

# Workplace Violence and Gender Equality: Country Level Data in European Countries and Korea

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**Objectives:** The purpose of this study was to compare the prevalence of workplace violence in European countries and Korea, and to determine the relationship between the prevalence of workplace violence and gender equality in each country. The level of gender equality was used as a proxy for the sensitivity to and awareness of workplace violence.

**Methods:** This study included 30,032 Europeans from the 6th European Working Conditions Survey and 39,675 Koreans from the 5th Korean Working Conditions Survey. Workplace violence included verbal abuse, unwanted sexual attention, threats, and humiliating behaviors over the past month and physical violence, sexual harassment, and bullying or harassment over the past year. The prevalence of workplace violence was standardized using the direct standardization method. Spearman's rank correlation analysis was used to examine the relationship between the prevalence of workplace violence and Gender Gap Index (GGI) adjusted for the Gini coefficient, unemployment rate, and share of temporary employment.

**Results:** Countries with a high GGI showed a higher prevalence of workplace violence. Even after adjusting for the Gini coefficient, unemployment rate, and share of temporary employment, the positive correlations between the GGI and workplace violence over the past month ( $r=0.475$ ,  $P=0.019$ ) and workplace violence over the past year ( $r=0.692$ ,  $P=0.001$ ) were still significant.

**Conclusion:** This study is significant in that it addressed the issue of underreporting violence despite data limitations. Public intervention should be considered to increase sensitivity to workplace violence and prevent workplace violence. (**Ewha Med J 2021;44(3):70-79**)

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## Key Words

Workplace violence; Gender Equity;  
Ecological study

## Introduction

Workplace violence, as defined by the International Labor Office, refers to “any action, incident or behavior that departs from reasonable conduct in which a person is assaulted, threatened, harmed, injured in the course of, or as a direct result of, his or her work” [1]. Mental and physical problems such as insomnia, depression, anxiety, post-traumatic stress disorder,

and cardiovascular disease may occur due to workplace violence [2-4]. In addition, workplace violence can have a negative effect on the organization by increasing turnover intentions and reducing commitment and job satisfaction [5,6]. Therefore, workplace violence is an important public health issue that requires active intervention.

Previous studies found that gender, age, race, and marital status are personal factors related to the risk of workplace

violence, and occupation type, occupational position, work experience, working hours, night shift work, and workloads are occupational factors that can increase the risk of workplace violence [7–9]. In addition, other studies indicated that workers with previous experience of workplace violence and job stress such as high job demands may be more vulnerable to workplace violence [10,11]. Workplace-related factors as interpersonal conflict, low work efficiency, and a poor violence prevention climate and policy-related factors such as business policies also have an effect on workplace violence [9,12].

Similar to other health problems, it is crucial to accurately determine the status of workplace violence to ensure proper intervention. The main approach for understanding the current status of workplace violence is through a survey. The reporting of workplace violence in a survey depends on individual judgment, which may be influenced by the sociocultural context and the level of perception and awareness [13]. European countries with a higher power distance, which indicates a higher tolerance for violence, have been found to show a lower prevalence of self-reported adverse social behaviors. In addition, a patriarchal or masculine culture could contribute to the social acceptance of adverse social behaviors [13]. These public attitudes toward violence seemed to be rooted in gender inequality in each society [14]. The level of gender equality in the country may influence the reported level of workplace violence depending on the sociocultural context in terms of tolerance for violence and level of sensitivity to and awareness of violence. However, studies exploring the relationship between gender equality and workplace violence are limited.

The main objective of this study was to compare the prevalence of workplace violence in European countries and Korea. In addition, the study aimed to determine the relationship between the prevalence of workplace violence and the level of gender equality using the Gender Gap Index (GGI).

## Methods

### 1. Study subjects

This study used data from the 6th European Working Conditions Survey (EWCS) in 2015 and the 5th Korean Working Conditions Survey (KWCS) in 2017. The EWCS has been conducted every 4 to 5 years by the European Foundation for the Improvement of Living and Working Conditions (Eurofound)

since 1991, and it has been used as a basis for establishing safety and health policies in European countries. In the most recent 6th EWCS in 2015, 28 European Union countries and seven other European countries were surveyed, 1,000 to 3,300 people per country were recruited, and 43,850 people were surveyed. The KWCS is conducted by the Korea Occupational Safety and Health Agency from 2006 on sample workers nationwide with the EWCS as benchmark. The target population of the first KWCS was individuals aged 15 to 64 years who were in employment, and the number of samples was 10,000. Fifty thousand two hundred five people were surveyed in 2017. As the sampling framework and questionnaire were created based on the EWCS, the questionnaire is similar except for Korea-specific questions. Therefore, both surveys generate representative statistical data that reflect the working environment based on a sample of workers and are comparable because the same questions are used in the questionnaires [15].

