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Development of a cohort-based survey instrument to assess working conditions and health among care workers in South Korea

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Abstract

Background

Since South Korea entered a super-aged society in 2024, the demand for formal care services has increased rapidly. Formal care workers employed in hospitals and long-term care facilities, including long-term care aides and paid caregivers, play a central role in providing health-related care and assistance with daily living for older adults. Despite their essential contribution, empirical evidence on their working conditions and health

remains limited and no dedicated cohort-based study focusing on this workforce currently exists. This study aimed to develop an integrated, cohort-based survey instrument to systematically assess the working conditions, care environments, and health of institution-based formal care workers in South Korea.

Methods

The survey instrument was developed through a multi-phase scale development process, which included: (1) a review of existing national and international labor and care-work surveys; (2) in-depth interviews with institution-based care workers employed in hospitals and long-term care facilities, followed by qualitative content analysis using Attribute Analysis of the Dynamic Mapping Method; (3) item generation, consolidation, and inter-researcher validation; (4) expert consultation to assess content validity; and (5) pilot testing with formal care workers. Qualitative findings and expert feedback were iteratively integrated to refine domains and survey items.

Results

The final conceptual framework comprised three major domains (i.e., sociodemographic characteristics, care work environment, and health), encompassing 11 subdomains and 79 variables. The finalized instrument consisted of 79 items encompassing multiple dimensions of institutional care work, including employment status, care-related workload, occupational health and safety, organizational and social support, and physical and mental

health. Key components related to working conditions (including working hours and income), organizational support, and workplace safety were prioritized through expert review and importance assessment.

Conclusions

This study presented the first cohort-oriented survey instrument specifically designed for institution-based formal care workers in South Korea. By focusing on care labor within hospitals and long-term care facilities, the instrument provided a robust foundation for longitudinal monitoring, policy evaluation, and research on workforce sustainability in aging societies.

Key words

Care workers; Long-term care workforce; Working conditions; Survey instrument development; Cohort study; Occupational health; Aging society; South Korea

Text box 1. Contributions to the Literature.

- Formal care workers are essential to health and long-term care systems in aging societies, yet empirical data on their working conditions and health remain limited, particularly in South Korea.
- This study develops the first cohort-based survey instrument specifically designed to capture the multidimensional work environment, employment conditions, and health outcomes of institution-based care workers.
- The instrument integrates qualitative insights, expert consultation, and systematic scale development methods, providing a comprehensive framework for monitoring care workforce conditions.
- The survey instrument offers a foundation for future longitudinal research and evidence-informed policy development to improve the sustainability of care systems in aging societies.

Introduction

South Korea entered a super-aged society in 2024, and the demand for care services has risen sharply in parallel with rapid population aging. The growing proportion of older adults has generated an explosive increase in the

need for chronic disease management, long-term care, and daily living support [1]. Formal care workers (certified care aides from long-term care system, privately employed paid caregivers) play a pivotal role in the front lines of hospitals, long-term care facilities, and home-based settings. Despite their essential role in sustaining the care infrastructure, research on their working conditions, compensation, and health status remains limited [2, 3].

In this study, “formal care workers” refers to paid care workers who provide hands-on assistance with activities of daily living and health-related support in institutional settings. Specifically, the term includes (1) certified long-term care aides employed within South Korea’s Long-Term Care Insurance system and (2) paid caregivers who provide one-to-one care in hospitals or long-term care facilities through private contractual arrangements. These workers are distinguished from informal caregivers, such as family members, relatives, or other unpaid caregivers.

Formal care workers, particularly paid caregivers, are often employed under dispatch or other non-standard employment arrangements characterized by low wages, unstable working hours, and limited institutional protection [2–4]. Although more than 3 million individuals in South Korea hold certification as long-term care workers, only a fraction are actively employed in the sector, with the number of working care aides increasing from 206,344 in 2015 to 519,069 in 2024 [5]. Reliable national statistics on paid caregivers are currently unavailable because they remain outside formal workforce reporting systems. However, according to the Korean Association

of Geriatric Hospitals, although long-term care hospitals operated approximately 265,000 beds in 2022, the total number of paid caregivers was estimated to be only around 44,000, including approximately 35,000 migrant caregivers [6].

