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Regional and Temporal Trends in Workplace Violence and Presenteeism among Healthcare Professionals: A Comparative Analysis of Europe and South Korea during the COVID-19 Pandemic

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Abstract

Background: The coronavirus disease 2019 (COVID-19) pandemic has dramatically affected healthcare professionals globally. Presenteeism and workplace violence in the healthcare sector are global issues that exhibit different characteristics depending on the country. This study examined the prevalence and impact of workplace violence and presenteeism among healthcare professionals in Europe and South Korea by comparing data before and during the COVID-19 pandemic to identify regional differences.

Methods: This study analyzed secondary data from the sixth (2015) and seventh (2021) European Working Conditions Surveys and the fifth (2017) and sixth (2020) Korean Working Conditions Surveys. Healthcare professionals aged 18–65 years were identified using standardized occupational and industrial classification codes. Logistic regression analyses were conducted to examine the relationships between variables, and pooled models with interaction terms were used to formally test whether the associations differed by region and time period.

Results: Workplace violence was more prevalent in Europe than in Korea, both before (27.6% vs. 10.3%) and during (16.3% vs. 8.8%) the pandemic. Presenteeism was consistently higher in Europe than in Korea but decreased in both regions during the pandemic, declining from 42.0% to 36.0% in Europe and 20.3% to 15.3% in Korea. Workplace violence significantly increased the odds of presenteeism in both regions. Although the association was attenuated during the COVID-19 pandemic, the interaction between violence and country was not statistically

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significant in the pooled analyses.

Conclusions: Workplace violence consistently predicted presenteeism across both regions and time periods. Although this association was attenuated during the pandemic, it showed no significant difference between Europe and Korea. Tailored interventions, such as zero-tolerance policies and supportive work environments, are essential for addressing these issues. Given the nonaligned survey years across regions, temporal comparisons should be interpreted with caution. Further longitudinal and time-aligned studies are needed to clarify causal mechanisms and contextual heterogeneity.

Keywords: workplace violence, presenteeism, healthcare professionals, COVID-19 pandemic

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Background

Presenteeism is defined as being present at work despite feeling ill or unable to perform work [1]. An estimated 35% and 23% of workers in Europe and Korea experience presenteeism, respectively [2,3]. Working in healthcare is often highly demanding, with the work environment characterized by a high risk of stress and burnout, resulting in a high prevalence of presenteeism among healthcare professionals [4]. Healthcare professionals generally have a greater sense of duty, making them more likely to experience presenteeism [5]. In healthcare, a growing number of studies have sought to explore presenteeism because of its association with increased costs and lower work productivity and performance [6,7]. Among healthcare professionals, presenteeism can lead to adverse patient outcomes, such as falls, medication errors, and missed care [8,9]. Therefore, efforts to reduce presenteeism may improve the work productivity and well-being of healthcare professionals, consequently improving care quality [10].

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Studies have reported several personal (e.g., age, sex, and education) and work-related (e.g., shift work, workload, and working climate) predictors of presenteeism [4,11]. Moreover, work-related factors have a greater impact on presenteeism than personal factors [12,13]. For example, workers who experience workplace violence are exposed to stressful and unpleasant work environments that can potentially lead to presenteeism [14,15]. Conceptually, workplace violence refers to any act or threat of physical violence, intimidation, harassment, or threatening behavior at the workplace [16]. Healthcare

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professionals are particularly vulnerable to violence [17]. In a recent systematic review by Liu et al. [18], approximately 60% of healthcare professionals reported experiencing workplace violence, primarily involving verbal abuse (57.6%), threats (33.2%), physical violence (22.4%), and sexual harassment (12.4%). Beyond overall rates and types of abuse, a meta-analysis found the prevalence of workplace violence was substantially higher in Asian (pooled prevalence: 45.5%) and North American (58.7%) countries than in European countries (31.6%) [18].

Research indicates that employees who experience workplace violence tend to be emotionally exhausted and are at risk of presenteeism [19]. McGregor et al. [14] reported a significant association between workplace bullying and presenteeism among Australian workers. Workplace violence, such as verbal abuse, threats, and bullying, is a predictor of presenteeism among Korean workers [20]. Despite these insights, most studies on presenteeism have investigated this phenomenon in industries other than healthcare [21]. Consequently, relatively little research exists on the association between workplace violence and presenteeism among healthcare professionals.

Although presenteeism and workplace violence are critical global issues, their prevalence and manifestations differ significantly by country [22]. Presenteeism is influenced by personal, work, and organizational factors, all of which are shaped by broader cultural and societal contexts [23]. To effectively support worker health and safety, healthcare systems must understand how these interrelated factors are embedded within national culture. Hofstede’s cultural dimensions framework [24]—

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specifically, power distance, individualism–collectivism, and uncertainty avoidance—provides a robust theoretical rationale for analyzing these cross-national variations. According to this framework, organizational behaviors, such as a worker's willingness to report violence or take sick leave, are deeply influenced by cultural expectations of occupational stress and interpersonal dynamics. Using this cultural lens, a comparison of South Korea with European countries offers conceptually meaningful insights into how healthcare professionals respond to workplace adversity. South Korea typically exhibits higher power distance, stronger collectivistic norms, and higher uncertainty avoidance [24]. These cultural traits may discourage the upward voice and formal reporting of violence while simultaneously increasing job-related anxiety and the perceived duty to work while sick. In contrast, healthcare professionals in many European countries, which generally exhibit lower power distance, more individualistic normative climates, and a higher tolerance for uncertainty [24], may experience different normative expectations regarding presenteeism and speaking up against abuse.