The EWCS and the KWCS recruited subjects aged 15 or older (16 or older in Bulgaria, Norway, Spain, and the United Kingdom) who were in employment. There were differences in the range and proportion of the subject's age according to the country. In this study, the age range was limited to 20 to 64 years. Unpaid family workers and soldiers were excluded.

As the Organisation for Economic Co-operation and Development (OECD) unemployment rate and share of temporary employment were used as variables, 9 countries from 35 European countries were excluded, and 26 European countries and Korea were included in the final sample. The study included 30,032 individuals (15,052 men and 14,980 women) in Europe, and 39,675 individuals (19,372 men, 20,303 women) in Korea.

The data were obtained from the Eurofound and Korea Occupational Safety and Health Agency. This study was approved by the institutional review board of Ewha Womans University Seoul Hospital (SEUMC 2020–05–022). Consent to participate was not required, because this study did not involve human participant interactions and all data were publicly available and de-identified.

### 2. Variables

Workplace violence over the past month was identified using the question, “Over the past month during the course of your work, have you been subjected to any of the following?”, and the types of violence were verbal abuse, unwanted sexual at-

tention, threats, and humiliating behaviors. Verbal abuse also included abuse in the form of texts such as emails. Workplace violence in the past 1 year was based on the question, "Over the past 12 months during the course of your work, have you been subjected to any of the following?", and the types of violence included physical violence, sexual harassment, and bullying/harassment with the answers "Yes", "No", "Don't know", or "Refused to answer" for each of the items.

In this study, workplace violence over the past month (WPV1) included one or more experiences of verbal abuse, un-

wanted sexual attention, threats, or humiliating behaviors over the past month. Workplace violence over 12 months (WPV12) included more than one experience of physical violence, sexual harassment, or bullying/harassment for 12 months. In addition, the prevalence of the specific types of workplace violence was also identified.

Gender equality in the present study was assessed using the GGI in 2015. The GGI is an indicator of gender gaps in economics, politics, education and health published by the World Economic Forum. The GGI consists of 14 indicators in four

