



# Gender Inequalities in Mental Health During the COVID-19 Pandemic: A Population-based Study in Korea

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**Objectives:** This study explored the effect of the coronavirus disease 2019 (COVID-19) pandemic on psychosocial stress in prime working-age individuals in Korea, focusing on gender inequalities. We hypothesized that the impact of COVID-19 on mental health would differ by age and gender, with younger women potentially demonstrating heightened vulnerability relative to men.

**Methods:** The study involved data from the Korea Community Health Survey and included 319 592 adults aged 30 years to 49 years. We employed log-binomial regression analysis, controlling for variables including age, education, employment status, marital status, and the presence of children. The study period included 3 phases: the period prior to the COVID-19 outbreak (pre-COVID-19), the early pandemic, and the period following the introduction of vaccinations (post-vaccination).

**Results:** The findings indicated that women were at a heightened risk of psychosocial stress during the early pandemic (relative risk [RR], 1.01; 95% confidence interval [CI], 0.98 to 1.05) and post-vaccination period (RR, 1.07; 95% CI, 1.04 to 1.10) compared to men. This pattern was prominent in urban women aged 30-34 years (pre-COVID-19: RR, 1.06; 95% CI, 1.02 to 1.10; early pandemic: RR, 1.16; 95% CI, 1.08 to 1.25; post-vaccination period, RR, 1.22; 95% CI, 1.14 to 1.31).

**Conclusions:** The COVID-19 pandemic has exerted unequal impacts on psychosocial stress among prime working-age individuals in Korea, with women, particularly those in urban areas, experiencing a heightened risk. The findings highlight the importance of addressing gender-specific needs and implementing appropriate interventions to mitigate the psychosocial consequences of the pandemic.

**Key words:** Mental health, Psychological stress, Gender equity, Pandemics, COVID-19

## INTRODUCTION

The mental health repercussions of coronavirus disease 2019 (COVID-19) have been a topic of global discussion throughout

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the pandemic. Previous research has examined the impact of the pandemic response on the mental health of the general population [1]. Measures such as lockdowns, social distancing, and school closures have been found to disproportionately affect the mental health of vulnerable individuals [2].

Worldwide, women are known to have been more heavily impacted during the COVID-19 pandemic [3-6]. This is largely because women often shoulder more caregiving responsibilities, both in their personal lives and in the public sector. Prior studies have indicated that the burden of unpaid care work within the home is not evenly distributed by gender [7,8]. The COVID-19 pandemic has brought about changes such as social

distancing, school closures, remote work, and the closures of elderly care centers due to inadequate social security systems—for instance, the lack of paid sick leave. These changes may have shifted a substantial amount of public caregiving responsibilities into the home, exacerbating the unequal distribution of care work [5]. Moreover, gender inequalities in the formal labor market may have expanded in the wake of the COVID-19 pandemic. This is further complicated by the triple role women often have to fulfill, while the deinstitutionalization and re-familization of care, intertwined with ingrained gender norms in the home, have made it even more challenging for women to cope with the pandemic.

Globally, working-age women from dual-income or single-parent households are more heavily impacted by the COVID-19 pandemic than men, due to the double burden of domestic and professional labor [9-14]. Specifically, women between the ages of 35 years and 44 years have seen an increase in duties related to reproductive work and are shouldering a larger share of unpaid work than before [15]. For instance, a United Kingdom-based empirical study using time-use survey data revealed a decline in the mental health of young women during the pandemic [5]. The findings from the Time Use Survey by Statistics Korea during the COVID-19 period further corroborate the growing gender inequalities in caregiving and housework [16]. However, another study indicated that women aged 30 years to 49 years did not have notable changes in their mental health during the pandemic, while men aged 30 years to 39 years experienced a deterioration in their mental health [17].