Although European countries vary considerably in healthcare system organization, labor protection, and reporting cultures regarding workplace violence and presenteeism, they are nonetheless embedded within shared European Union regulatory infrastructures—most notably the Occupational Safety and Health “Framework Directive” (Council Directive 89/391/EEC)—that establish common minimum principles for worker safety and health governance across Member States [25]. This shared infrastructure makes the European Working Conditions Survey

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(EWCS) a defensible and cohesive counterpart to the Korean Working Conditions Survey (KWCS). In this study, Europe is treated as an EWCS-based aggregate rather than as a single-country system, and the European findings are interpreted at the cross-national survey level. Together, these two contexts provide a theoretically motivated contrast between two structurally and culturally distinct settings, advancing our understanding beyond a descriptive account of regional differences.

The need for such cross-national comparisons has been further emphasized by the coronavirus disease 2019 (COVID-19) pandemic. The crisis drastically reshaped the healthcare landscape by overwhelming systems, increasing stress, and forcing shifts to new care models [26,27]. Although these changes potentially amplified both workplace violence and presenteeism, previous studies have reported inconsistent findings regarding the pandemic's effects on these phenomena [28, 29]. These inconsistencies highlight the critical gap in our understanding of how the pandemic has influenced interrelated issues across countries.

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Therefore, this study pursues three objectives: (1) to describe and compare the prevalence of workplace violence and presenteeism among healthcare professionals in European countries and South Korea before and during the COVID-19 pandemic using the EWCS and KWCS; (2) to estimate the associations between workplace violence and presenteeism separately for each region and period; and (3) to determine whether the association between workplace violence and presenteeism differs by country and time period, thereby identifying contextual factors that moderate this relationship.

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Methods

Data Source and Sample

We conducted a secondary data analysis using data from the sixth EWCS (2015) and the fifth KWCS (2017) as the pre-COVID-19 period, and the seventh EWCS (2021) and the sixth KWCS (2020) as the COVID-19 period. These waves represent the closest available survey rounds capturing working conditions before and during the COVID-19 era in each region; however, the survey years are not perfectly aligned because the EWCS and KWCS are administered on different schedules. Accordingly, period comparisons should be interpreted as a pre-COVID-19 vs. during-COVID-19 era contrast rather than as a strictly year-matched comparison.

The KWCS was developed based on the EWCS framework, with both surveys providing nationally representative data and including questions related to occupation, working conditions, exposure to occupational hazards, and worker health. Both surveys employ a cross-sectional design, targeting workers aged 15 years and older. Data collection is typically conducted through in-person survey interviews by professionally trained investigators. However, the EWCS 2021 was administered via telephone interviews due to the COVID-19 pandemic. The representativeness of each survey was ensured using probability-based sampling. The EWCS uses country-specific sampling frames and typically applies stratified, multistage probability sampling (e.g., stratification by geographic region and degree of urbanization), followed by the probability selection of households and eligible respondents. The

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KWCS employs a stratified multistage probability sampling design to represent the economically active population of Korea, with sampling strata and selection procedures structured to mirror the national distribution of workers across regions and household sampling units. During the pre-COVID-19 period, the EWCS interviewed 43,850 professionals, and the KWCS surveyed 50,250. During the COVID-19 period, 71,758 workers were interviewed in the EWCS, and 50,538 workers participated in the KWCS.

We defined the eligible population as healthcare professionals aged 18–65 years. An upper age limit of 65 years was consistently applied across all datasets to reflect the standard retirement age of healthcare professionals in Korea. The identification of healthcare professionals was tailored to the specific occupational and industrial classification systems available in each dataset and period to ensure high specificity. In the pre-COVID-19 period, eligibility was determined using the International Standard Classification of Occupations (ISCO, code 22) for the EWCS. In the KWCS, eligibility was determined using the Korean Standard Classification of Occupations (KSCO, code 2 for professionals and related workers) in conjunction with the Korean Standard Industrial Classification (KSIC codes 861, 862, and 863, representing hospitals, clinics, and public health institutions, respectively).

For the COVID-19 period analyses, the classification criteria were refined to account for the updated classification structure: the EWCS combined ISCO code 22 with Nomenclature of Economic Activities level 2 code 86, and the KWCS employed the KSCO (IND code 17,

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encompassing healthcare and social work activities) and KSIC (OCC2 codes 241–246, encompassing doctors, pharmacists, nurses, nutritionists, rehabilitation specialists, medical technicians, and other healthcare professionals.)

After excluding ineligible respondents, the final sample comprised 1,320 respondents from European countries and 965 respondents from Korea for the pre-COVID-19 period. The sample for the COVID-19 period consisted of 1,806 respondents from European countries and 1,033 respondents from Korea.

Measures

We used data on participants' demographic characteristics (e.g., age, sex, and educational level), workplace violence, and presenteeism.

Workplace violence. Workplace violence was assessed based on responses to two questions: (1) "Over the past month, during the course of your work, have you been subjected to any of the following?"; and (2) "Over the past 12 months, during the course of your work, have you been subjected to any of the following?" Respondents reported whether they had experienced any of the specified types of workplace violence by selecting "yes," "no," or "do not know." Responses of "no" and "do not know" indicated that the respondent had not experienced workplace violence, whereas a "yes" response to any item confirmed the experience.

To ensure cross-national and longitudinal comparability, the categorization of workplace violence was harmonized across the four datasets (EWCS 2015/2021 and KWCS 2017/2020). As the 2021 EWCS questionnaire assessed workplace violence using three pre-aggregated

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categories, we matched the items from the other datasets to these overarching categories. Consequently, workplace violence was classified into three scope-specific categories: (1) verbal abuse and threats (restricted to psychological and verbal aggression without physical contact); (2) unwanted sexual attention (encompassing unwelcome behaviors of a sexual nature); and (3) bullying, harassment, and violence (a composite category capturing severe or direct victimization, created by aggregating physical violence, humiliating behaviors, and bullying/harassment, and consistent with the 2021 EWCS variable "bullying/harassment/violence").