**Table 1.** Age-standardized prevalence of WPV1 in each country

Country	WPV1	Verbal abuse	Unwanted sexual attention	Threats	Humiliating behaviors
Austria	16.5 (13.8–19.2)	13.0 (10.6–15.3)	2.4 (1.4–3.3)	4.5 (3.1–5.9)	8.7 (6.8–10.6)
Belgium	16.3 (14.5–18.0)	11.9 (10.4–13.4)	2.0 (1.3–2.7)	5.7 (4.7–6.7)	7.8 (6.5–9.0)
Czech Republic	17.6 (14.4–20.9)	12.6 (9.9–15.3)	3.7 (1.9–5.5)	4.5 (3.0–6.0)	5.4 (3.7–7.2)
Denmark	24.4 (20.8–28.0)	19.9 (16.6–23.1)	3.7 (2.3–5.2)	7.0 (5.1–8.8)	5.8 (4.1–7.5)
Estonia	21.2 (18.0–24.4)	16.5 (13.6–19.3)	2.2 (1.2–3.2)	4.6 (3.1–6.0)	8.1 (6.2–10.0)
Finland	19.7 (16.4–23.0)	15.2 (12.3–18.1)	3.2 (1.8–4.7)	5.7 (4.1–7.2)	6.2 (4.4–8.0)
France	20.5 (17.9–23.0)	16.9 (14.6–19.2)	1.7 (1.0–2.5)	7.5 (6.0–9.0)	8.0 (6.4–9.6)
Germany	15.3 (13.4–17.2)	12.3 (10.6–14.0)	2.1 (1.4–2.9)	3.2 (2.3–4.0)	5.6 (4.5–6.7)
Greece	9.9 (7.6–12.2)	5.4 (3.7–7.1)	1.9 (0.8–3.0)	2.6 (1.5–3.6)	5.8 (4.0–7.5)
Hungary	7.5 (5.6–9.4)	5.2 (3.5–6.8)	1.0 (0.2–1.8)	2.3 (1.2–3.4)	4.3 (2.8–5.8)
Ireland	15.0 (12.3–17.8)	12.9 (10.4–15.5)	1.6 (0.7–2.5)	6.5 (4.6–8.3)	6.0 (4.3–7.6)
Italy	8.4 (6.1–10.7)	5.6 (3.7–7.5)	1.4 (0.7–2.1)	1.1 (0.5–1.7)	3.6 (2.2–4.9)
Latvia	18.6 (15.3–21.9)	16.6 (13.5–19.7)	2.7 (1.3–4.1)	4.3 (2.6–6.0)	7.0 (5.0–9.1)
Lithuania	14.5 (11.8–17.2)	12.3 (9.8–14.8)	1.5 (0.5–2.5)	2.8 (1.7–3.9)	6.0 (4.2–7.7)
Luxembourg	16.5 (13.3–19.7)	11.3 (8.8–13.8)	2.1 (0.9–3.3)	6.2 (4.2–8.2)	8.2 (5.9–10.5)
Netherlands	26.5 (23.0–30.0)	21.6 (18.4–24.7)	3.9 (2.6–5.3)	8.9 (6.9–10.9)	10.8 (8.5–13.0)
Norway	17.8 (14.8–20.7)	11.0 (8.8–13.3)	3.6 (2.2–5.0)	4.0 (2.7–5.4)	8.9 (6.8–11.0)
Poland	10.4 (8.3–12.5)	8.1 (6.2–10.0)	1.6 (0.7–2.4)	2.4 (1.4–3.4)	4.1 (2.7–5.4)
Portugal	4.7 (3.1–6.3)	3.3 (2.0–4.6)	0.5 (0.0–1.0)	1.4 (0.6–2.2)	0.8 (0.2–1.3)
Slovakia	19.1 (16.0–22.3)	16.4 (13.5–19.3)	2.9 (1.5–4.3)	6.2 (4.4–7.9)	3.3 (2.1–4.5)
Slovenia	15.9 (13.4–18.3)	10.0 (8.0–11.9)	2.0 (1.1–2.9)	5.3 (4.0–6.6)	10.3 (8.3–12.2)
Spain	9.3 (8.1–10.5)	7.5 (6.4–8.5)	1.2 (0.7–1.6)	3.7 (3.0–4.5)	4.7 (3.9–5.6)
Sweden	19.1 (16.0–22.2)	11.5 (9.1–13.9)	3.6 (2.1–5.1)	8.4 (6.3–10.4)	9.9 (7.7–12.2)
Switzerland	18.5 (15.5–21.5)	13.8 (11.2–16.4)	3.8 (2.3–5.3)	4.3 (2.8–5.7)	6.0 (4.3–7.8)
Turkey	5.8 (4.5–7.0)	3.3 (2.4–4.2)	1.3 (0.7–1.8)	2.4 (1.6–3.2)	3.9 (2.9–5.0)
United Kingdom	20.5 (18.1–23.0)	17.4 (15.2–19.6)	2.6 (1.7–3.6)	7.6 (6.1–9.1)	7.3 (5.8–8.8)
Korea	7.0 (6.7–7.3)	4.9 (4.7–5.2)	1.2 (1.1–1.3)	0.7 (0.6–0.8)	3.5 (3.3–3.8)

Values are presented as percentage with confidence interval.  
WPV1, workplace violence over the past month.

sectors, and measures gender equality only based on gender gaps, regardless of the state of development in the country. A score of 1 indicates perfect equality, and a score of 0 indicates perfect inequality [16].

Income inequality, unemployment rate, and share of temporary employment were included as covariates considering that variables at the national level that could increase stress in the labor market and workplace. The Gini coefficient represents the relationship between population distribution and income distribution, with a value of 0 indicating maximal equality and a value of 1 indicating maximal inequality [17]. The Gini coef-

ficient was taken from the 2015 United Nations Development Program Human Development Report [18]. To reflect the country's labor market situation, the unemployment rate and share of temporary employment in the 2015 OECD statistics were selected as variables [19].

