Research Square

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Association Between Care-task Burden and Occupational Infection Among Care Workers in South Korea

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Abstract

Background

Occupational infection is a significant concern among long-term care workers, yet most studies characterize risk by job category or general workload rather than by the burden of specific direct-care tasks. This study examined the association between care-task burden and occupational infection among care workers in South Korea.

Methods

This cross-sectional study used baseline data from the Korean Care Workers Cohort (N = 459), collected September–November 2025. Care-task burden was assessed across six tasks and classified as none, moderate, or high. Occupational infection was self-reported over the past 12 months. Modified Poisson regression estimated adjusted prevalence ratios (aPRs).

Results

Overall, 18.5% of workers reported an occupational infection. High care-task burden was associated with a significantly higher adjusted prevalence of infection (aPR = 1.93, 95% CI: 1.12–3.32) compared with no burden; the moderate-burden association was attenuated (aPR = 1.58, 95% CI: 0.96–2.58). Burden related to mobility/wheelchair assistance (aPR = 1.81), bathing assistance (aPR = 1.74), medical procedures (aPR = 1.58), and position changes (aPR = 1.53) was significantly associated with infection.

Conclusions

High care-task burden was independently associated with occupational infection among Korean care workers. Infection prevention strategies should address the demands of direct-care tasks and organizational support, not only individual-level training.

Trial registration

Not applicable. This is an observational cohort study and does not report the results of a health care intervention on human participants.

Background

Occupational infections remain an important occupational health concern among healthcare workers. In long-term care facilities, infection prevention has become increasingly important because healthcare-

associated infections affect not only residents but also workers who provide direct care [1, 2]. Infection prevention and control (IPC) practices, particularly hand hygiene, remain the primary strategy for limiting pathogen transmission in these settings. Yet adherence to these practices is often poor. A systematic review of 96 studies reported a median hand hygiene compliance rate of only about 40%, and compliance was lower still during periods of high clinical activity [3]. More recent evidence suggests that adherence depends less on workers' knowledge or attitudes than on the conditions under which care is delivered [4].

A growing body of research has examined the work-related and organizational factors that shape infection prevention in long-term care facilities. A systematic review of IPC interventions in long-term care facilities found only limited support for programs combining education, monitoring, and feedback, and could not identify a definitive set of effective measures [2]. Chronic workforce shortages compound this problem, pushing facilities toward extended working hours and live-in staffing arrangements that require workers to take on multiple, overlapping roles [1]. Workload itself is one of the most consistent correlates of IPC adherence. Higher nursing workload was associated with lower hand hygiene compliance, even in well-staffed, highly trained units [5]. In a study examining hand hygiene opportunities as a measure of workload, compliance declined significantly when the number of hand hygiene opportunities exceeded 30 per hour [6]. Workload and time pressure are recurrent barriers to IPC compliance more broadly [4].

Most studies examining workload and IPC practices, however, have been conducted among nurses and other healthcare professionals and have operationalized workload using measures such as staffing, nursing intensity, patient volume, working time, or the number of hand hygiene opportunities [5–8]. Less is known about workload arising from the content of direct care work among workers who routinely provide hands-on assistance with activities of daily living. Studies of long-term care workers have largely focused on infection-control knowledge, hand hygiene, and personal protective equipment use rather than on the demands associated with the care tasks themselves [9]. One study observed these tasks directly, finding that certified nursing assistants failed to change gloves when indicated in two-thirds of toileting and perineal-care events, contaminating 44% of gloved touches [10].

Previous studies examining infection among long-term care workers have reported higher infection risk among nurses and certified nursing assistants and among workers spending more time in direct resident care [11]. Similarly, studies in other long-term care settings have reported elevated SARS-CoV-2 infection among workers in direct-care roles [12]. However, these studies characterized occupational exposure primarily by job category rather than by the specific care tasks workers perform. Less is known about whether the burden associated with the specific care tasks that workers perform in their routine work is related to their own experience of occupational infection across a broader range of infections.