Recent research showed that female South Korean care workers endure long hours, unpaid “shadow labor,” and tasks beyond their job descriptions, yet remain excluded from labor rights and recognition as employees [4]. This invisibility underscores the critical importance of generating systematic empirical evidence to inform evidence-based policy development and institutional reforms aimed at protecting and sustaining the care workforce.

Care workers are an important part of the health workforce, across hospitals, communities, and home-based settings in super-aging societies. Despite this, research focusing on formal care workers employed in hospital settings remains scarce, especially studies using longitudinal or cohort-based designs. In South Korea, no dedicated longitudinal cohort of formal care workers currently exists, limiting the ability to systematically track their working conditions, health trajectories, and caregiving burdens over time.

Concept and structure: Care work

Care work encompasses both physical assistance with activities of daily living and emotional support, requiring sustained interpersonal engagement and responsibility for vulnerable individuals [7]. It is performed in both paid and

unpaid contexts, and the boundaries between formal and informal care often overlap [8].

Care work is also strongly gendered, with women disproportionately represented and frequently exposed to disadvantaged labor market conditions [9, 10]. In South Korea, these dynamics are further shaped by institutional arrangements that rely heavily on family-based and privately contracted care services, where ‘shadow labor’—including unpaid tasks and emotional strain—remains insufficiently captured in labor statistics and policy discussions [4].

Moreover, care work entails a convergence of physical and emotional labor, often involving irregular schedules, limited career progression, and ongoing emotional demands from interactions with care recipients and their families [11]. While indispensable to the functioning of aging societies, care work remains structurally undervalued, underscoring the importance of examining care workers’ employment conditions and health outcomes.

Research on working conditions of formal care workers in Korea and other countries

Research on formal care workers in Korea remains limited in scope and methodological depth. Although some nationally representative surveys include care workers, they do not follow them as a distinct population over time. As a result, most studies rely on cross-sectional or small-scale data, often focusing on specific occupational groups such as long-term care aides

or paid caregivers. Some large-scale studies have begun to provide broader insights into the working conditions of care workers. For example, using national health insurance data, Kim et al. (2020) analyzed wage disparities among 1.2 million care workers using national health insurance data, revealing profoundly low wages and significant differences by care setting and regional context [12]. In addition, Jang et al. reported a high prevalence of co-residential caregiving, highlighting the continued reliance on family-based care in Korea [13].

In contrast, Japan has established a systematic approach to monitoring care labor. Since 2007, the Japan Care Work Foundation (日本ケアワーク財団), commissioned by the Ministry of Health, Labour and Welfare (厚生労働省), has annually conducted the Fact-Finding Survey on Long-term Care Work (長期介護労働実態調査). This nationwide survey includes both a Facility Survey (施設調査)—examining workforce size, employment structures, and wages—and a Worker Survey (労働者調査) that investigates care workers’ employment status, working conditions, health, and job satisfaction.¹ The survey draws on a large, nationally representative sample, providing essential data for workforce planning and policy development. The Foundation also implements training and policy programs to improve job stability and professionalization in the care sector.

Despite these efforts, no dedicated longitudinal cohort currently exists

¹ 日本ケアワーク財団. “長期介護労働実態調査”. <https://www.kaigo-center.or.jp/report/jittai/>.

in South Korea to systematically track care workers' employment conditions, health outcomes, or career trajectories over time. This gap limits to examine temporal changes and to generate evidence for policy development. Establishing a cohort-based study is therefore essential to provide robust longitudinal evidence and to support the sustainability of the care workforce in an aging society.

Developing a Cohort-Based Survey Instrument

Cohort studies enable the longitudinal tracking of populations to examine changes in health, working conditions, and the impact of policy interventions over time [14]. The work environments of care workers vary across institutional characteristics, employment arrangements, and regional factors, and are subject to change over time. Cross-sectional surveys alone are insufficient to capture these dynamic shifts.

A cohort-based survey instrument tailored to care workers would allow systematic monitoring of their employment conditions, health trajectories, and access to health care over time, while also providing a basis for evaluating policy interventions [15]. The purpose of this study, therefore, was to design and establish a cohort of employed care workers, develop a survey instrument that incorporates diverse environmental factors, and construct a framework for longitudinal research.