### 3. Statistical analysis

The 26 countries in Europe were grouped into four regions, and the number of subjects was 3,551 in Northern Europe, 11,460 in Western Europe, 5,986 in Eastern Europe, and 9,035 in Southern Europe (Northern Europe: Denmark, Finland,

**Table 2.** Age-standardized prevalence of WPV12 in each country

Country	WPV12	Physical violence	Sexual harassment	Bullying/harassment
Austria	7.4 (5.7–9.2)	1.8 (0.9–2.6)	1.6 (0.8–2.5)	5.4 (4.0–6.9)
Belgium	10.5 (9.1–11.9)	3.5 (2.7–4.4)	0.7 (0.3–1.0)	8.0 (6.8–9.3)
Czech Republic	3.6 (2.3–5.0)	1.5 (0.7–2.2)	0.9 (0.1–1.7)	1.5 (0.7–2.3)
Denmark	7.3 (5.4–9.2)	3.2 (1.9–4.5)	1.3 (0.5–2.1)	4.0 (2.6–5.5)
Estonia	3.4 (2.2–4.7)	0.8 (0.2–1.4)	0.5 (0.0–1.0)	2.6 (1.5–3.6)
Finland	7.6 (5.7–9.5)	3.1 (1.9–4.3)	1.1 (0.4–1.9)	4.6 (3.0–6.1)
France	13.7 (11.7–15.8)	2.4 (1.6–3.2)	0.5 (0.1–0.9)	12.4 (10.5–14.3)
Germany	7.1 (5.8–8.3)	1.1 (0.6–1.6)	1.5 (0.9–2.0)	5.2 (4.2–6.3)
Greece	4.1 (2.5–5.6)	0.4 (0.0–1.0)	1.8 (0.7–2.9)	2.4 (1.2–3.6)
Hungary	1.0 (0.2–1.7)	0.5 (0.0–1.1)	0.5 (0.0–1.1)	1.0 (0.2–1.7)
Ireland	9.9 (7.7–12.1)	3.2 (1.9–4.5)	1.0 (0.3–1.8)	7.9 (5.9–9.9)
Italy	2.8 (1.6–4.0)	0.3 (0.0–0.6)	0.2 (0.0–0.4)	2.6 (1.4–3.8)
Latvia	7.1 (5.0–9.2)	0.5 (0.0–1.0)	1.1 (0.1–2.1)	6.6 (4.6–8.6)
Lithuania	5.1 (3.4–6.7)	0.1 (0.0–0.4)	1.2 (0.3–2.1)	4.3 (2.8–5.8)
Luxembourg	12.8 (10.0–15.6)	3.1 (1.6–4.6)	1.0 (0.2–1.8)	11.4 (8.7–14.2)
Netherlands	12.3 (9.9–14.7)	6.3 (4.6–8.0)	2.7 (1.6–3.8)	7.6 (5.7–9.5)
Norway	8.7 (6.7–10.7)	3.8 (2.5–5.2)	1.6 (0.7–2.5)	5.0 (3.5–6.5)
Poland	1.8 (0.9–2.6)	0.5 (0.0–1.0)	0.3 (0.0–0.7)	1.2 (0.5–1.9)
Portugal	1.9 (0.9–2.9)	0.5 (0.1–1.0)	1.1 (0.2–1.9)	0.9 (0.2–1.5)
Slovakia	2.6 (1.4–3.9)	0.4 (0.0–0.8)	1.4 (0.4–2.4)	1.3 (0.4–2.1)
Slovenia	6.8 (5.2–8.3)	1.3 (0.7–1.9)	0.5 (0.1–0.8)	6.0 (4.5–7.5)
Spain	3.4 (2.6–4.1)	1.1 (0.7–1.5)	0.5 (0.2–0.8)	2.8 (2.2–3.5)
Sweden	9.8 (7.6–12.0)	5.1 (3.5–6.8)	2.0 (1.0–3.1)	4.5 (3.0–6.0)
Switzerland	6.8 (5.0–8.6)	2.0 (1.0–2.9)	2.3 (1.2–3.4)	3.7 (2.3–5.0)
Turkey	2.6 (1.8–3.4)	0.9 (0.4–1.3)	0.5 (0.1–0.9)	2.0 (1.2–2.7)
UK	9.3 (7.7–10.9)	5.4 (4.1–6.6)	1.0 (0.4–1.6)	5.6 (4.3–6.9)
Korea	1.0 (0.9–1.1)	0.2 (0.2–0.3)	0.7 (0.6–0.8)	0.1 (0.1–0.2)

Values are presented as percentage with confidence interval. WPV12, workplace violence over the 12 months.