Accordingly, this study examined the association between care-task burden and occupational infection among care workers in South Korea. By focusing on burden arising from specific direct-care tasks, rather than conventional measures of workload such as working hours or work schedules alone, this study

sought to capture an understudied dimension of care work that may be relevant to occupational infection. We hypothesized that higher care-task burden would be associated with a higher prevalence of occupational infection. We additionally examined the associations between burden related to individual care tasks and occupational infection.

Methods

Study design

This study was a cross-sectional analysis of baseline data from the Korean Care Workers Cohort (KCWC), an ongoing prospective cohort established to investigate the working conditions and health of institution-based care workers in South Korea. The baseline survey was conducted over a 10-week period from September to November 2025 and included paid caregivers and long-term care aides. The development of the cohort, including the conceptual framework, questionnaire development, recruitment procedures, and data collection process, has been described in detail elsewhere [13]. The present study specifically examined the association between care-task burden and occupational infection using baseline survey data.

Study population

The target population consisted of institution-based care workers employed in hospitals, long-term care hospitals, and long-term care facilities across South Korea. During the baseline survey, a total of 925 participants completed the questionnaire. Because several study variables, including care-task burden and occupational infection, were assessed with reference to participants' work experience over the previous year, workers with less than one year of work experience were excluded from the analysis. Participants with missing data on occupational infection, care-task burden, or covariates were also excluded. After these exclusions, 459 participants were included in the final analytic sample. This study was conducted in accordance with the Declaration of Helsinki. This study was approved by the Institutional Review Board of Chung-Ang University (IRB No. 1041078-20250218-HR-034). All participants provided written informed consent before participation.

Care-task burden level

Care-task burden was assessed using six caregiving tasks: position changes, diaper changing, feeding assistance, bathing assistance, medical procedures, and mobility/wheelchair assistance. For each task, participants reported their perceived burden on a six-point scale ranging from “very burdensome” to “not applicable.” Responses of “very burdensome” or “burdensome” were considered indicative of burden for the corresponding task. After excluding tasks reported as “not applicable,” the number of tasks reported as burdensome was counted among the worker's applicable tasks. Participants who reported no burden across all applicable tasks (i.e., “moderate,” “not burdensome,” or “not burdensome at all”) were classified as having no burden (0). Those reporting burden in one to three tasks were classified as

having moderate burden (1), whereas those reporting burden in four to six tasks were classified as having high burden (2).

Occupational infection

Participants were asked, “Have you experienced an infection related to your work during the past 12 months?”. Responses were coded as a binary variable indicating the yes (1) or no (0) of occupational infection.

Covariates

The analyses adjusted for socio-demographic and occupational characteristics that may be associated with both care-task burden and occupational infection. Socio-demographic variables included gender (male or female), age (<50, 50–59, 60–69, and ≥70 years), marital status (married vs. unmarried, including single, separated, divorced, or widowed), educational attainment (middle school or less, high school, and college or higher), monthly income (<200, 200–299, and ≥300 ten-thousand Korean won), and region of residence (Seoul, metropolitan cities, and other regions).

Occupational characteristics included job title (long-term care aide or paid caregiver), years of work experience (≤5, 6–10, and ≥11 years), daily working hours (<9, 9–23, and 24 hours), and work schedule type (24-hour shifts, 12-hour shifts, three-shift rotation, and others).

Statistical analysis

Descriptive statistics were used to summarize participant characteristics. Differences in occupational infection according to participant characteristics were examined using chi-square tests. Because the prevalence of occupational infection exceeded 10%, modified Poisson regression models with robust variance estimation were used to estimate prevalence ratios (PRs) and 95% confidence intervals (CIs) [14]. Model 1 estimated crude associations between care-task burden level and occupational infection, whereas Model 2 adjusted for socio-demographic and occupational covariates. Additional multivariable modified Poisson regression models were conducted to examine the association between each individual care task and occupational infection. Statistical significance was defined as $p < 0.05$. All statistical analyses were performed using Stata/MP version 16.1 (StataCorp LLC, College Station, TX, USA).