Presenteeism. Presenteeism was measured by the question, "Over the past 12 months, did you work when you were sick?" Respondents who selected "yes" were considered to have experienced presenteeism, whereas those who responded "no" or "I was not sick" were deemed as not having experienced presenteeism.

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Data Analysis

Data analysis was conducted using SPSS, version 29.0 (IBM Corp). First, we used descriptive statistics (i.e., mean, SD, frequency, and percentage) to analyze the respondents' demographic characteristics and identify the prevalence of workplace violence and presenteeism. Between-country comparisons within the same period (EWCS vs. KWCS) and within-survey temporal comparisons (before vs. during) were assessed using Welch's t-test for continuous variables to account for unequal variances where applicable, and Pearson's chi-square test for categorical variables and binary outcomes. Second, differences in

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demographic characteristics and study variables were examined by comparing EWCS and KWCS data using the chi-square test. Third, we investigated the effect of workplace violence on presenteeism using logistic regression models, controlling for demographic characteristics (age, sex, and educational level). To formally test the heterogeneity of effects across contexts, we additionally fitted pooled logistic regression models, including country (Europe vs. Korea), period (pre-COVID-19 vs. COVID-19), workplace violence, and the interaction terms violence × country, violence × period, and country × period. Statistical significance was set at $p < .05$, and 95% confidence intervals (CIs) were used. Missing data were handled using listwise deletion (complete-case analysis), and participants with missing values for any variable required for a given analysis were excluded. Survey sampling weights and complex sampling design features were not applied in the analyses to enhance comparability between the EWCS and KWCS. This approach was adopted because neither dataset provides standardized guidance for adjusting the sampling weights when merging data across different survey periods and countries. Using unweighted data, we prioritized a consistent and transparent comparison of the associations between workplace violence and presenteeism within a unified analytical framework.

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Ethical Considerations

Ethical review and approval were waived for this study by the Institutional Review Board of Chung-Ang University based on the study design, which was a secondary analysis of pre-existing datasets (No.

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1041078-20250109-HR-010).

Results

Descriptive Characteristics of Study Respondents

Table 1 presents the characteristics of the EWCS and KWCS respondents before and during the COVID-19 pandemic. Before COVID-19, the average age of respondents was significantly higher in Europe (43.3 years) than in Korea (38.4 years; $p < .001$). A similar trend was observed during the COVID-19 period, where the EWCS respondents were older (mean age, 39.0 years) than the KWCS respondents (mean age, 38.6 years; $p < .001$). A higher proportion of female respondents was observed in Korea than in Europe, both before (86.5% vs. 78.0%) and during the pandemic (83.0% vs. 72.1%), and all differences were statistically significant ($p < .001$).

Education levels differed notably between the two regions. Before the pandemic, most respondents in Europe held an associate degree (76.4%), whereas nearly half of the Korean respondents held a bachelor's degree (44.9%). During the pandemic, the proportion of respondents with a master's degree or higher was significantly higher in Europe (53.5%) than in Korea (7.7%; $p < .001$).

[Insert Table 1 here]

Temporal comparisons within each survey revealed distinct patterns of change between the European and Korean workforces (Table 1). In the European sample, the mean age decreased significantly from 43.3 to 39.0 years ($p = .002$), and significant shifts were observed across all demographic categories, including age groups ($p < .001$), sex (p

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< .001), and education level ($p < .001$). In contrast, for the Korean sample, although education level ($p < .001$) and sex distribution ($p = .030$) showed significant temporal changes, the mean age and overall age distribution remained relatively stable between the two periods ($p = .654$ and $p = .379$, respectively).

Prevalence of Workplace Violence and Presenteeism Before and During the COVID-19 Pandemic

Table 1 compares the prevalence of workplace violence and presenteeism between European and Korean respondents before and during the COVID-19 pandemic. Overall, workplace violence was more prevalent in Europe than in Korea in both periods. Before COVID-19, 27.6% of European respondents reported experiencing workplace violence compared with 10.3% of Korean respondents ($p < .001$). During the pandemic, workplace violence decreased to 16.3% in Europe but remained relatively stable in Korea at 8.8%, with regional differences remaining significant ($p < .001$). Verbal abuse and threats were the most common types of workplace violence in both regions, with significantly higher rates in Europe than in Korea before ($p < .001$) and during the pandemic ($p < .001$). In Europe, the prevalence of verbal abuse decreased from 21.0% before COVID-19 to 11.8% during the pandemic, whereas Korea reported a smaller decline, from 7.6% to 5.8%. Similarly, the rates of unwanted sexual attention and bullying/harassment/violence were consistently higher in Europe than in Korea, both before and during the pandemic, with all differences found to be statistically significant ($p < .001$).

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Significant temporal shifts were observed in the main outcomes. In Europe, the prevalence of workplace violence showed a substantial and statistically significant decline from 27.6% before the pandemic to 16.3% during the pandemic ($p < .001$). This downward trend in the EWCS was consistent across subcategories, particularly for verbal abuse and threats (21.0% to 11.8%; $p < .001$) and bullying/harassment/violence (17.3% to 8.6%; $p < .001$). Conversely, in Korea, the overall prevalence of workplace violence remained statistically stable (10.3% before vs. 8.8% during; $p = .270$). Although a slight increase was noted in unwanted sexual attention (0.9% to 2.0%; $p = .037$) and a small decrease in bullying/harassment/violence (6.2% to 4.2%; $p = .022$) in the KWCS, the primary forms of violence did not show the same drastic reduction observed in Europe.