Norway, and Sweden; Western Europe: Austria, Belgium, France, Germany, Ireland, Luxembourg, Netherlands, Switzerland, and United Kingdom; Eastern Europe: Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, and Slovakia; Southern Europe: Greece, Italy, Portugal, Slovenia, Spain, and Turkey.).

The prevalence of workplace violence in 26 European countries and Korea was standardized using the direct standardization method with grouping of 5 years from 20 to 64 years. The data from the European Statistical Office (Eurostat) were used as the standard population [20].

In this study, data analysis was performed using SAS ver. 9.4 (SAS Institute, Cary, NC, USA) and R ver. 4.0 (R Foundation for Statistical Computing, Vienna, Austria). Spearman's rank correlation coefficient was used to identify the relationship between workplace violence prevalence and the GGI. The partial correlation coefficient was used to assess the independent association between workplace violence and the GGI, with adjustment for the Gini coefficient, unemployment rate and share of temporary employment.

## Results

Table 1 shows the age-adjusted prevalence and confidence interval of WPV1 according to the country. WPV1 was the

highest in the Netherlands (26.5%), followed by Denmark (24.4%), and Estonia (21.2%). The prevalence in Korea was 7.0%, ranking 25th out of 27 countries. In terms of verbal abuse, unwanted sexual attention, threats and humiliating behaviors, Korea ranked 24th to 27th. The average WPV1 according to the region was 20.2% in Northern Europe, 18.4% in Western Europe, 15.6% in Eastern Europe, 9.0% in Southern Europe, and 7.0% in Korea.

As shown in Table 2, France (13.7%) had the highest prevalence of WPV12, followed by Luxembourg (12.8%) and the Netherlands (12.3%). Korea ranked 27<sup>th</sup> with a prevalence of 1.0%. In terms of the types of violence, Korea ranked 18th for sexual harassment, which was higher than the ranks for physical violence (26th) and bullying or harassment (27th). The regional average prevalence of WPV12 was 8.3% in Northern Europe, 10.0% in Western Europe, 3.5% in Eastern Europe, 3.6% in Southern Europe, and 1.0% in Korea. The prevalence of workplace violence was higher in Northern and Western European countries than in Eastern and Southern European countries and Korea.

Table 3 shows the descriptive statistics including the mean, standard deviation, median, maximum, and minimum values of the prevalence of workplace violence, GGI, Gini coefficient, unemployment rate, and share of temporary employment in 26 European countries and Korea. The average, maximum, and

**Table 3.** Descriptive statistics for prevalence of workplace violence, GGI, Gini coefficient, unemployment rate and share of temporary employment in 27 countries (%)

	Mean	SD	Median	Minimum	Maximum
WPV1	15.4	5.7	16.5	4.7	26.5
Verbal abuse	11.7	5.0	12.3	3.3	21.6
Unwanted sexual attention	2.3	1.0	2.1	0.5	3.9
Threats	4.6	2.2	4.5	0.7	8.9
Humiliating behaviours	6.3	2.4	6.0	0.8	10.8
WPV12	6.3	3.7	6.8	1.0	13.7
Physical violence	2.0	1.7	1.3	0.1	6.3
Sexual harassment	1.1	0.6	1.0	0.2	2.7
Bullying/harassment	4.5	3.1	4.3	0.1	12.4
GGI	0.745	0.056	0.749	0.624	0.850
Gini coefficient	0.305	0.041	0.295	0.250	0.404
Unemployment rates	9.0	4.9	7.6	3.7	25.1
Share of temporary employment	13.1	6.5	12.0	2.1	28.0

GGI, Gender Gap Index; SD, standard deviation; WPV1, workplace violence over the past month; WPV12, workplace violence over the 12 months.