Methods

Derivation of Variables and Conceptual Framework

The survey instrument was developed through a structured five-phase process to ensure content validity, contextual relevance, and applicability to formal care workers. This process included (1) literature review and analysis of existing instruments, (2) in-depth interviews and content analysis, (3) item consolidation and inter-researcher validation, (4) expert consultation and content validity assessment, and (5) pilot testing.

Survey items were constructed by following the scale development procedures of DeVellis and Thorpe (2021) [16], through a multi-phase process that included literature review, analysis of existing instruments, qualitative inquiry, expert consultation, content validity assessment, and pilot testing. The overall goal was to generate valid and contextually grounded measures capturing the employment, working conditions, and health of care workers in Korea. This study was conducted in accordance with ethical standards, with particular attention to the protection of participants' rights and personal information. This study was approved by the Institutional Review Board of Chung-Ang University (Approval No. 1041078-20250218-HR-034). All procedures were conducted in accordance with the ethical principles of the Declaration of Helsinki. All participants were informed about the purpose of the study, assured of confidentiality, and provided written informed consent prior to participation. Participation was voluntary, and respondents could withdraw from the study at any time without any consequences. The development and reporting of this study were informed by relevant reporting guidance from the EQUATOR Network for observational and survey-based

research.

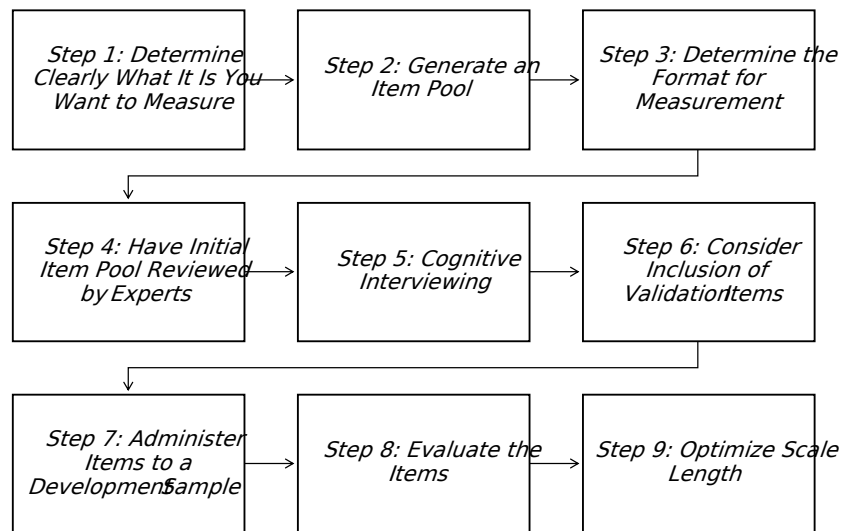


Figure 1. Guidelines in Scale Development (DeVellis & Thorpe, 2021)

Phase 1. Literature Review and Analysis of Existing Instruments

In the first phase, key measurement constructs were defined, and an initial item pool was developed through an extensive review of prior research and large-scale survey instruments related to care work and labor conditions. Particular attention was given to Japan's *Survey on the Actual Conditions of Long-Term Care Work*, Korea's *Long-Term Care Service Survey*, and the *Korean Working Conditions Survey*, which together offered useful frameworks for structuring domains such as employment status, organizational environment, and health. In addition, empirical studies on labor precarity, aging, and gendered employment were examined to reflect the intersecting characteristics of the care workforce, which is predominantly female, older, and situated in precarious employment.

Findings from these instruments were synthesized to construct an initial conceptual framework and generate a preliminary pool of survey items. Variables were organized into three major domains: (1) socio-demographic characteristics, (2) care work environment, and (3) health outcomes. Similar items were grouped into variable clusters, which served as the foundation for subsequent qualitative refinement.

Phase 2: In-depth Interview and Content Analysis

To ensure the survey reflected the lived experiences of frontline workers, in-depth interviews were conducted with paid caregivers (*ganbyeongin*) and long-term care aides (*yoyang bohosa*) between April and July of 2025. A total of 10 participants were recruited from hospitals, long-term care facilities, and home-care settings through purposive sampling. These interviews explored topics such as workload, emotional labor, physical burden, interpersonal relationships, and safety concerns. The qualitative findings were used to refine existing items and generate new items that reflected care workers' lived experiences, particularly in areas related to informal employment, cultural context, and psychosocial risks that were not fully captured in prior instruments. These insights guided major revisions to the initial item pool and informed the wording and ordering of survey questions.