Psychosocial stress is considered either a characteristic of an event or stimulus [18] or the outcome of an interaction between the event and the individual's interpretation of it [19]. It is often used to evaluate the mental health repercussions of natural or man-made disasters [20]. This is because psychosocial stress can significantly affect mental health by modifying biological systems, potentially contributing to the onset of mental illnesses (such as major depressive disorder or bipolar disorder) or leading to suicidal ideation [21].

We hypothesized that COVID-19 impacts mental health differently depending on age and gender, with women aged 30 years to 49 years experiencing a greater impact than men of the same age range. The Organization for Economic Cooperation and Development (2022) identifies individuals between the ages of 25 and 54 as being in their prime working years. For the present study, we refined the definition of working age to encompass those between 30 years and 49 years old, focus-

ing on the gender differential impact in this age group [22]. The objective of this study was to explore the changes in psychosocial stress based on gender among Korean prime working-age population, specifically those aged 30 to 49 who are in their peak working years, before and during the COVID-19 pandemic. The primary focus was to examine gap in psychosocial stress levels by age and gender.

## METHODS

### Data Source

We utilized data from the Korea Community Health Survey (KCHS) spanning the years 2017 to 2021. The KCHS is an annual nationwide cross-sectional survey, initiated in 2008 by the Korea Disease Control and Prevention Agency in accordance with Article 4 of the Regional Health Act [23]. The study focuses on adults aged 19 years and older residing in Korea. Data collection for each year was conducted from August to October. A 2-step probability sampling method was employed, with an average of 900 individuals selected from each *si/gun/gu* (city/county/district). Each year, interviews were carried out using computer-assisted personal interviewing by trained investigators, with the informed consent of the participants [23].

### Study Population

We conducted a study analyzing a sample of 319 620 Korean adults, aged between 30 years and 49 years, who participated in the KCHS from 2017 to 2021. The main goal of this research was to investigate the prevalence of psychosocial stress among the prime working-age population. To achieve this aim, we deliberately selected participants within the age range of 30 years to 49 years, based on the assumption that individuals within this age group are typically in their prime working years.

The study included 150 835 men and 168 785 women. However, 28 individuals were excluded due to missing values in the dependent variable. Overall, the analysis was conducted on a total of 319 592 Korean adults between the ages of 30 years and 49 years.

### Variables

The explanatory model for psychosocial stress incorporated socio-demographic variables such as gender, age, education, employment status, marital status, and the presence of children. Gender was divided into 2 categories, men and women, based on the binary response option provided in the survey. Age was

grouped in 5-year intervals, namely 30-34 years, 35-39 years, 40-44 years, and 45-49 years. Education level was segmented into 3 categories: "primary", "secondary", and "college or above". Employment status was coded as "business owner or self-employed", "employee", "unpaid family worker", or "other", while marital status was classified as "married (living with a spouse)" or "other". The presence of children was determined based on household characteristics and marital status information, as the survey did not include a specific question on this topic. Individuals were identified as having "no" or "1 or more" children. Those who had never married were assumed to have no children. For regional stratified analysis, cities within metropolitan,

special, autonomous, and provincial cities were categorized as "urban", while counties were classified as "rural", based on geocodes in the data.

Psychosocial stress was examined using a single question about daily stress levels. Individuals experiencing substantial psychosocial stress were identified based on responses of "I feel extreme a lot" or "I feel often". Considering the temporal changes in social distancing and school closure practices, we divided the study period into 3 phases: pre-COVID-19 (2017-2019), the early pandemic (2020), and the post-vaccination period (2021).