**Table 4.** Spearman correlation matrix of workplace violence and covariates

Correlation coefficient/P-value	GGI	Gini coefficient	Unemployment rates	Share of temporary employment
WPV1				
<i>r</i>	0.561	-0.411	-0.304	-0.345
<i>P</i>	0.002	0.033	0.123	0.078
Verbal abuse				
<i>r</i>	0.495	-0.274	-0.245	-0.426
<i>P</i>	0.009	0.167	0.218	0.027
Unwanted sexual attention				
<i>r</i>	0.545	-0.520	-0.455	-0.303
<i>P</i>	0.003	0.006	0.017	0.125
Threats				
<i>r</i>	0.586	-0.408	-0.100	-0.237
<i>P</i>	0.001	0.035	0.619	0.234
Humiliating behaviors				
<i>r</i>	0.676	-0.286	-0.303	-0.262
<i>P</i>	0.000	0.148	0.124	0.187
WPV12				
<i>r</i>	0.709	-0.230	-0.139	-0.298
<i>P</i>	<0.001	0.249	0.489	0.131
Physical violence				
<i>r</i>	0.710	-0.373	-0.321	-0.107
<i>P</i>	<0.001	0.056	0.102	0.594
Sexual harassment				
<i>r</i>	0.418	-0.194	-0.243	-0.201
<i>P</i>	0.030	0.332	0.222	0.314
Bullying/harassment				
<i>r</i>	0.651	-0.132	-0.054	-0.300
<i>P</i>	0.000	0.512	0.788	0.128
GGI				
<i>r</i>	1	-0.330	-0.216	-0.111
<i>P</i>		0.093	0.280	0.581
Gini coefficient				
<i>r</i>	-	1	0.215	-0.054
<i>P</i>	-		0.282	0.790
Unemployment rates				
<i>r</i>	-	-	1	0.241
<i>P</i>	-	-		0.227
Share of temporary employment				
<i>r</i>	-	-	-	1
<i>P</i>	-	-	-	

GGI, Gender Gap Index; WPV1, workplace violence over the past month; *r*, rho; *P*, P-value; WPV12, workplace violence over the 12 months.

minimum values of WPV1 were 15.4%, 26.5%, and 4.7%, respectively, and those of WPV12 were 6.3%, 13.7%, and 1.0%, respectively. The average GGI was 0.745. Finland and Norway had the highest gender equality level (0.850), and Turkey had a GGI of 0.624. The average Gini coefficient was 0.305, with the highest (0.404) in Turkey (largest income inequality) and the lowest (0.250) in Slovakia and Slovenia. The average unemployment rate was 9.0%, with the highest (25.1%) in Greece

and the lowest (3.7%) in Korea. The average share of temporary employment was 13.1%, with 28.0% in Poland, and 2.1% in Lithuania.

Table 4 shows the bivariate correlation matrix from Spearman's correlation analysis. The prevalence of workplace violence and GGI showed a statistically significant positive correlation. In more gender-equal countries with a higher GGI, the prevalence of workplace violence tended to be higher (WPV1,