Before the pandemic, presenteeism was significantly higher in Europe (42.0%) than in Korea (20.3 %) ($p < .001$), whereas during the pandemic, it decreased to 36.0% in Europe and remained relatively stable at 15.3% in Korea. The difference between the two regions during the pandemic was also statistically significant ($p < .001$). Presenteeism rates decreased significantly in both regions over time. In Europe, presenteeism decreased from 42.0% to 36.0% ($p < .001$). Although Korea had a lower baseline rate, it experienced a highly significant reduction in presenteeism, dropping from 20.3% to 15.3% during the pandemic ($p < .001$).

Distribution of Workplace Violence and Presenteeism by Demographic Characteristics

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Table 2 presents the distribution of workplace violence and presenteeism among survey respondents from Europe (EWCS) and Korea (KWCS) before and during the COVID-19 pandemic, analyzing the data across demographic factors. Before COVID-19, female respondents in Europe experienced significantly higher rates of workplace violence (χ^2 = 6.37; p = .012) and presenteeism (χ^2 = 10.20; p < .001) than male respondents. The results also revealed a significant difference in presenteeism based on educational level (χ^2 = 10.44; p = .012). In Korea, there were no significant differences in workplace violence across age and sex. However, presenteeism was significantly higher among female respondents compared with male respondents (90.8% vs. 9.2%; p = .049), and showed a significant difference based on educational level (χ^2 = 7.98, p = .018).

[Insert Table 2 here]

During COVID-19, female respondents in Europe continued to experience significantly higher rates of workplace violence (χ^2 = 8.83, p = .012) compared with male respondents, and presenteeism differed significantly based on educational level (χ^2 = 18.96, p = .015). In Korea, workplace violence remained similar across age and sex groups, with no significant differences observed. The results revealed significant differences in presenteeism based on educational level (χ^2 = 17.89; p = .007).

Effect of Workplace Violence on Presenteeism

Table 3 presents the results of the logistic regression models before and during COVID-19. Before COVID-19, European respondents

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who experienced any type of workplace violence were 3.62 times more likely to experience presenteeism than those who did not (95% CI, 2.80–4.67). When broken down by type, verbal abuse and threats were associated with 3.16 times higher odds of presenteeism (95% CI, 2.39–4.17; $p < .001$), unwanted sexual attention with 2.71 times higher odds (95% CI, 1.48–4.94; $p = .001$), and bullying/harassment/violence with 3.14 times higher odds (95% CI, 2.32–4.24; $p < .001$).

[Insert Table 3 here]

In Korea, participants who experienced workplace violence were 4.70 times more likely to experience presenteeism compared with those who did not (95% CI, 3.03–7.28; $p < .001$). Verbal abuse and threats increased the odds of presenteeism by 4.30 times (95% CI, 2.61–7.06; $p < .001$), unwanted sexual attention by 3.52 times (95% CI, 1.40–8.88; $p = .008$), and bullying/harassment/violence by 6.80 times (95% CI, 3.93–11.80; $p < .001$).

During COVID-19, European respondents who experienced workplace violence were only 1.99 times more likely to experience presenteeism compared with those who did not (95% CI, 1.55–2.57; $p < .001$). Verbal abuse and threats remained a significant factor, associated with 1.96 times higher odds of presenteeism (95% CI, 1.47–2.62; $p < .001$), as did unwanted sexual attention (adjusted odds ratio [aOR] = 2.16; 95% CI, 1.21–3.85; $p = .009$) and bullying/harassment/violence (aOR = 2.01; 95% CI, 1.44–2.79; $p < .001$).

In Korea, the odds of experiencing presenteeism among those affected by workplace violence decreased during the pandemic.

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However, the odds remained significant at 2.75 times higher among those who had experienced workplace violence compared with those who had not (95% CI, 1.68–4.47; $p < .001$). Verbal abuse and threats were associated with 2.04 times higher odds of presenteeism (95% CI, 1.11–3.73; $p = .021$), whereas bullying/harassment/violence was associated with 4.03 times higher odds (95% CI, 2.08–7.79; $p < .001$). Unwanted sexual attention was no longer significantly associated with presenteeism during this period (95% CI, 0.28–6.88; $p = .691$).

Table 4 presents the results of the pooled logistic regression models examining the factors associated with presenteeism among healthcare professionals. In the initial model adjusting for demographic characteristics and main effects (Model 1), healthcare professionals in Korea were significantly less likely to report presenteeism (aOR = 0.38; 95% CI, 0.33–0.44; $p < .001$) compared with those in European countries. Conversely, the likelihood of presenteeism was significantly lower during the COVID-19 pandemic compared with the pre-pandemic period (aOR = 0.82; 95% CI, 0.71–0.95; $p = .007$). Workplace violence emerged as a potent predictor, with those experiencing violence being nearly three times more likely to engage in presenteeism (aOR = 2.84; 95% CI, 2.42–3.32; $p < .001$).

[Insert Table 4 here]

Model 2 incorporated two-way interaction terms to test for effect heterogeneity across countries and periods. The strong association between workplace violence and presenteeism remained robust (aOR = 4.71; 95% CI, 3.31–6.69; $p < .001$). A significant interaction was found

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between workplace violence and period (aOR = 0.57; 95% CI, 0.42–0.79; $p < .001$). However, the interaction between workplace violence and country was not statistically significant (aOR = 0.75; 95% CI, 0.52–1.08; $p = .121$). Similarly, the interaction between country and period (aOR = 1.31; 95% CI, 0.97–1.77; $p = .077$) did not reach statistical significance at the .05 level, although a marginal trend was observed.

