse visits/ month | 6.77 ± 4.30 |
| | Length in minutes | 34.13 ± 11.52 |

**Table 2.** Item Description & Cronbach's α's (*N*=202)

| Factor | Item | Item description | M ± SD | Corrected item-total correlation | Cronbach's α after item deleted |
|---|---|---|---|---|---|
| Management continuity | | | | | |
| Customized care plan | 1 | Knowing the user's health history and current health status | 4.15 ± 0.78 | .59 | .97 |
| | 2 | Knowing the user's family situation | 3.96 ± 0.88 | .67 | .97 |
| | 3 | Explaining to the user the services needed for his or her health condition | 4.27 ± 0.76 | .80 | .97 |
| | 4 | Establishment of a care plan through mutual consultation with the user and family caregivers | 4.21 ± 0.78 | .79 | .97 |
| | 5 | Continuous care plan adjustment based on the evaluation of the user's response to care | 4.31 ± 0.76 | .68 | .97 |
| Care coordination | 6 | Seeking the doctor's advice on the user's health problems | 3.95 ± .0.86 | .73 | .97 |
| | 7 | Referring the user to doctors when necessary | 3.86 ± 0.90 | .66 | .97 |
| | 8 | Linking available community care resources | 3.59 ± 0.97 | .35 | .97 |
| | 9 | Building a collaborative relationship with the user's primary care physician | 3.89 ± 0.87 | .67 | .97 |
| | 10 | Communicating with other home care service providers | 4.12 ± 0.84 | .63 | .97 |
| | 11 | Encouraging users and their families to participate in care | 4.22 ± 0.79 | .73 | .97 |
| Service availability | 12 | Providing timely services for users' health issues | 4.11 ± 0.80 | .74 | .97 |
| | 13 | Spending sufficient time on direct user care | 4.23 ± 0.77 | .67 | .97 |
| | 14 | Providing high-quality home visiting care that meets the user's primary care needs within the patient's home | 4.24 ± 0.75 | .66 | .97 |
| Care consistency | 15 | Consistent provision of standardized nursing services | 4.04 ± 0.77 | .56 | .97 |
| | 16 | Provide nursing care according to the priorities of the care plan | 4.14 ± 0.76 | .73 | .97 |
| | 17 | Knowledge and skills required for healthcare | 4.27 ± 0.67 | - | - |
| Informational continuity | | | | | |
| Nurse-user communication | 18 | Taking time to listen to the user and family caregivers | 4.32 ± 0.80 | .74 | .97 |
| | 19 | Explaining the treatment or care provided to the user | 4.29 ± 0.76 | .77 | .97 |
| | 20 | Teaching the user and family caregivers how to engage in self-care correctly | 4.30 ± 0.76 | .79 | .97 |
| Nurse-Provider communication | 21 | Documenting the user's health status and the services provided | 4.18 ± 0.76 | .77 | .97 |
| | 22 | Exchanging documented or verbal information about the user's care | 3.82 ± 0.93 | .76 | .97 |
| Relational continuity | | | | | |
| Longitudinal care | 23 | Continuous visits by a limited number of nursing personnel | 4.26 ± 0.80 | .43 | .97 |
| | 24 | Maintaining longitudinal and regular contact with the user | 3.88 ± 0.90 | .72 | .97 |
| | 25 | Checking the user's health status even while hospitalized | 3.81 ± 0.93 | .65 | .97 |
| Therapeutic relationship | 26 | Building users' trust in nurses' expertise in addressing comprehensive health problems | 4.22 ± 0.77 | .77 | .97 |
| | 27 | Treating the user with understanding and respect | 4.28 ± 0.75 | .76 | .97 |
| | 28 | Taking responsibility for resolving users' health problems | 4.23 ± 0.75 | .79 | .97 |
| | 29 | Providing services at scheduled times | 4.22 ± 0.77 | .68 | .97 |
| | 30 | Building rapport with the user and their families | 4.30 ± 0.75 | .77 | .97 |
| | 31 | Helping the user feel comfortable discussing health-related issues or concerns | 4.28 ± 0.81 | .79 | .97 |

using Promax rotation. As a result, four factors with an eigenvalue of 1.0 or greater were extracted according to the Kaiser rule, and it was found that the slope of the graph in the scree plot became rapidly gentler starting from factor 3. As a result of performing parallel analysis, the number of factors compared to the 95th percentile value among the eigenvalues obtained from 500