In the analysis process of the interview data, content analysis was employed to extract the key components necessary for developing the survey

instrument. During the initial coding stage of the content analysis, four rounds of component analysis were conducted, resulting in the identification of a total of 474 components. These components were multi-coded according to various attributes, and this attributes-analysis process was based on Eunkyung's (2026) Dynamic Mapping Method (DMM) [17]. In this study, DMM was adapted as an analytic strategy for survey instrument development. Specifically, the procedures of component extraction and attribute analysis were used to identify care-work-related components from interview data and translate them into measurable variables suitable for cohort-based research. According to DMM, after components are extracted from qualitative data, an attributes decomposition is conducted for each component. Here, "attributes decomposition" refers to the process of examining each component individually and breaking down the attributes it possesses. In this study, this process was used to identify the core components necessary for survey development from the qualitative interview data, and attributes analysis was subsequently conducted for each identified component.

The attributes derived from the data were coded according to both (1) system-level attributes; ranging from micro-, meso-, to macro-levels, and (2) quality-of-life attributes across domains such as health, working conditions, characteristics of care work, organizational factors, and emotional well-being. Each component was then organized into lower-, middle-, and higher-level categories through the attribute-coding process.

Attribute analysis multi-coding process

Table 1. Example of variable coding and hierarchical mapping structure used in the survey instrument

Target	Major Category	Mid-Level Category	Attribute	Upper-Level Variable	Lower-Level Variable	Mapped Category (Major)	Mapped Category (Upper)	Mapped Category (Lower)
Common	Care Environment	Macro	Education	Korean Language Education	Korean Language Education	Care Environment	Job Training & Capacity Building	Korean Language Education
Common	Care Environment	Macro	Education	Refresher Training	Refresher Training	Care Environment	Job Training & Capacity Building	Refresher Training
Common	Care Environment	Macro	Education	Mandatory Training	Mandatory Training	Care Environment	Job Training & Capacity Building	Mandatory Training
Common	Care Environment	Macro	Education	Human Rights Education	Human Rights Education	Care Environment	Job Training & Capacity Building	Human Rights Education
Common	Care Environment	Macro	Emotional	Emotional Labor Support	Emotional Labor Support	Care Environment	Policy & Institutional Framework	Emotional Labor Support
Common	Care Environment	Macro	Education	Education Program	Education Program	Care Environment	Job Training & Capacity Building	Education Program
Common	Care Environment	Meso	Job	Workforce Supply	Workforce Supply	Care Environment	Job Tasks & Workload	Workforce Supply
Common	Care Environment	Meso	Compensation	Wage-paying Entity	Wage-paying Entity	Care Environment	Policy & Institutional Framework	Wage-paying Entity
Caregiver	Care Environment	Meso	Rest	Sleeping Space	Sleeping Space	Care Environment	Facility & Physical Environment	Sleeping Space
Common	Care Environment	Meso	Physical Environment	Facility Size	Facility Size	Care Environment	Facility & Physical Environment	Facility Size
Common	Care Environment	Meso	Physical Environment	Type of Institution	Type of Institution	Care Environment	Facility & Physical Environment	Type of Institution
Common	Care Environment	Meso	Job	Staffing Standards	Staffing Standards	Care Environment	Job Tasks & Workload	Staffing Standards
Common	Care Environment	Meso	Physical Environment	Convenience of Equipment	Bed	Care Environment	Facility & Physical Environment	Bed Convenience
Common	Care Environment	Micro	Job	Care Tasks	Diaper Changing	Care Environment	Job Tasks & Workload	Diaper Changing

Common	Care Environment	Micro	Job	Care Tasks	Repositioning	Care Environment	Job Tasks & Workload	Repositioning
Common	Care Environment	Micro	Job	Care Tasks	Bathing	Care Environment	Job Tasks & Workload	Bathing Support
Caregiver	Care Environment	Micro	Employment	Working as a Couple	Working as a Couple	Care Environment	Working Conditions	Working as a Couple
Common	Care Environment	Micro	Communication	Communication (Korean Language)	Language Ability	Care Environment	Interpersonal Relationship	Language Ability

Based on the results of the content analysis and the DMM, the initial variable framework for developing the cohort-based survey instrument for care workers was constructed as shown above. This framework was organized into three major domains: (1) socio-demographic characteristics, (2) care work environment, and (3) health. Each domain was further structured into subcategories and detailed variables.