Discussion

This study explored changes in the prevalence of workplace violence and presenteeism among healthcare professionals in Europe and South Korea before and during the COVID-19 pandemic. It also examined whether the association between workplace violence and presenteeism varied across survey contexts and periods. Healthcare professionals who had experienced workplace violence consistently showed higher odds of presenteeism in both regions. However, because the EWCS and KWCS waves were conducted in different calendar years, these comparisons should be interpreted as cross-survey, pre-COVID-19 vs during-COVID-19 era contrasts, rather than strictly year-matched or causal pandemic effects. Although the stratified odds ratios were numerically higher in Korea, the pooled model did not show a statistically significant workplace violence × country interaction. Therefore, the present findings support a robust positive association between workplace violence and presenteeism in both settings, rather than providing definitive evidence that the effect is stronger in Korea than in Europe.

Presenteeism Trends and Regional Differences

The results revealed a higher prevalence of presenteeism in

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Europe than in Korea, both before and during the COVID-19 outbreak. As Europe was treated as an EWCS-based aggregate encompassing heterogeneous countries, this regional difference should be interpreted as an aggregate survey-level pattern rather than a uniform country-specific phenomenon across all European countries. This finding contrasts with prior research showing higher presenteeism in Asian countries, such as Taiwan, compared with Western nations [30]. Our results challenge the assumption that the prevalence of presenteeism would be higher in Korea than in Europe, which is rooted in the Confucian tradition of “hard work and endurance” [31]. The lower prevalence of presenteeism among Korean respondents may be due to cultural differences in the perception and reporting of presenteeism. For instance, the definition of sickness may vary across countries, with minor symptoms considered sufficient for taking leave in one culture that are not regarded as such in another. Additionally, even with confidentiality measures in place, Korean participants may have underreported presenteeism due to cultural and social pressures. These explanations remain interpretive rather than directly tested in the present dataset. Future studies using real-time objective measures along with self-reported data could provide more accurate cross-country comparisons [15].

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During the pandemic, presenteeism decreased significantly in Europe (from 42.0% to 36.0%) and Korea (from 20.3% to 15.3%). The relative magnitude of the decline was comparable across both regions (approximately a 14–25% reduction), suggesting that pandemic-related

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factors may have exerted similar downward pressure on presenteeism, regardless of regional differences in healthcare systems or workplace cultures. This finding is consistent with previous studies in Korea [32]. The observed decline can likely be attributed to several pandemic-specific factors common to both regions, including heightened fear of viral transmission, implementation of stricter health protocols, and increased public awareness of the risks of working while ill [32]. These factors may have created a normative climate in which staying home when sick has become more socially acceptable and institutionally supported across diverse cultural contexts.

Although Europe showed a higher prevalence of presenteeism than Korea in both periods, both regions experienced declines of similar absolute magnitudes. Therefore, the current data do not justify attributing the European decrease specifically to workplace policy changes or drawing a differential policy explanation for Europe and Korea. Potential contributors, such as remote work, flexible leave arrangements, public-health messaging, or changing norms around working while ill, are plausible in both settings [33,34] but were not directly measured in this study. Thus, a more cautious interpretation is that presenteeism declined in both regions during the later survey period, although the contextual mechanisms underlying this decline remain unclear and require future research. Organizational education on presenteeism and its impacts, including training managers and employees to recognize its consequences on health and productivity, is critical. Positive workplace relationships and climates may further

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mitigate presenteeism [35,36].

Prevalence of Workplace Violence

Workplace violence was more prevalent in Europe than in Korea both before and during the pandemic. This difference may reflect actual variations in prevalence or cultural differences in perceiving and reporting workplace violence [37]. In Korean workplaces, hierarchical power disparities may lead to greater tolerance for workplace violence, whereas European professionals may have lower thresholds for such behavior and feel safer reporting such incidents.

The prevalence of workplace violence observed in this study was lower than that reported in previous studies, which may be due to differences in measurement tools [38]. For instance, the yes-or-no questions used in the EWCS and KWCS may underreport workplace violence compared with tools that describe specific behaviors [39]. To improve cross-country comparisons, future research should adopt unified measurement tools that capture concrete behaviors related to workplace violence. Additionally, organizations must foster a workplace climate in which employees feel safe reporting violence without fear of retaliation [40,41].

The observed prevalence of workplace violence was lower in the later survey waves, particularly in Europe, which is broadly consistent with the findings of previous studies [29]. However, because the survey years were not aligned and the data were cross-sectional, this pattern should be interpreted with caution and not as direct evidence that the pandemic itself reduced workplace violence. Changes in work

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organization, workforce composition, and reporting behavior, including reduced face-to-face contact in some settings, may have contributed to the observed pattern [42,43]. Verbal abuse or threats were the most common forms of violence in both regions, which is consistent with the finding that verbal aggression is often normalized or overlooked in workplaces [44]. However, their higher prevalence in Europe suggests differences in workplace communication styles and thresholds for reporting such incidents. The larger decline observed in Europe may reflect multiple unmeasured factors and should not be solely attributed to the shift toward virtual communication. Although virtual communication can limit direct confrontation, it also poses challenges in terms of addressing online harassment. Organizational interventions, such as zero-tolerance policies and workplace violence education, are necessary to effectively reduce such incidents [45,46].

Impact of Workplace Violence on Presenteeism

Workplace violence significantly increased the odds of presenteeism in both regions and periods. Although the stratified odds ratios were higher in Korea, the pooled interaction analysis did not reveal a statistically significant difference between Korea and Europe in terms of the magnitude of this association (Table 4). Accordingly, the present findings are better interpreted as evidence of a robust positive association across settings rather than conclusive evidence of a stronger effect in Korea. In contrast, the significant workplace violence × period interaction suggests that this association was attenuated in the later survey wave, although the reasons for this attenuation could not be

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disentangled from temporal confounding factors. Given the heterogeneity within Europe and the mismatch in survey years, any cross-national comparison of effect magnitudes should remain tentative.