random data was found to be 5. Thus, exploratory factor analysis was repeatedly conducted by varying the number of factors from 3 to 5, and a 5-factor model that best matched the theoretical basis was finally selected. Then, exploratory factor analysis was performed by fixing the number of factors as 5. As a result, all items showed a commonality of .40 or higher and a factor loading of .40 or higher, but in the case of item 29, the factor loading was cross-loaded on the first and fifth factors at .31 and .69, respectively. However, item 29 was maintained because the difference was .30 or higher and the item was considered necessary to theoretically explain the fifth factor. However, items 11, 21, 24, and 25 were removed because the relevant factors were considered difficult to explain, based on the conceptual framework of this study. The final number of items derived through exploratory factor analysis was 22. At this time, the KMO measure was .93, the Bartlett's test of sphericity value was $\chi^2 = 3651.58$ ($p < .001$), and the cumulative explained variance was 75.6% (Table 3).

The results of group comparison analysis performed to verify the construct validity of the developed tool (Table 4) showed that the level of continuity of care was significantly higher in the groups that used the visiting nursing service 5-9 times or 10 or more times in the past month, compared to the group that used the service less than 4 times in the past month ($F = 13.16$, $p < .001$). In addition, the group that used visiting nursing for an average of 30 to less than 60 minutes per session showed a significantly higher level of continuity of care compared to the group that used it for less than 30 minutes $F = 6.71$, $p = .002$), indicating that the hypothesis was verified.

### Naming factors

The name of each factor was determined so that the name could represent the common attributes of the items of each factor through the process of identifying the meanings of the items included in each factor through comparison with the meanings of

**Table 3.** Exploratory Factor Analysis Pattern Matrix (*N*=202)

| Factors | Item | 22 Items | | | | |
|---|---|---|---|---|---|---|
| | | Factor 1 | Factor 2 | Factor 3 | Factor 4 | Factor 5 |
| Factor 1 | 31 | .89 | .03 | -.10 | .16 | -.11 |
| Therapeutic relationship | 27 | .85 | .05 | -.06 | .02 | .00 |
| | 28 | .85 | -.01 | .03 | -.05 | .08 |
| | 18 | .79 | -.07 | .15 | .01 | -.06 |
| | 26 | .74 | .02 | .12 | -.15 | .16 |
| | 20 | .69 | .01 | .08 | .04 | .05 |
| Factor 2 | 9 | .00 | .95 | -.09 | .07 | -.14 |
| Coordination of care | 7 | -.01 | .82 | .04 | -.15 | .09 |
| | 6 | -.01 | .77 | .06 | .01 | .03 |
| | 10 | -.04 | .71 | -.06 | .12 | .02 |
| | 22 | .21 | .52 | .12 | -.09 | .11 |
| Factor 3 | 13 | .05 | -.05 | .94 | .01 | -.12 |
| Service availability | 14 | .05 | .03 | .70 | .04 | .00 |
| | 12 | .04 | .06 | .70 | .03 | .11 |
| Factor 4 | 2 | .19 | .02 | .01 | .79 | -.25 |
| Customized care plan | 1 | -.10 | -.04 | .01 | .77 | .09 |
| | 3 | .17 | .09 | -.02 | .57 | .14 |
| | 5 | -.16 | .01 | .26 | .47 | .28 |
| | 4 | .15 | .26 | .06 | .43 | .03 |
| Factor 5 | 15 | -.12 | .07 | .07 | -.08 | .79 |
| Consistency in service provision | 16 | .27 | .02 | -.12 | .02 | .71 |
| | 29 | .30 | -.13 | -.10 | .07 | .70 |
| Explained variance | | 10.1 | 8.7 | 8.2 | 8.8 | 7.9 |
| Explained for variance (%) | | 54.8 | 7.2 | 5.0 | 4.6 | 3.9 |
| Cumulative variance (%) | | 54.8 | 62.0 | 67.0 | 71.6 | 75.6 |
| Kaiser-Meyer-Olkin (KMO), Bartlett's test of sphericity ($\chi^2$) | | KMO = .93, $\chi^2 = 3651.58$ ($p < .001$) | | | | |
| Total Cronbach's α = .96 | | .94 | .89 | .87 | .88 | .85 |