**Table 1.** General characteristics of the study population<sup>1</sup>

Characteristics	Men			Women		
	Period			Period		
	Pre-COVID-19 (2017-2019)	Early pandemic (2020)	Post-vaccination (2021)	Pre-COVID-19 (2017-2019)	Early pandemic (2020)	Post-vaccination (2021)
Age (y)						
30-34	16 967 (20.0)	5225 (20.1)	5624 (21.2)	18 799 (19.4)	5552 (19.3)	5838 (19.9)
35-39	22 908 (26.1)	6920 (25.8)	6818 (24.3)	26 149 (26.3)	7594 (25.8)	7452 (24.9)
40-44	24 210 (25.1)	7713 (25.1)	7843 (26.2)	27 442 (24.7)	8498 (24.7)	8811 (26.1)
45-49	28 360 (28.8)	9230 (29.0)	9004 (28.2)	32 276 (29.5)	10 481 (30.2)	9878 (29.1)
Income						
Q4 (highest)	25 467 (31.7)	8482 (32.4)	9986 (37.9)	27 960 (31.0)	8733 (30.7)	10 171 (35.3)
Q3	26 820 (30.5)	9534 (33.5)	7416 (25.5)	29 434 (29.5)	10 878 (34.7)	8232 (26.3)
Q2	26 293 (27.2)	6517 (21.5)	7825 (25.6)	30 816 (28.2)	7386 (21.9)	8880 (26.3)
Q1 (lowest)	12 213 (10.6)	4319 (12.6)	3942 (11.0)	14 507 (11.3)	4819 (12.7)	4550 (12.1)
Education						
Primary	547 (0.5)	153 (0.5)	125 (0.3)	799 (0.5)	224 (0.5)	190 (0.4)
Secondary	35 163 (33.9)	10 755 (32.7)	10 100 (30.5)	42 911 (36.3)	12 352 (33.7)	11 103 (30.2)
College or above	56 656 (65.6)	18 163 (66.8)	19 055 (69.2)	60 880 (63.2)	19 520 (65.8)	20 681 (69.4)
Employment status						
Business owner or self-employed	21 180 (20.5)	6196 (18.9)	6230 (19.0)	12 206 (10.8)	3552 (10.4)	3838 (11.4)
Employee	65 205 (73.6)	20 197 (72.6)	20 740 (73.6)	52 127 (49.9)	16 195 (50.1)	16 749 (52.2)
Unpaid family worker	991 (0.5)	349 (0.7)	287 (0.5)	3799 (2.0)	944 (1.6)	868 (1.4)
Others	5069 (5.3)	2346 (7.8)	2032 (6.8)	36 534 (37.4)	11 434 (38.0)	10 524 (35.0)
Marital status						
Married, living with a spouse	65 293 (71.8)	18 722 (65.7)	18 898 (66.5)	84 747 (81.0)	24 188 (75.3)	24 061 (75.3)
Others	27 075 (28.2)	10 352 (34.3)	10 388 (33.5)	19 770 (19.0)	7920 (24.7)	7915 (24.7)
Children						
0	38 909 (40.9)	13 559 (45.6)	13 924 (46.2)	30 134 (27.4)	10 334 (31.1)	10 720 (32.8)
≥ 1	53 438 (59.1)	15 515 (54.4)	15 362 (53.8)	74 369 (72.6)	21 773 (68.9)	21 256 (67.2)
Psychosocial stress						
No	63 950 (67.8)	20 034 (68.2)	20 395 (69.9)	75 075 (69.5)	22 127 (67.0)	22 048 (67.9)
Yes	28 495 (32.2)	9054 (32.8)	8894 (31.1)	29 591 (28.5)	9998 (33.0)	9931 (32.1)
Total	92 449 (100)	29 088 (100)	29 289 (100)	104 666 (100)	32 125 (100)	31 979 (100)

Values are presented as number (%).

COVID-19, coronavirus disease 2019; Q, quartile.

<sup>1</sup>The total may not equal the sum of the column due to missing values of each characteristic.

## Statistical Analysis

For descriptive statistics, the proportion (%) for each variable was calculated using the relevant individual sampling weight.