Results

Among the 459 care workers included in the study, 85 (18.5%) reported experiencing an occupational infection during the previous 12 months. Table 1 presents participants' socio-demographic and occupational characteristics according to occupational infection status. Occupational infection was significantly associated with monthly income and work schedule type. Workers with a monthly income of 300 ten-thousand Korean won or higher reported the lowest prevalence of occupational infection (5.0%). In contrast, those earning 200–299 ten-thousand Korean won had the highest prevalence (21.1%) (p =

0.013). Occupational infection also differed by work schedule type, with the highest prevalence among workers on 12-hour shifts (26.3%) and the lowest among those on 24-hour shifts (10.8%) (p = 0.004). No significant differences were observed according to gender, age, marital status, educational attainment, region, job title, years of work experience, or daily working hours.

Table 1. Socio-demographic characteristics of the study participants according to occupational infection

Variables		Total (N=459) N (%)	Occupational infection N (%)	p
Gender				0.764
	Male	24 (5.23)	5 (20.83)	
	Female	435 (94.77)	80 (18.39)	
Age (years)				0.188
	<50	22 (4.79)	5 (22.73)	
	50-59	152 (33.12)	32 (21.05)	
	60-69	230 (50.11)	34 (14.78)	
	≥70	55 (11.98)	14 (25.45)	
Spouse				0.838
	Have	296 (64.49)	54 (18.24)	
	No	163 (35.51)	31 (19.02)	
Education				0.539
	≤Middle school	116 (25.27)	18 (15.52)	
	High school	268 (58.39)	54 (20.15)	
	≥University	75 (16.34)	13 (17.33)	
Monthly Income (10,000KRW)				0.013
	<200	91 (19.83)	17 (18.68)	
	200-299	308 (67.10)	65 (21.10)	
	≥300	60 (13.07)	3 (5.00)	
Region				0.793
	Seoul	74 (16.12)	12 (16.22)	
	Metropolitan	166 (36.17)	30 (18.07)	
	Others	219 (47.71)	43 (19.63)	
Job title				0.089
	LTC aide	184 (40.09)	41 (22.28)	
	Paid caregiver	275 (59.91)	44 (16.00)	

Years of work experience				0.837
	≤5 years	150 (32.68)	26 (17.33)	
	6-10 years	145 (31.59)	29 (20.00)	
	≥11 years	164 (35.73)	30 (18.29)	
Daily working hours				0.057
	<9 hours	175 (38.13)	41 (23.43)	
	9-23 hours	53 (11.55)	11 (20.75)	
	24 hours	231 (50.33)	33 (14.29)	
Work schedule type				0.004
	24-hour shifts	139 (30.28)	15 (10.79)	
	12-hour shifts	175 (38.13)	46 (26.29)	
	Three-shift rotation	109 (23.75)	17 (15.60)	
	Others	36 (7.84)	7 (19.44)	

Significance determined by chi-square test.

Table 2 shows the association between care-task burden level and occupational infection. In the unadjusted model, workers with moderate care-task burden had a 73% higher prevalence of occupational infection compared with those reporting no burden (PR = 1.73, 95% CI: 1.05–2.86). Those with high care-task burden had approximately twice the prevalence of occupational infection (PR = 2.02, 95% CI: 1.19–3.41). After adjustment for socio-demographic and occupational characteristics, the association remained significant for workers with high care-task burden (aPR = 1.93, 95% CI: 1.12–3.32). Although the association for moderate burden was attenuated and no longer statistically significant, the magnitude of the association remained elevated (aPR = 1.58, 95% CI: 0.96–2.58). Overall, a dose–response pattern was observed, with increasing care-task burden associated with a higher prevalence of occupational infection.

Table 2. Association between care-task burden level and occupational infection among care workers in South Korea

Care-task burden level	PR	95% CI	aPR	95% CI
No	ref	–	ref	–
Moderate	1.73*	1.05-2.86	1.58	0.96-2.58
High	2.02**	1.19-3.41	1.93*	1.12-3.32

Adjusted for gender, age, spouse, education, region, monthly income, job title, years of work experience, daily working hours, work schedule type.