This aligns with findings from other industries where workplace violence is a critical facilitator of presenteeism [14,20]. According to the Job Demands-Resources model, a framework commonly used to explain presenteeism [47], the work environment affects worker health and productivity [48]. This model further suggests that job demands (e.g., time pressure, high workloads, irregular working hours, and job insecurity) can cause higher worker stress and burnout, resulting in presenteeism [14,49]. Meanwhile, reinforcing job resources (e.g., providing a supportive work environment and quality leadership) can reduce worker stress and burnout, potentially reducing the risk of presenteeism [14,48]. Accordingly, further longitudinal studies are needed to confirm the underlying mechanisms of the relationship between workplace violence and presenteeism among healthcare professionals.

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Implications for Occupational Health Practice

The findings of this study highlight the significant relationship between workplace violence and presenteeism, with pooled analyses suggesting that this association was attenuated in later survey periods. As our data did not directly measure the mechanisms underlying this attenuation, explanations such as increased health safety awareness or altered attendance norms should be viewed as tentative rather than causal [50,51]. Among the various forms of workplace violence, bullying,

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harassment, and violence have consistently demonstrated the strongest impact on presenteeism across regions and periods. Although the strength of these associations weakened during the pandemic, they remained statistically significant in most cases, highlighting the persistent influence of workplace violence on presenteeism.

Given the absence of a significant interaction between workplace violence and country in our pooled analyses, our findings suggest that the association between workplace violence and presenteeism operates similarly across European and Korean healthcare contexts. This indicates that workplace violence should be understood as a common occupational health concern in both contexts and that preventing workplace violence may represent a broadly relevant strategy for reducing presenteeism and its associated burdens. However, similar association patterns do not necessarily imply that identical intervention approaches are equally effective across settings. Rather than framing one region as being more strongly affected than another, a more appropriate implication is that context-sensitive implementation is required within a shared prevention agenda. In Europe, maintaining the decline in workplace violence observed during the pandemic should be prioritized. This can be achieved through initiatives aimed at fostering inclusive workplace cultures and improving reporting mechanisms to ensure that workplace violence incidents are promptly and effectively addressed. In Korea, tackling cultural stigmas that normalize or downplay workplace violence is critical, as it strengthens the enforcement of workplace violence policies to create a safer work environment. Managers must also

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recognize presenteeism as a risk factor for worker health and productivity to ensure that institutional practices do not implicitly encourage presenteeism [52,53].

Particular attention should be paid to healthcare professionals who face an elevated risk of presenteeism when exposed to workplace violence [17]. To address this issue, stakeholders must develop innovative interventions to provide supportive and safe work environments. These interventions should operate at both the individual and organizational levels, ensuring that workers are equipped with the resources and support needed to manage workplace violence and its impact. By implementing these targeted strategies, organizations can mitigate the negative consequences of workplace violence, improve employee well-being, and reduce presenteeism across sectors and regions.

Limitations

This study has several limitations. First, this was a secondary data analysis study, meaning that only variables included in the dataset could be used. Consequently, we may have omitted some important variables that might have affected the study results. Additionally, the harmonization of workplace violence categories across different survey years and countries resulted in some conceptual overlap (e.g., combining physical violence and bullying into a single category in the 2021 EWCS). Future research using standardized granular measurement tools is required to disentangle the distinct effects of physical, psychological, and sexual violence. Second, our datasets did not specify participants'

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occupations (e.g., doctors and nurses), precluding our ability to analyze the data by healthcare occupation. Third, we measured presenteeism and workplace violence based on responses to a single yes/no question, raising the possibility of missing multidimensional aspects of each variable. Therefore, future research should compare different measures of these variables and develop instruments that capture specific concepts relevant to healthcare. Fourth, our datasets had a cross-sectional design, limiting our ability to determine causality between the variables of interest. To address this limitation, future longitudinal studies should be conducted to confirm the causal relationships between them. Fifth, a temporal mismatch exists between the pre- and during-pandemic survey waves across Europe and Korea (EWCS: 2015 vs. 2021; KWCS: 2017 vs. 2020). Accordingly, the observed period differences may reflect not only COVID-19–related changes but also secular trends, policy shifts, or broader labor market transformations occurring between survey years. Therefore, cross-period and cross-national comparisons should be interpreted with caution. Future studies using more closely aligned time points or repeated annual data are warranted to better isolate pandemic-specific effects. Sixth, this study did not apply survey sampling weights, as neither the EWCS nor the KWCS provides standardized guidance for weight adjustment when merging data across different survey periods and countries. Nevertheless, because both surveys employ stratified, multistage cluster sampling designs for which weighted estimation is conventionally required, this methodological choice may affect the generalizability of the reported prevalence estimates. Accordingly, these

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estimates should be interpreted with caution and may not fully represent national population-level burdens. Despite these limitations, this study contributes to our understanding of workplace violence and presenteeism by formally testing their interaction effects across regions and time periods using two large national datasets, thereby providing a more nuanced understanding of how these relationships may vary across different contexts.

Conclusions

This study reveals significant temporal changes in the prevalence of workplace violence and presenteeism among healthcare professionals in Europe and Korea. Workplace violence consistently influenced presenteeism across both regions and periods, with a significant attenuation of this effect during the COVID-19 pandemic. Formal interaction testing indicated that the association between workplace violence and presenteeism did not differ significantly between Europe and Korea, suggesting that addressing workplace violence may be a universally important strategy for reducing presenteeism, regardless of the regional context. However, the interpretation of these findings must be tempered by the temporal misalignment of survey waves and the considerable heterogeneity within regions. Tailored interventions that account for local cultural and structural contexts are essential for creating safer workplaces and reducing presenteeism. By addressing these challenges and fostering a positive workplace climate, healthcare organizations can reduce the negative consequences of presenteeism and ensure safer and healthier work environments for their employees.