First, the sociodemographic characteristics domain examines care workers' sociodemographic profiles, job-related competencies, and access to institutional policies. This domain includes socio-demographic characteristics (e.g., age, education, and work experience), factors related to job training and competency development, and institutional conditions such as labor union participation and access to policy-related information. Together, these variables reflect the foundational conditions that shape care workers' occupational roles and professional identities.

Second, the care work environment domain focuses on the workplace conditions and contexts in which care labor is performed. This domain

encompasses working conditions, task scope and workload, organizational structure, facility and physical environments, interpersonal and relational dynamics, exposure to violence or harassment, and characteristics of multicultural work settings. Collectively, these variables capture the multifaceted nature of care work, which entails not only physical labor but also emotional and relational labor within complex organizational and structural contexts.

Third, the health domain includes variables related to care workers' physical and mental health, as well as occupational safety. Key indicators include musculoskeletal disorders, pain frequency, mental health conditions, sleep quality, exposure to infectious diseases, and experiences of occupational injury. These outcomes are closely linked to the physically and emotionally demanding nature of care work.

This initial variable framework was developed through a multi-stage process involving literature review, analysis of existing survey instruments, in-depth interviews, and expert consultation, and served as the basis for survey item development and the conceptualization of the cohort-based instrument.

Table 2. Initial conceptual framework and variable structure of the survey instrument

Major	Subcategory	Detailed Variables
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Category		
1) Socio-demographic characteristics	Sociodemographic Characteristics	Age; Gender, Education level; Marital status; Primary breadwinner status; Region; Nationality; Years of work experience; Previous workplaces; Work experience at current workplace; Experience as a long-term care aide; Work experience in other industries; Motivation for choosing the occupation
	Job Training & Capacity Building	Certification possession; Time and reason for obtaining certifications; Initial training; Regular training; Refresher training; Mandatory/legal training; Human rights training; Compensation for training hours; Frequency of education and training; Availability of designated trainer; Opportunities for competency development; Self-directed learning motivation; Desire to enhance work skills
	Policy & Institutional Accessibility	Labor union membership and participation; Accessibility to policy information; Experiences of institutional blind spots; Needs for government support; Awareness of welfare systems; Expectations for improvements in working conditions; Perception of compensation systems

2) Care Work Environment	Working Conditions & Environment	Employment type; Work arrangement; Contract type; Commute time; Shift hours; Working hours; Number of working days; Average daily working hours; Actual working hours; Wage level; Wage-paying entity; Bonuses; Tax details; Break time; Meal time and conditions; Sleeping area; Shower facilities; Use of paid leave; Availability of replacement staff; Ability to use vacation
	Job Tasks & Workload	Position changing; Diaper changing; Bathing; Feeding assistance; Cleaning; Suctioning; Pressure ulcer care; Physical care; Meal assistance; Supporting older adults' activities; Scope of duties; Main job tasks; Types of instructions; Emotional labor intensity; Emotional exhaustion; Mental burden; Trauma; Stress
	Organizational & Hospital Structure	Facility size; Operational model; Direct employment vs. outsourcing; Team composition; Supervisory structure; Role of team leaders; Handover processes; Communication methods; Monthly meetings; Case conferences; Hospital welfare programs

	Facility & Physical Environment	Bed availability; Automated beds; Hoist/lifting devices; Lighting; Ventilation; Windows; Anti-slip features; Emergency call system; Safety facilities; Medical waste management; Rest area; Sleeping space; Washing/sanitary space; Wheelchair accessibility; Movement pathways; Adjustable lighting
	Interpersonal Relationships & Emotional Interactions	Communication with colleagues; Collaboration; Conflict; Relationships with family caregivers; Emotional bonding with patients; Cooperation with nursing staff; Nurse-care worker relationship; Emotional counseling experiences; Emotional exchanges; Positive social interactions (e.g., laughter, conversation)
	Violence & Harassment Experiences	Verbal abuse; Physical violence; Sexual harassment; Threats; Isolation/neglect; Unreasonable work instructions; Private/personal task intrusion; Response system for violence; Protective measures; Psychological harassment; Rights violations; Presenteeism
	Multicultural Care Environment	Differences and collaboration with foreign caregivers; Language/communication barriers; Differences in hygiene norms; Differences in rule awareness; Conflict experiences; Differences in cultural attitudes