PR: Prevalence ratio; CI: Confidence interval.

*Significance levels: *p < .05, **p < .01*

Table 3 presents the association between specific care tasks and occupational infection. After adjustment for socio-demographic and occupational factors, several care tasks were significantly associated with occupational infection. Workers reporting burden related to mobility or wheelchair assistance showed the highest prevalence ratio (aPR = 1.81, 95% CI: 1.24–2.65), followed by bathing assistance (aPR = 1.74, 95% CI: 1.18–2.56), medical procedures (aPR = 1.58, 95% CI: 1.05–2.37), and position changes (aPR = 1.53, 95% CI: 1.04–2.25). Burden associated with diaper changing (aPR = 1.47, 95% CI: 0.94–2.28) and feeding assistance (aPR = 1.46, 95% CI: 0.94–2.26) was positively associated with occupational infection, although these associations did not reach statistical significance.

Table 3. Association between each care task and occupational infection among care workers in South Korea

Care task	N (%)	aPR	95% CI
Position changes	174 (37.91)	1.53*	1.04-2.25
Diaper changing	101 (22.00)	1.47	0.94-2.28
Feeding assistance	98 (21.35)	1.46	0.94-2.26
Bathing assistance	164 (35.73)	1.74**	1.18-2.56
Medical procedures	210 (45.75)	1.58*	1.05-2.37
Mobility/wheelchair assistance	167 (36.38)	1.81**	1.24-2.65

Adjusted for gender, age, spouse, education, region, monthly income, job title, years of work experience, daily working hours, work schedule type.

PR: Prevalence ratio; CI: Confidence interval.

*Significance levels: *p < .05, **p < .01*

Discussion

This study found that care workers with high care-task burden had a significantly higher prevalence of occupational infection than those reporting no burden. This association remained significant after adjustment for sociodemographic and occupational characteristics. For moderate burden, the adjusted association was no longer statistically significant, though the point estimate remained above 1 (aPR =

1.58). At the individual task level, burden related to mobility or wheelchair assistance, bathing assistance, medical procedures, and position changes was associated with a higher prevalence of occupational infection. Burden from diaper changing and feeding assistance did not reach statistical significance. Most prior work has characterized occupational risk by job title or overall workload. These findings suggest that occupational infection may be particularly relevant among workers who experience burden across multiple areas of direct care.

One possible explanation is that greater care-task burden reflects more intensive involvement in hands-on care, creating greater opportunities for exposure to infectious agents. A recent meta-analysis of 56 studies involving 185,712 healthcare workers found that direct patient contact was associated with a significantly higher odds of infection than low-risk exposure (OR 1.79, 95% CI 1.49–2.14) [15]. Nursing home staff in direct-care roles have shown higher rates of SARS-CoV-2 infection than non-patient-facing staff [11]. Workers who circulate across multiple facilities, often due to understaffing, have been linked to broader transmission between facilities [16]. This evidence is largely drawn from COVID-19 and cannot be directly generalized to the broader infections assessed here, but it supports close resident contact as a plausible exposure pathway. The present findings add a task-level dimension to this pathway.

The task-specific results support this interpretation. Mobility or wheelchair assistance, bathing assistance, medical procedures, and position changes all involve sustained physical contact, body-weight transfer, or contact with bodily fluids and devices. Frequent physical contact with residents is often unavoidable in Korean long-term care, given the high prevalence of functional impairment among residents, which complicates IPC adherence [17]. Certified nursing assistants have been observed to skip glove changes in two-thirds of toileting and perineal-care events, contaminating 44% of gloved touches [10]. Mobility assistance and position changes are also the leading causes of manual-lifting injuries among Korean long-term care workers, a trend linked to staffing shortages and rising work intensity [18]. Although that evidence concerns musculoskeletal injury rather than infection, it points to the same two tasks identified here as disproportionately demanding, suggesting that their burden may reflect a broader pattern of physically intensive, understaffed care work rather than task-specific infection risk alone.