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Future studies using longitudinal and time-aligned data are needed to clarify causal mechanisms and contextual heterogeneity.

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List of Abbreviations

COVID-19: Coronavirus Disease 2019

EWCS: European Working Conditions Survey

ISCO: International Standard Classification of Occupations

KSCO: Korean Standard Classification of Occupations

KWCS: Korean Working Conditions Survey

KSIC: Korean Standard Industrial Classification

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Declarations

Ethical approval and consent to participate

The study received an exemption from the Institutional Review Board of Chung-Ang University (Approval No. 1041078-20250109-HR-010). Consent to participate was not obtained because this study used deidentified and publicly available secondary data.

Consent to publication

Not applicable

Availability of data and materials

The data that support the findings of this study for the EWCS are openly available at https://www.eurofound.europa.eu/data/european-working-conditions-survey (http://doi.org/10.5255/UKDA-SN-8098-4). For the KWCS, at https://oshri.kosha.or.kr/oshri/researchField/workingEnvironmentSurvey.do

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Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

Dr. Kim and Dr. Min contributed substantially to the conception and design of the work, acquisition, analysis, interpretation of data for the

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work, and drafting of the manuscript. Dr. Chang contributed to the analysis and interpretation of the data and critically revised the manuscript. Dr. Kang critically reviewed the draft for important intellectual content. All authors approved the final version of the manuscript for publication.

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Table 1. Descriptive characteristics and prevalence of workplace violence and presenteeism among healthcare professionals by region and pandemic period

Variables	Before COVID-19			During COVID-19			Temporal Comparison	
	EWCS (n = 1,320)	KWCS (n = 965)	*p-value*†	EWCS (n = 1,806)	KWCS (n = 1,033)	*p-value*†	*p-value* ‡	
							EWCS (Before vs. During)	KWCS (Before vs. During)
Demographics								
Age, mean (± SD)	43.3 (±11.2)	38.4 (±9.7)	< .001	39.0 (±11.9)	38.6 (±9.9)	< .001	.002	.654
< 30, n (%)	197 (14.9)	208 (21.6)	< .001	333 (18.4)	225 (21.8)	< .001	< .001	.379
30–39, n (%)	322 (24.4)	333 (34.5)		496 (27.5)	356 (34.5)			
40–49, n (%)	355 (26.9)	279 (28.9)		457 (25.3)	278 (26.9)			
50–59, n (%)	350 (26.5)	137 (14.2)		357 (19.8)	156 (15.1)			
≥ 60, n (%)	96 (7.3)	8 (0.8)		163 (9.0)	18 (1.7)			
Sex, n (%)			< .001			< .001	< .001	.030
Male	290 (22.0)	130 (13.5)		502 (27.8)	175 (16.9)			
Female	1,030 (78.0)	835 (86.5)		1303 (72.1)	857 (83.0)			
Education level, n (%)			< .001			< .001	< .001	< .001
Associate degree	977 (76.4)	490 (50.8)		224 (12.4)	403 (39.4)			
Bachelor’s degree	103 (8.1)	433 (44.9)		616 (34.1)	550 (53.2)			
Master’s or higher	199 (15.5)	42 (4.3)		966 (53.5)	80 (7.7)			
Main outcomes								

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Workplace violence, n (%)	364 (27.6)	99 (10.3)	< .001	294 (16.3)	91 (8.8)	< .001	< .001	.270
Verbal abuse/threats	277 (21.0)	73 (7.6)	< .001	213 (11.8)	60 (5.8)	< .001	< .001	.116
Unwanted sexual attention	50 (3.8)	19 (2.0)	< .001	49 (2.7)	9 (0.9)	< .001	.073	.037
Bullying/harassment/violence	229 (17.3)	60 (6.2)	< .001	155 (8.6)	43 (4.2)	< .001	< .001	.022
Presenteeism, n (%)	554 (42.0)	196 (20.3)	< .001	650 (36.0)	158 (15.3)	< .001	< .001	< .001

Note: KWCS, Korean Working Conditions Survey; EWCS, European Working Conditions Survey. Values are presented as mean (± SD) or n (column %) unless otherwise stated. Percentages use the variable-specific number of respondents with non-missing values as the denominator. † Between-country comparisons within the same period (EWCS vs. KWCS): Welch's t-test for continuous variables, Pearson's chi-square test for categorical variables/binary outcomes. Within-survey temporal comparisons (before vs. during): Welch's t-test was employed for continuous variables to adjust for unequal variances, where appropriate; Pearson's chi-square test was used for categorical variables and binary outcomes. Survey sampling weights were not applied to enhance comparability between the EWCS and KWCS.