3) Health	Health & Safety	Musculoskeletal disorders; Pain frequency; Physical workload; Mental health status; Depressive symptoms; Sleep quality; Insomnia; Injury experiences; Industrial accident insurance coverage; Availability of health check-ups; Infection prevention; Infection response systems; Exposure to infectious diseases; Support for diagnostic test costs
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Phase 3. Item Consolidation and Inter-Researcher Validation

In Phase 3, the survey instrument was finalized through item construction and inter-researcher validation to enhance content validity. First, new items were developed inductively based on the results of the in-depth interviews and content analysis, reflecting care workers' lived experiences that were insufficiently captured by existing instruments. Next, these items were integrated with selected standardized items aligned with the conceptual framework.

The final-draft questionnaire was then subjected to inter-researcher validation. The research team reviewed the items for relevance, clarity, and alignment with the predefined domains. Discrepancies were resolved through discussion and consensus, leading to item revision, consolidation, or removal. This process ensured that the final items were both conceptually coherent and empirically grounded in care workers' experiences.

Phase 4. Expert Consultation & Content Validity Feedback

In Phase 4, content validity was further examined through expert consultation. A multidisciplinary expert panel, including labor union organizers and members with care experience, professors of social welfare and nursing, directors of long-term care facilities, and researchers specializing in aging and labor, reviewed the revised survey instrument.

Experts evaluated each item for relevance, clarity, and comprehensiveness in relation to the study objectives and provided feedback on domains related to institutional policies, worker protection mechanisms, and employment conditions. This process contributed to refining domain boundaries and strengthening content representativeness.

In the final stage of variable framework development, the research team conducted an importance assessment of key components through a series of team meetings. Within the DMM, this step is recommended to identify essential components among numerous derived elements and to reinforce the validity of component selection. Content validity was assessed through expert consultation and pilot testing with formal care workers.

Phase 5. Pilot Study

Finally, a pilot study was conducted to assess the usability, clarity, and response patterns of the instrument in real-world settings. The pilot survey included eight formal care workers. Findings from this stage were used to identify problematic wording, refine response categories, and eliminate items

with low variability or redundancy. The final instrument reflects iterative refinement across all development phases, ensuring both conceptual validity and practical applicability within the Korean care-work context. Findings from this stage were used to refine item wording, response categories, and overall survey structure to improve clarity and usability.

Results

1. Development of the Conceptual and Variable Framework

The final variable framework comprised three major domains: sociodemographic characteristics, care work environment, and health. Across these domains, 11 subdomains and 79 variables were identified through iterative refinement based on literature review, qualitative analysis, and expert consultation. The final framework included domains related to sociodemographic characteristics, care work environment, and health, encompassing organizational, occupational, and health-related variables identified through the development process. In the process of developing the variable framework, the initially identified components underwent an inter-researcher importance assessment in accordance with the procedures of the DMM. Each researcher reviewed the components individually and assigned scores to each component. These scores were then aggregated to identify components considered to be important. For components that could not be clearly prioritized through this initial scoring process, the research team conducted internal meetings to further discuss and select key components.

Through this process, components identified through the interview and review process were refined, and the selected components were subsequently transformed into survey items suitable for questionnaire administration.

2. Item Generation and Refinement Process

An initial pool of 59 items was generated from existing survey instruments and prior literature. Following in-depth interviews and content analysis, 52 new items were inductively developed. Through inter-researcher validation and expert consultation, 32 items were revised or merged, and removed due to redundancy or conceptual overlap. During the inter-researcher validation process, the research team reviewed each survey item one by one through research meetings and examined whether there was any gap between the item and the realities observed during the interview process. In fact, some items and response options derived from previous studies did not sufficiently reflect the realities of care workers as understood through the interviews. Therefore, these items and response options were revised and further reviewed. The final instrument consisted of 79 items across three domains.