**Table 4.** Known Group Validity of a Scale for Continuity of Care in Home Health Care (*N*=202)

| Variables | Categories | n (%) | M ± SD | F | *p* | Scheffé |
|---|---|---|---|---|---|---|
| Home-visiting nursing use | | | | | | |
| Days with nurse visits/ month | 1-4[a] | 93 (46.0) | 86.37 ± 13.22 | 13.16 | < .001 | a < b, c |
| | 5-9[b] | 58 (28.7) | 95.55 ± 11.57 | | | |
| | 10 ≤ [c] | 51 (25.3) | 94.86 ± 11.14 | | | |
| Length in minutes | < 30[a] | 24 (11.9) | 82.67 ± 10.86 | 6.71 | .002 | a < b, c |
| | 30~60[b] | 154 (76.2) | 91.90 ± 12.98 | | | |
| | 60 ≤ [c] | 24 (11.9) | 94.83 ± 11.86 | | | |

**Table 5.** Correlations of a Scale for Continuity of Care in Home Health Care Toward the Performance of Visiting Nursing Services Scale (*N*=202)

| Factors | Performance of visiting nursing service scale |
|---|---|
| | r (*p*) |
| Continuity of care in home health care | .91 ( < .001) |
| Therapeutic relationship | .87 ( < .001) |
| Care coordination | .77 ( < .001) |
| Care availability | .75 ( < .001) |
| Customized care plan | .76 ( < .001) |
| Consistency in service provision | .73 ( < .001) |

the preliminary items. As a result, the five factors included in the scale were named as follows: 'therapeutic relationship (6 items)', 'coordination of care (5 items)', 'service availability (3 items)', 'customized care plan (5 items)', and 'consistency in service provision (3 items).' The first factor corresponds to the dimension of the relational continuity, and the second to fifth factors correspond to the dimension of management continuity.

### Criterion validity

The correlation coefficient between the total scores of the scale developed in this study and the Performance of Visiting Nursing Services Scale [23] was .91 ($p$ < .001), and the correlation coefficient of the total scores for each of the five factors was .73 to .87, indicating a high correlation, so the criterion validity of the developed scale was verified (Table 5).

### Reliability

The Cronbach's α value for each factor of the scale ranged from .85 to .94, and the Cronbach's α value for the entire scale was .96. The value of split-half reliability estimated using the Spearman-Brown formula was .94 ($p$ < .001), so the internal consistency and stability of the developed scale were verified (Table 3).

## Discussion

In the stage of scale development, continuity of care was defined as eight factors under three conceptual dimensions (management continuity, informational continuity, and relational continuity) through an integrated analysis of the results of a literature review and in-depth interviews with the users of long-term care visiting nursing services and visiting nurses based on the definition of the concept suggested by Haggerty et al. [8]. However, in the phase of scale validation, the number of the subfactors of continuity of care was reduced to five factors under two conceptual dimensions (management continuity, relational continuity). Among the three factors excluded from the subfactors of continuity of care, 'nurse-user communication' and 'nurse-provider communication' in the informational continuity dimension were respectively integrated into 'therapeutic relationship' (the first factor), and 'care coordination (the second factor)', and 'longitudinal care' was deleted.

The first factor, which belongs to the dimension of relational continuity, explained 54.8% of the variance, showing that it had the greatest explanatory power among the five factors. The six items on this factor were questions about the extent to which visiting nurses 'listen to users and their families', 'have trust in the professionalism of health care', 'have a sense of responsibility for the management of health problems', 'show concern for and human respect for the user', 'provide education on health management methods for the user', and 'provide the user with comfortable access to counseling about health problems or concerns.' This factor was named 'therapeutic relationship.' Regarding the impact of the relationship between the user and the provider on continuity of care, Yang et al. [29] reported that when long-term care home-based care service workers have difficulty forming relationships with users and their families, they experience difficulty in continuing the service due to the users' or their families' refusal of the visits of the service providers or their uncooperative

attitudes. This finding indicates that therapeutic relationships have a significant impact on the continuity of visiting nursing services. In this regard, it has been suggested that if visiting nurses elicit the user's cooperation to promote the user's self-management by building rapport with the user and his or her family and maintaining a therapeutic relationship with them [9], and provide nursing services that can meet the user's needs by accurately identifying changes in the user's needs over time, they can allow users to experience predictability and consistency in services [8].