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Table 2. Distribution of workplace violence and presenteeism by demographic characteristics before and during the COVID-19 pandemic

	Before COVID-19								During COVID-19							
	EWCS (n = 1,320)				KWCS (n = 965)				EWCS (n = 1,806)				KWCS (n = 1,033)			
	WV n(%)	*p-value*	Presenteeism n(%)	*p-value*	WV n(%)	*p-value*	Presenteeism n(%)	*p-value*	WV n(%)	*p-value*	Presenteeism n(%)	*p-value*	WV n(%)	*p-value*	Presenteeism n(%)	*p-value*
Age (year)		.404		.511		.490		.687		.240		.395		.446		.818
< 30	58(15.9)		86(15.5)		27(27.3)		36(18.4)		55(18.7)		113(17.4)		26(28.6)		32(20.3)	
30–39	85(23.4)		136(24.6)		34(34.3)		66(33.7)		92(31.3)		173(26.6)		27(29.7)		65(41.1)	
40–49	107(29.4)		145(26.2)		24(24.2)		63(32.1)		67(22.8)		179(27.5)		26(28.6)		40(25.3)	
50–59	94(25.8)		154(26.8)		14(14.2)		29(14.8)		61(20.7)		135(20.8)		11(23.1)		20(12.7)	
≥ 60	20(5.5)		33(5.9)		0(0.0)		2(1.0)		19(6.5)		50(7.7)		1(1.1)		1(0.6)	
Sex		.012		.001		.468		.049		.012		.829		.315		.777
Male	63(17.3)		98(17.7)		11(11.1)		18(9.2)		68(23.1)		168(28.8)		12(13.2)		28(17.7)	
Female	301(82.7)		456(82.3)		88(88.9)		178(90.8)		225(76.5)		482(74.2)		79(86.8)		130(82.3)	
Education level		.917		.012		.484		.018		.457		.015		.354		.007
Associate	277(76.1)		405(73.1)		52(50.5)		117(59.7)		37(12.6)		90(13.8)		30(33.0)		50(31.6)	
Bachelor’s	27(7.4)		58(10.5)		45(45.5)		73(27.2)		109(33.5)		216(33.2)		55(60.4)		86(54.4)	
Master’s/higher	60(16.5)		91(16.4)		2(2.0)		6(3.1)		148(54.1)		344(52.9)		6(6.6)		22(13.9)	

Note. EWCS = European Working Conditions Survey; KWCS = Korean Working Conditions Survey; WV=Workplace Violence. P-values were calculated using Pearson’s chi-square test to compare outcome prevalence across the categories within each stratum.

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Table 3. Region- and period-stratified associations between workplace violence and presenteeism

	Before COVID-19†		During COVID-19†	
	Adjusted OR (95%CI)	*p*-value	Adjusted OR (95%CI)	*p*-value
EWCS				
Workplace violence (overall)	3.62(2.80–4.67)	<.001	1.99(1.55–2.57)	<.001
Verbal abuse/threat	3.16(2.39–4.17)	<.001	1.96(1.47–2.62)	<.001
Unwanted sexual attention	2.71(1.48–4.94)	.001	2.16(1.21–3.85)	.009
Bullying/harassment/violence	3.14(2.32-4.24)	<.001	2.01(1.44–2.79)	<.001
KWCS				
Workplace violence (overall)	4.70(3.03–7.28)	<.001	2.75(1.68–4.47)	<.001
Verbal abuse/threat	4.30(2.61–7.06)	<.001	2.04(1.11–3.73)	.021
Unwanted sexual attention	3.52(1.40–8.88)	.008	1.38(0.28–6.88)	.691
Bullying/harassment/violence	6.80(3.93–11.80)	<.001	4.03(2.08–7.79)	<.001

Note. OR, Odds ratio; CI = Confidence interval; EWCS, European Working Conditions Survey; KWCS, Korean Working Conditions Survey. Estimates were obtained from separate logistic regression models stratified by survey type (EWCS vs. KWCS) and period (pre-COVID-19 vs. COVID-19). †Models adjusted for age, sex, and educational level. Analyses were conducted using complete-case data without applying survey sampling weights or complex design features; therefore, differences in OR magnitude across surveys should be interpreted descriptively rather than as formal cross-survey effect differences. †† Significance is based on a 95% CI.

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Table 4. Pooled logistic regression models examining the interaction effects of workplace violence, country, and period on presenteeism among healthcare professionals

Variables	Model 1		Model 2	
	Adjusted OR (95% CI)	*p*-value	Adjusted OR (95% CI)	*p*-value
Demographic characteristics				
Age (year)	1.01(.999-1.01)	.426	1.01(.99-1.01)	.418
Sex				
Male	1.00		1.00	
Female	1.24(1.06-1.46)	.007	1.24(1.06-1.45)	.007
Educational level				
Associate degree	1.00		1.00	
Bachelor's degree	0.99(0.85-1.17)	.979	0.97(0.82-1.15)	.728
Master's or higher	1.09(0.91-1.30)	.358	1.03(0.86-1.25)	.725
Main effects				
Country				
European countries	1.00		1.00	
South Korea	0.38(0.33-0.44)	<.001	2.45(1.97-3.06)	<.001
Period				
Before COVID-19	1.00		1.00	
During COVID-19	0.82(0.71-0.95)	.007	0.79(0.62-1.01)	.057
Workplace violence				
No	1.00		1.00	
Yes	2.84(2.42-3.32)	<.001	4.71(3.31-6.69)	<.001
Interaction terms†				
Workplace violence × Country	-		0.75(0.52-1.08)	.121
Workplace violence × Period	-		0.57(0.42-0.79)	<.001
Country × Period	-		1.31(0.97-1.77)	.077

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Notes: *OR*= Adjusted Odds Ratio, *CI*= Confidence Interval, *COVID-19* = Coronavirus Disease 2019. Both models utilize a pooled dataset integrating the European Working Conditions Survey (EWCS) and Korean Working Conditions Survey (KWCS). Model 1 includes the main effects of country, period, and workplace violence after adjusting for demographic characteristics (age, sex, and educational level). Model 2 builds on Model 1 by adding two-way interaction terms to formally test for heterogeneity across countries and periods. †For the interaction terms, the estimated adjusted ORs and *p*-values represent the multiplicative effects of the specified categories (i.e., Workplace violence [Yes], Country [Korea], and Period [During-COVID-19]) relative to their respective reference groups.

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