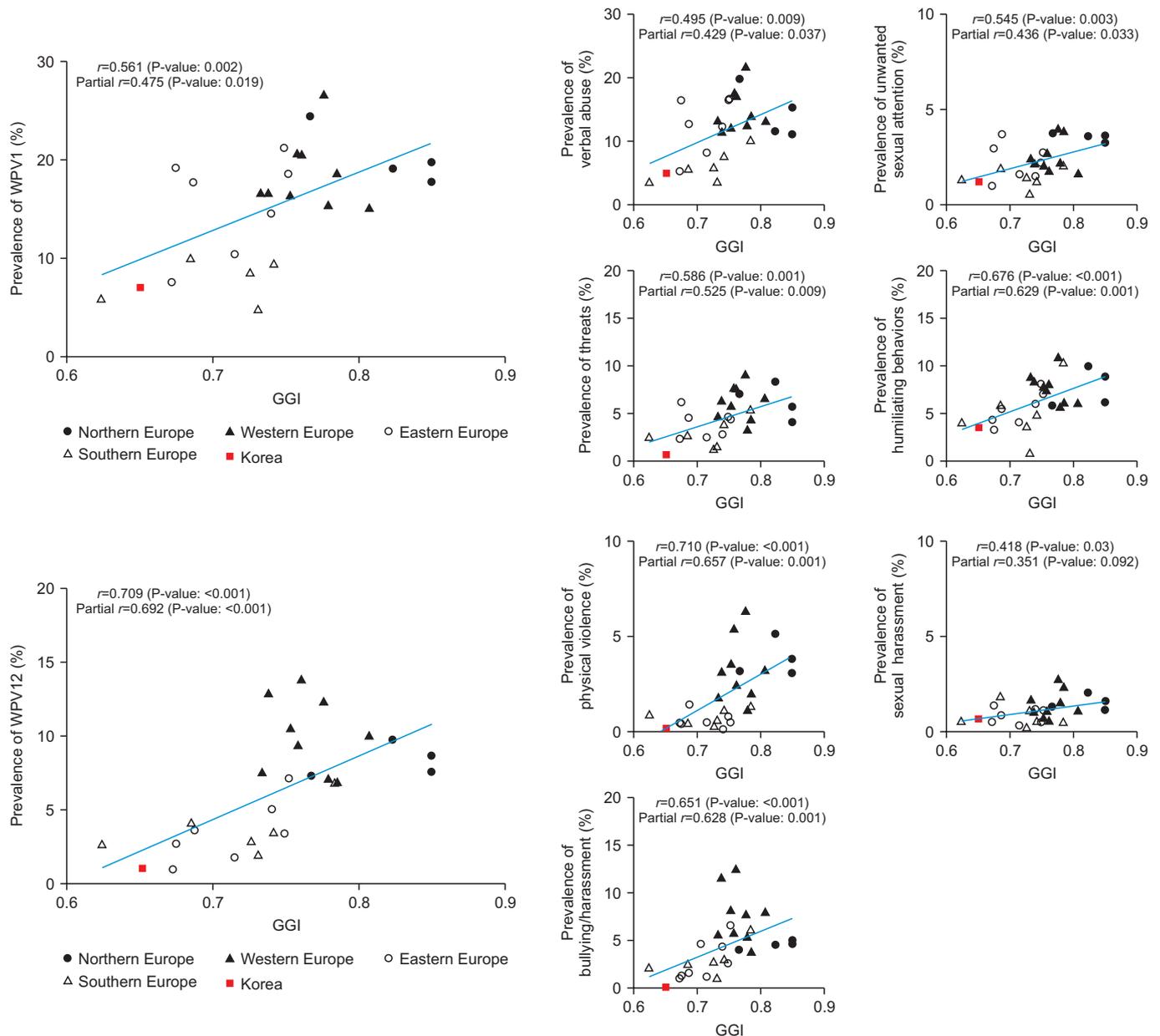


Fig. 1. Correlation between workplace violence and Gender Gap Index (GGI).  $r$ , rho; partial  $r$ , partial correlation on Gini coefficient, unemployment rate, share of temporary employment; WPV1, workplace violence over the past month; WPV12, workplace violence over the 12 months.

$r=0.561$ ,  $P=0.002$ ; WPV12,  $r=0.709$ ,  $P<0.001$ ). The Gini coefficient showed a statistically significant negative correlation only for some types of violence. After adjusting for the Gini coefficient, unemployment rate, and share of temporary employment by partial correlation analysis, there was a statistically significant positive correlation between workplace violence and GGI, and the correlation coefficient was slightly lower (WPV1,  $r=0.475$ ,  $P=0.019$ ; WPV12,  $r=0.692$ ,  $P=0.001$ ) (Fig. 1). The partial correlation coefficients for humiliating behaviors, physical violence, and bullying or harassment were over 0.6.

## Discussion

Countries with a higher GGI showed a higher prevalence of workplace violence. Even after adjusting for the Gini coefficient, unemployment rate, and share of temporary employment, there was a statistically significant positive correlation. Overall, Northern and Western European countries had a high prevalence of violence, whereas Eastern and Southern European countries and Korea had a low prevalence of violence.

The European Foundation qualitatively analyzed the relationship between workplace violence and awareness, sociocultural attitudes, working environment, and policy in European countries using EWCS [13]. The findings showed that systematic policies to prevent workplace violence might lead to greater awareness, which could contribute to the increased reporting of workplace violence. This study also showed the countries with a higher GGI, which suggests a higher level of sensitivity to and awareness of violence, tended to have a higher prevalence of workplace violence.

The effect of gender equality could be interpreted in two ways. First, gender equality reflects the level of human rights in a country. It could influence the level of workplace violence through negative stereotypes of women, discrimination due to pregnancy or childbirth, and glass ceilings for careers [21]. In this case, a higher level of gender equality would reduce the level of workplace violence, which is in contrast to the findings of this study. Second, the level of gender equality indicates the level of sensitivity to and awareness of violence, which is consistent with the finding of this study. The national level of workplace violence in the survey may not reflect the actual level; but it may reflect the level of awareness of workplace violence. As a more objective indicator, the number of homicides

per 100,000 people in OECD countries in 2015 was 0.5 in Norway and Austria, 0.6 in the Netherlands, 0.8 in Germany, 2.3 in Hungary, and 0.7 in Korea, which were not related to workplace violence by survey. The findings also suggest that the prevalence of workplace violence in the survey may represent the level of social awareness and reporting.