A second explanation is that high care-task burden may also signal working conditions that make consistent infection-prevention practice difficult to sustain. Previous studies have consistently demonstrated that infection-prevention behaviors are sensitive to these conditions. Scheithauer et al. found an inverse association between electronically measured nursing workload and hand-hygiene compliance [5]. Chang et al. similarly found that hand-hygiene compliance decreased significantly at high workload, particularly when hand-hygiene opportunities approached or exceeded 30 per hour [6]. This threshold pattern may explain why the present association reached significance only at high, not moderate, burden: preventive behavior may degrade once demand crosses a critical threshold rather than declining steadily.

These findings suggest that infection prevention among care workers should address the demands of direct-care work, not only workers' knowledge and practices. Nursing homes with weaker nurse staffing and existing infection-control deficiencies were more likely to experience COVID-19 outbreaks [19]. Across more than 12,000 U.S. nursing homes, higher staff turnover independently predicted infection-control citations [20]. Staffing instability may therefore translate into weaker infection control at the facility level. In Korean long-term care facilities, organizational culture has been a stronger predictor of infection-control performance than knowledge of guidelines (β = .479 vs. β = .223) [21].

Limitations

Several limitations should be considered. First, because this study used cross-sectional baseline data, the temporal relationship between care-task burden and occupational infection cannot be established. Reverse causation cannot be ruled out. For example, workers who recently experienced infection may report greater task burden. Second, occupational infection was assessed using a single self-reported question asking whether participants had experienced an infection related to work during the previous 12 months. The type of infection and route of transmission were not assessed. Occupational attribution was not confirmed through clinical records, so some misclassification of the outcome is possible. Third, care-task burden was based on workers' perceived burden rather than objective measures of task frequency, duration, or intensity. The measure should therefore not be interpreted as a direct measure of workload or exposure. Fourth, several factors central to the proposed mechanisms were not measured: frequency and duration of resident contact, staffing levels, time pressure, PPE availability and use, and IPC adherence. The exposure and IPC pathways proposed above therefore could not be directly tested and remain interpretive. Finally, participants were recruited from hospitals, long-term care hospitals, and long-term care facilities across South Korea, but the cohort was not designed as a nationally representative sample. This may limit the generalizability of the findings.

Conclusions

This study identified an association between high care-task burden and occupational infection among care workers in South Korea. Occupational infection may be related not simply to whether workers provide direct care, but also to the burden accumulated across the care activities they perform. Greater exposure during hands-on care and working conditions that constrain infection-prevention practice represent two plausible, interrelated pathways. These findings suggest that infection-prevention strategies for this workforce should address the demands embedded in direct-care tasks, alongside adequate staffing and organizational support, rather than relying on individual-level training alone. Longitudinal studies with more detailed measures of task exposure, work intensity, and clinically confirmed infection are needed to clarify these pathways and to identify which combinations of task demand and organizational support best protect this workforce.

Abbreviations

IPC
Infection prevention and control
KCWC
Korean Care Workers Cohort
LTCF
Long-term care facility
IRB
Institutional Review Board
PR
Prevalence ratio
aPR
Adjusted prevalence ratio
CI
Confidence interval

Declarations

Ethics approval and consent to participate

This study was conducted in accordance with the Declaration of Helsinki. This study was approved by the Institutional Review Board of Chung-Ang University (IRB No. 1041078-20250218-HR-034). All participants provided written informed consent before participation.

Consent for publication

Not applicable

Availability of data and materials

The datasets generated and analyzed during the current study are not publicly available because the Korean Care Workers Cohort (KCWC) is an ongoing longitudinal study and public release of participant-level data could compromise participant confidentiality, but are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests

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Authors' contributions

BC conceptualized the study and developed the research design. BC conducted the literature review, performed the statistical analysis, and drafted the manuscript. AL and JC contributed to data interpretation and critical revision of the manuscript. S-NJ supervised the study and critically revised the manuscript for important intellectual content. All authors read and approved the final manuscript.

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