Given that the proportion of participants with substantial psychosocial stress exceeded 30%, utilizing logistic regression and odds ratios for risk estimation could introduce an upward bias. Log-binomial regression was identified as a potential alternative for handling binary count data with a frequency of 10% or more as a dependent variable [24,25]. We developed a model to explain substantial psychosocial stress, incorporating factors such as gender and pandemic period, and applied it within each age stratum.

$$\log(\text{stress}) = (\text{intercept}) + \beta_1(\text{gender}) + \beta_2(\text{period}) + \beta_3(\text{gender}) * (\text{period}) + f(X) \quad (1)$$

† X: matrix of covariates

We utilized SAS version 9.4 (SAS Institute Inc., Cary, NC, USA), R version 4.2.0, and the R packages *srvyr* and *svyglm* in the analysis (R Foundation for Statistical Computing, Vienna, Austria).

## Ethics Statement

This study was conducted after receiving an institutional review board exemption from Korea University (approval No. KUIRB-2021-0237-01).

## RESULTS

The overall prevalence of psychosocial stress was 31.29% in the study population. The prevalence rates were 30.70%, 32.85%, and 31.58% for the pre-COVID-19, early pandemic, and post-vaccination periods, respectively.

The demographic characteristics of the study population remained consistent across the 3 periods examined (Table 1). The prevalence of psychosocial stress among women aged 30-34 years was 33.2% prior to the pandemic, and this figure rose to 36.2% during the early pandemic and 35.7% in the post-vaccination period (Supplemental Material 1). A similar trend was observed among women aged 35-39 years, with the prevalence of stress increasing from 31.6% pre-pandemic to 37.4% during the early pandemic, then slightly decreasing to 35.6% post-vaccination (Supplemental Material 1). For men aged 30-34 years, the prevalence of psychosocial stress decreased from 32.6% pre-pandemic to 31.6% during the early pandemic, and further to 30.5% post-vaccination. Among

men aged 35-39 years, the rate of psychosocial stress slightly increased from 33.6% pre-COVID-19 to 34.0% during the early pandemic, but then decreased to 33.0% post-vaccination. This pattern contrasts with the upward trend observed among women (Supplemental Material 1).

Before the pandemic, the adjusted relative risk (RR) of substantial psychosocial stress was lower in women than in men (0.95; 95% confidence interval [CI], 0.94 to 0.97) (Table 2). However, in the early pandemic and the post-vaccination period, women exhibited a higher risk of substantial psychosocial stress compared to men. This was evidenced by an RR of 1.01 (95% CI, 0.98 to 1.05) for the early pandemic and an RR of 1.07 (95% CI, 1.04 to 1.10) for the post-vaccination period (Figure 1).

Table 3 presents a stratified analysis of the data from Table 2, breaking this information into 4 age groups: 30-34 years, 35-39 years, 40-44 years, and 45-49 years. Among those 30-34 years old, the RR associated with gender significantly increased from 1.07 (95% CI, 1.03 to 1.11) in the pre-COVID-19 era to 1.16 (95% CI, 1.09 to 1.25) in 2020, and further to 1.21 (95% CI, 1.13 to 1.29) in 2021. A similar trend was observed in those 35-39 years old, for whom the RR of gender rose from 1.01 (95% CI, 0.98 to 1.05) in 2017-2019 to 1.10 (95% CI, 1.03 to 1.16) in 2020, then to 1.13 (95% CI, 1.06 to 1.20) in 2021. However, this pattern was less pronounced in the 40-44 year and 45-49 year groups, indicating discrepancies across generations.

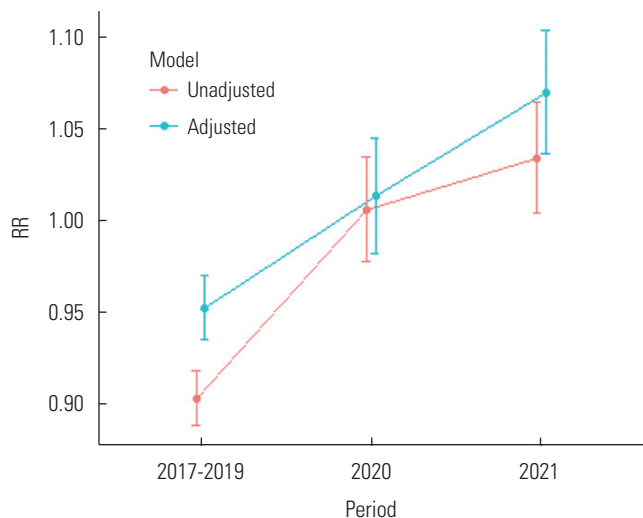
In the stratified analyses, the RR of substantial psychosocial