Among the second to fifth factors belonging to the dimension of management continuity, the second factor explained 7.2% of the variance, and this factor included questions asking about the degree of visiting nurses' service provision regarding the following five items: 'consultation with doctors to solve the user's health problems,' 'referral to doctors for medical treatment when necessary,' 'maintaining a cooperative relationship with the doctor who issued a physician's order for visiting nursing services for the user,' 'linkage and communication with long-term care service institutions or personnel,' and 'exchange of information with doctors about users' key health information.' The factor was named 'care coordination.' Care coordination includes the integrated linkage of home health care services, such as home visit care, home visit bathing, day and night care, and the provision of rental welfare equipment along with medical treatment by physicians. In order to strengthen the role of visiting nurses as practical care coordinators, it is necessary to establish a formal system that allows for collaboration with doctors or information sharing between different other home care service areas [18], and visiting nurses should be given decision-making authority and allowed to be in charge of their work as care coordinators.

The third factor explained 5.0% of the variance, and it included three items on whether visiting nurses 'provide sufficient nursing care during the planned visiting time,' 'solve the service users' health problems in their homes if possible,' and 'provide prompt nursing care.' This factor was named 'availability of care.' In order to ensure a rapid response to the complex healthcare needs of home-visiting nursing service users with limited mobility, it is necessary to secure sufficient visiting nursing personnel and expand and develop the areas of home-visiting nursing services to accommodate service users' demand regarding visiting hours and respond to their comprehensive healthcare needs. Lim & Kim [11] conducted job analysis for the cases of home-visiting nursing services currently provided, and reported that home-visiting nurses perform various direct nursing activities in areas such as education, counseling, rehabilitation exercise, community resource linkage, and case management in addition to the therapeutic nursing areas, including basic nursing care, health management, physical function management, cognitive function management, nutritional management, excretion management, and disease management, which are presented in the standard long-term care plan. Therefore, the development and expansion of home-visiting nursing services in areas that are currently not legally included in the service items for which healthcare service fees are not paid or covered by the National Health Insurance Service, securing sufficient manpower [11], and improving working conditions including the compensation system for home-visiting nurses [29,30] are considered prerequisite tasks for the quantitative and qualitative improvements in the availability of care to meet the complex needs of the users.

The fourth factor explained 4.6% of the total variance, and the five items included in the factor are questions about the degree of visiting nurses' 'knowledge of the past medical history and current health problems of the user', 'knowledge of the home situation of the user', 'creating a nursing plan through discussion and an agreement with the user and his or her primary family caregiver', and 'flexibly adjusting the nursing plan according to changes in the user's health status'. This factor was named 'customized care plan.' In establishing a care plan, based on comprehensive knowledge and understanding of the service recipient's health status and the family's situation regarding the care of the service recipient [19], visiting nurses elicit interest and cooperative attitudes from family caregivers who make decisions about and take responsibility for the utilization and management of services [29], and flexibly adjust services according to the changing course of the disease within a complex medical system, thereby contributing to the long-term maintenance of living in place of users [31].

The fifth factor explained 3.9% of the variance, and consists of 3 items. The three items included were 'provision of services according to standardized procedures', 'provision of services according to the priorities of a care plan', and 'visiting the service user at the appointed time' by visiting nurses, and the factor name is 'consistency in service provision. Consistency in service provision is an important concept for patients with complex chronic conditions who may potentially receive services from multiple providers with different goals. A shared care plan and care protocol provide predictability and a sense of security for future care for both users and providers, thereby improving continuity of care [8]. According to the 'National Survey of Working Conditions of Long-Term Care Visiting Nursing Services' conducted in 2020, there were differences in the application and performance of nursing processes depending on the location of the

home-visiting nursing service institution or the size of the city [30], so it is thought that the development of service standardization guidelines can contribute to ensuring consistency in visiting nursing services.

Among the three conceptual dimensions of this tool, informational continuity was not derived as an independent factor. These results are similar to the factor analysis results of the generic measure of continuity of care for primary care developed by Haggerty et al. [9], which was developed based on the concepts of the three dimensions of continuity of care presented by Haggerty et al. [8]. The fact that informational continuity was not included as a separate factor in the developed scale may be attributed to the fact that it is difficult for users to directly observe or perceive information sharing between service providers or recording or documenting health status. However, additional research on the dimension of informational continuity is needed to explore measurement methods that allow users to accurately perceive and evaluate the dimension.