3. Results of Expert Review and Importance Assessment

Expert consultation on the items developed through the research team's review was designed to assess whether the items were appropriate from the perspectives of experts other than the researchers who conducted

the study. Based on expert feedback, the existing items were revised once again. Expert consultation led to refinement of domain boundaries, particularly within the care work environment and institutional conditions. The importance assessment conducted by the research team resulted in the prioritization of key components related to employment precarity, organizational support, and occupational risk, which were retained as core elements of the final framework.

Table 3. Measured variables across the three domains of the care worker survey instrument

Category	Measured variables
Socio-demographic characteristics	Gender, Age, Education level, Monthly income (10,000KRW), Marital status, Family member with care needs, Nationality, Region, Reason for care work, Primary breadwinner status
Care work environment	Occupation, Years of work experience (total/current workplace), Types of workplace, Employment status (contract type, period of contract, working time, payment arrangement), Number of working days per week, Actual working hours per day, Shift work, Team- based

	work, Care recipient turnover, Supervisor, Availability (Break, Meal, Sleeping, Sanitary facilities), Accessibility (Emergency call, Bed bathing equipment, Mobility Aid, Electric bed), Social insurance coverage (Employment insurance, National Health Insurance, National Pension, Workers' Compensation insurance, Occupational Pension), Labor union membership and participation, Perceived care task burden (Position changing, Diaper changing, Feeding assistance, Bathing assistance, Medical procedure assistance, Mobility assistance), Work-life interference, Care burden [18], Information on care recipients (Number per day, reason for change, gender, ADL dependent, Behavioral symptoms), Social support from work, Effort-reward imbalance, Job insecurity, Workplace health and safety information, Job related training (Hygiene management, Handling complaints, Accident prevention and
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	emergency response, Abuse, Workers' compensation), Work competency training, Protection tools, Organizational procedures & manuals, Staffing adequacy, Statutory allowances & compensation, Presenteeism, Experience of work-related injury & illness, Experience of workplace discrimination, Experience of workplace violence
Health	Job satisfaction, Intention to change job, Self-reported health, Smoking, Drinking, Physical activity, Chronic disease, Insomnia, Unmet needs, Isolation and loneliness [19], Depressive symptoms (CESD11) [20], Suicidal ideation, Bereavement-related distress

Discussion

This study developed a cohort-based survey instrument designed to assess the working conditions, care environments, and health of formal care workers in South Korea. The instrument was constructed through a multi-stage process that integrated a literature review, analysis of existing survey instruments, in-depth interviews, content analysis and DMM-informed

attribute analysis, expert review, and pilot testing. The final measurement framework was refined into three major domains: (1) socio-demographic characteristics, (2) care work environment, and (3) health outcomes. This instrument could provide an empirical foundation for long-term monitoring of care workers' conditions and for evaluating the effects of policy interventions.

This study contributed conceptually to the understanding and measurement of care work. Unlike conventional labor surveys primarily focused on employment status, wages, and working hours, the present instrument was designed to capture the multidimensional nature of care work, including organizational structure, workplace violence, multicultural care environments, and health outcomes. Several domains included in the present instrument, such as workplace violence, care burden, and workplace environment, were also consistent with factors identified in previous qualitative research on paid caregivers in Korea [21]

Drawing on perspectives that conceptualized care work as involving emotional and relational labor within broader institutional and social contexts [22], the instrument reflected key dimensions of care work that were often insufficiently addressed in existing workforce surveys. For example, the inclusion of domains related to emotional demands, interpersonal relationships, and organizational conditions was informed by the Job Demands-Resources model, which emphasized the interaction between workplace demands and available resources in shaping workers' health and

well-being [23].

From a methodological perspective, the survey development process was grounded in qualitative interview data and systematic analytic procedures. The study applied multiple qualitative approaches, including content analysis and DMM-based attribute analysis, extending beyond conventional scale-driven survey development and contributing to methodological literature on measurement of labor and health research [24, 25]. By complementing standardized measurement approaches, this strategy enabled the instrument to reflect the lived experiences and complex realities of care workers. In particular, the procedural approach of DMM used in this study had important methodological implications, as it applied qualitative research techniques to the process of developing survey items in order to address limitations in conventional survey instrument development. By using the procedures of DMM, this study sought to identify components embedded in frontline care settings as revealed through qualitative interview data, and to decompose and analyze the attributes of those components. This effort to transform real-world phenomena in care workers' working environments into measurable variables may contribute to methodological discussions on integrating qualitative approaches into survey instrument development.