The prevalence of violence was lower in Korea compared with European countries. As the Working Conditions Survey is a one-to-one interview, it is possible that reporting was low due to the cultural characteristics of Korea; the subjects may be reluctant to reveal experiences of workplace violence or may not want to recall negative experiences. The degree of tolerance for unwanted behavior may vary from country to country, and underreporting problems may be more prevalent in some countries than in others. When public awareness and discourse on these topics are limited, victims of violence may be ashamed to report their experiences or feel guilty. Moreover, due to the sensitive and complex nature of the problem, victims may be reluctant to report; thus, the prevalence may be underestimated [22].

In a study that investigated workplace violence against Iranian emergency room residents, 214 out of 280 people (74.4%) did not report violence, and the main reason for not reporting was that it was considered to be useless (37.4%) or that it was recognized as an insignificant event (36.9%) [23]. Other reasons included feeling embarrassed and blaming themselves. Some studies have shown that underreporting could occur because workers perceive violence as part of their work or as a trifle and believe that reporting violence will be useless [24–27].

The lack of reporting of workplace violence could lead to the assumption that there is little need to prevent the negative effects of workplace violence [28]. Underreporting may result in the failure to recognize the problem of workplace violence, which can lead to employers failing to adequately protect workers. In addition, if workers do not have knowledge of the overall violent incidents, efforts to prevent them from violence may be limited [29]. It is necessary to share experiences on how to effectively reduce underreporting, and a reliable system for responding to and reporting violence should be developed [9]. It is also important to gain insights into groups with a high risk of exposure to violence.

This study was an ecological study using national-level data. Ecological studies are epidemiological studies based on

the characteristics of a group rather than an individual [30]. Individual correlations and ecological correlations should be differentiated. An ecological fallacy is likely to occur when attempting to describe an individual's characteristics through relationships between variables measured at the group level [31]. For example, studies on the relationship between the incidence of breast cancer and the average fat intake in several countries showed a higher rate of breast cancer in countries with a high fat intake [32]. This correlation may suggest that fat intake could contribute to the development of breast cancer; however, it is not known whether individuals diagnosed with breast cancer would have a high fat intake.

In studies using a survey, the question type and term, length, response category, number of questions, questionnaire order, and questionnaire sensitivity are known to cause measurement errors [33]. The questionnaire can influence the accuracy of the response [34]. In addition, the involvement of an investigator in the survey may influence the understanding, recall ability, and judgment and response process of the respondents [35]. As the Working Conditions Survey is an individual interview survey, depending on the level of recognition of the respondents, the sensitivity of the questionnaire may be different.

A limitation of this study was the comparability of the results from different countries. The KWCS was developed based on the EWC. Jobs, industries, and employment types were modified to reflect the situation in Korea; however, it was possible to compare and analyze the working environment of each country through the same questions. However, there may be parts in which the intention of the questionnaire was distorted due to limitations in translation and the degree of understanding by respondents. As the types of violence in the workplace are limited to seven types, types that do not belong may be excluded from the response. Second, as this study is a cross-sectional study, it was not possible to infer the causal relationship between workplace violence and risk factors. In addition, the possibility of reverse causality cannot be excluded.

Nevertheless, the data used in this study are representative statistical data of the workers in each country. Previous studies on workplace violence were mainly limited to medical workers. However, this study has the advantage of using representative data for all industries. The majority of studies on workplace violence focuses on the prevalence of violence, and limited studies explore factors that can predict or increase the risk of expe-

riencing violence in the workplace. This study is meaningful in that it compared the status of workplace violence in Korea and European countries and clarified the relationship between workplace violence and underreporting in relation to the level of gender equality.

The prevalence of workplace violence was high in Northern and Western European countries and low in Eastern and Southern European countries and Korea. We explored the correlation between reported workplace violence and GGI as a proxy for the sensitivity to and awareness of workplace violence. This study is significant in that it addressed the issue of underreporting violence despite data limitations. Public intervention should be considered to increase sensitivity to workplace violence and prevent workplace violence.

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