Regarding attributes, the 'longitudinal care' attribute of the preliminary items was not included in the final components. In particular, in the correlation analysis between items, 'continuous visits by one or two identical visiting nurses', which corresponds to the attribute of 'longitudinal care', showed a low correlation with other items. Meanwhile, in the field of primary care, continuous contact with the same physician has been regarded as continuity of care since the 1970s, and quantitative indicators, such as the Continuity of Care Index (COCI) and Usual Provider Continuity Index (UPCI), have been actively employed to assess continuity of care [32]. In primary care, a continuous relationship with the same healthcare service provider can help minimize appointment cancellations and duplication of services, facilitate the continuous acquisition of comprehensive information about the service users in the same location, and contribute to consistent care provision, regular follow-up care, and the establishment of a therapeutic relationship with the service users [8,9]. However, in the actual practice of long-term care visiting nursing services studied in this study, differently from the situation of primary care centered on outpatient treatment, service users are thought to feel a sense of stability through the predictability and consistency of the service through the maintenance of continuous relationships with key service managers, such as the director of a home-visiting nursing center, rather than the one-on-one relationship between the nurse and the user.

The correlation coefficient between the total scores of the developed scale and the Performance of Visiting Nursing Services Scale [23] was calculated as .91, indicating that the criterion validity of the developed scale was secured. These results suggest that some sub-attributes of the five factors of 'therapeutic relationship', 'availability of care', 'customized care plan', and 'consistency in service provision', which are the attributes that determine continuity of care in home-visiting nursing services in the developed scale, may have some conceptual similarity to the five determinants of service quality ('tangibility', 'reliability', 'responsiveness', 'assurance', and 'empathy') of the Performance of Visiting Nursing Services Scale [23]. However, the scale developed in this study was developed to measure the essential elements for achieving continuity of care in home-visiting nursing services, and thus the assessment results of this tool are different from the information on the overall quality and performance of home-visiting nursing services provided by the Performance of Visiting Nursing Services Scale [23]. In other words, the inclusion of the key attributes of continuity of care in the developed scale suggests that the five attributes included in this tool, which are 'therapeutic relationship', 'care coordination', 'availability of care', 'customized care plan', and 'consistency in service provision', are key elements in providing continuous care, and are highly correlated with the improvement of the quality of home-visiting nursing services.

The present study developed a measure for continuity of care by clarifying the multidimensional role of service providers in ensuring continuity of care from the user's perspective, and verified the reliability and validity of the developed scale. The development and validation of a scale for continuity of care are considered a significant outcome in view of the current policy environment, where a direction of change in home health care services of long-term care insurance is being explored in order to respond comprehensively to the needs of service users through measures such as the activation of home-visiting nursing services. However, the users' perceptions and evaluations of continuity of care in visiting nursing services may be sensitively affected by changes in their health needs, the content of services, and the role of service providers [9], so caution is needed in interpreting and generalizing the research results. In follow-up studies, it is necessary to verify the factor structure by conducting confirmatory factor analysis with the users of home-visiting nursing services with the same characteristics and conditions, and to continuously supplement the tool through the verification of the quality improvement of home-visiting nursing services, verification of the effects of visiting nursing services on health outcomes in the users, and repeated assessments and validations of the scale in consideration of the development and changes of the visiting nursing service system.

## Conclusions

This study developed and validated a scale for the assessment of continuity of care in long-term care visiting nursing services. The developed scale contains a total of 22 items in 5 subdomains: 'customized care plan' (5 items), 'care availability' (3 items), 'consistency in service provision' (3 items), 'care coordination' (5 items), and 'therapeutic relationship' (6 items). Each item is rated on a 5-point Likert scale. The total scores range from 22 to 110 points, and higher scores indicate higher levels of continuity of care experienced by the users of home-visiting nursing services (Supplementary 1). Since the reliability and validity of the tool developed in this study have been verified, this scale can be used to identify factors that threaten the integration and consistency of the services to meet the complex needs of the users of long-term care visiting nursing services through the multidimensional evaluation of the service provision process of visiting nurses in terms to continuity of care in aspects such as the improvement of management continuity, relational continuity, and informational continuity experienced by the users of visiting nursing services. The results of such multidimensional evaluation of continuity of care in visiting nursing services using the developed scale are expected to serve as basic data for the development of service elements required to improve the integrated visiting nursing service provision system to prevent potentially preventable hospital admissions and long-term care facility admissions of the users of visiting nursing services in the future. Additionally, the results of such evaluations can also be utilized as basic data for the development of intervention programs to enhance the capabilities of visiting nurses.

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## Conflict of interest

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## Authors' contributions

Jiyeon Kim contributed to conceptualization, data curation, formal analysis, methodology, and writing - original draft. Sook-Ja Yang contributed to conceptualization, methodology, writing - review & editing, supervision, and validation.

## Data availability

Please contact the corresponding author for data availability.

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