Also, the instrument was developed with potential applicability to longitudinal cohort research. By enabling repeated measurement of working conditions, care environments, workplace exposures, and health outcomes, the instrument may allow future studies to examine temporal changes and

trajectories among care workers. This may be particularly relevant in care work, where employment arrangements, workload, and organizational conditions were often unstable and subject to change over time. The cohort-based design could facilitate examination of temporal associations between workplace exposures and health outcomes, as well as patterns of workforce retention, turnover, and job transitions. In addition, repeated measurements may provide a basis for evaluating whether policy or organizational interventions, such as labor regulations, workplace improvements, or training programs, were associated with improvements in working conditions and health outcomes.

Lastly, this study may have policy relevance for discussions on working conditions and workforce support for care workers in South Korea. Care workers have long been essential to South Korea's welfare and long-term care systems, yet they have remained institutionally neglected with respect to labor protection and policy support. In a super-aged society, the sustainability of care systems has been linked to the working conditions and health of this workforce [17, 26]. Evidence generated through this instrument could inform more specific policy interventions in several areas. First, data on employment status, working hours, wage arrangements, social insurance coverage, and paid leave could help identify gaps in labor protection and support the development of minimum employment standards for formal care workers, including paid caregivers who remain weakly represented in official labor statistics. Second, information on access to basic facilities at workplace,

inadequate staffing, and workload could provide evidence for improving workplace standards and staffing policies in hospitals and long-term care facilities. Third, measures of workplace violence, harassment, occupational injury, infection exposure, and organizational response procedures could inform institutional protocols for worker safety, violence prevention, and occupational health management. Finally, longitudinal use of this instrument could help identify factors associated with job dissatisfaction, presenteeism, turnover intention, and health deterioration, thereby supporting workforce sustainability policies and broader care system reforms.

Nevertheless, this study has several limitations. First, the relatively small number of interview participants may limit the diversity of perspectives reflected in the instrument, underscoring the need for future research incorporating larger and more heterogeneous samples. In addition, the qualitative interviews and expert consultations were conducted primarily among institution-based care workers and related stakeholders, which may limit the applicability of the instrument to other care settings such as home-based or informal care environments. Second, the present study focused on instrument development and did not evaluate the predictive validity or longitudinal performance of the instrument. The instrument's factor structure, criterion validity, and reliability require further examination using larger and more diverse samples. Given the cohort-based design, future studies should also assess its temporal stability and responsiveness, including its ability to detect changes in working conditions and health outcomes over

time. Despite these limitations, this study may represent an important first step toward establishing a research infrastructure for cohort-based studies of care workers in South Korea.

Conclusions

This study presents the first cohort survey instrument specifically designed to capture the multidimensional working conditions and health of formal care workers in South Korea. By establishing a standardized framework for longitudinal workforce monitoring, the study may provide a preliminary foundation for future public health research on care labor in aging societies.

Beyond its methodological contribution, the instrument highlights the importance of recognizing care workers as a critical population within health systems. Generating systematic evidence on their working conditions and health may support more equitable and sustainable long-term care policies. Future research should focus on large-scale validation and longitudinal application of the instrument to better inform policy development and workforce planning.

Declarations

Ethics approval and consent to participate

This study was approved by the Institutional Review Board of Chung-Ang University (Approval No. 1041078-20250218-HR-034). All procedures were conducted in accordance with the ethical principles of the Declaration of

Helsinki. All participants were informed about the purpose of the study, assured of confidentiality, and provided written informed consent prior to participation. Participation was voluntary, and respondents could withdraw from the study at any time without any consequences.

Consent for publication

Not applicable.

Availability of data and materials

The datasets generated and analyzed during the current study are not publicly available due to institutional and ethical restrictions but are available from the corresponding author on reasonable request. The survey instrument developed in this study is provided as a supplementary file.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

BC and AL conceptualized the study and developed the research design. BC

conducted the literature review and drafted the manuscript. AL contributed to the development of the survey instrument and supervised the overall research process. JC and S-NJ contributed to the refinement of the questionnaire, data interpretation, and critical revision of the manuscript. All authors read and approved the final manuscript.

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