**Table 2.** Adjusted RR of gender on psychosocial stress by period: pre-COVID-19, early pandemic, and post-vaccination period<sup>1</sup>

Period	n (weighted %)	RR (95% CI)	p for heterogeneity
2017-2019 (pre-COVID-19)			
Gender			<0.001
Men	28 495 (32.9)	1.00 (reference)	
Women	29 591 (28.5)	0.95 (0.94, 0.97)	
2020 (early pandemic)			
Gender			<0.001
Men	9054 (33.5)	1.00 (reference)	
Women	9998 (32.2)	1.01 (0.98, 1.05)	
2021 (post-vaccination)			
Gender			<0.001
Men	8894 (31.8)	1.00 (reference)	
Women	9931 (31.4)	1.07 (1.04, 1.10)	

COVID-19, coronavirus disease 2019; RR, relative risk; CI, confidence interval.

<sup>1</sup>Adjusted for age, income, education, employment, year, marital status, and presence of children.



**Figure 1.** Unadjusted and adjusted relative risk (RR) of gender on psychosocial stress by each period.

stress for women was consistently higher for women than for men. This risk increased from 1.07 (95% CI, 1.03 to 1.11) to 1.16 (95% CI, 1.09 to 1.25) and then to 1.21 (95% CI, 1.13 to 1.29) among those aged 30-34 years (Table 3). However, among participants 45-49 years old, women exhibited a lower risk compared to men prior to the pandemic (RR, 0.87; 95% CI, 0.84 to 0.90). The risk of substantial psychosocial stress for women increased over time for all age groups.

Table 4 presents the adjusted RR of psychosocial stress based on gender, stratified by region (urban or rural), age group, and pandemic period. In urban areas, women exhibited a higher RR of psychosocial stress than men during the pre-COVID-19 period (35-39 age group: RR, 1.06; 95% CI, 1.02 to 1.10). This gender disparity persisted into the post-vaccination period, with urban women continuing to show a higher RR (early pandemic: RR, 1.16; 95% CI, 1.08 to 1.25; post-vaccination period: RR, 1.22; 95% CI, 1.14 to 1.31). In rural regions, women demonstrated a higher RR of psychosocial stress than men in the pre-COVID-19 period (30-34 age group: RR, 1.20; 95% CI, 1.08 to 1.33). However, during the post-vaccination period, the RR for rural women either remained relatively stable or experienced a slight decrease (early pandemic: RR, 1.12; 95% CI, 0.93 to 1.34; post-vaccination period: RR, 1.02; 95% CI, 0.81 to 1.21).

## DISCUSSION

Using representative population-based data, we observed gender-based inequalities in the risk of psychosocial stress,

**Table 3.** Adjusted relative risk of gender on psychosocial stress by age group and period: pre-COVID-19, early pandemic, and post-vaccination period<sup>1</sup>

Period	Age (y)	Age (y)					p for heterogeneity
		30-34	35-39	40-44	45-49	p for heterogeneity	
2017-2019 (pre-COVID-19)							
Gender							<0.001
Men	5371 (32.6)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	8112 (30.0)	1.00 (reference)
Women	6150 (33.2)	1.07 (1.03, 1.11)	1.01 (0.98, 1.05)	0.90 (0.87, 0.94)	0.87 (0.84, 0.90)	7882 (24.8)	0.87 (0.84, 0.90)
2020 (early pandemic)							
Gender							<0.001
Men	1631 (31.6)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	2734 (32.0)	1.00 (reference)
Women	1916 (36.2)	1.16 (1.09, 1.25)	1.10 (1.03, 1.16)	0.98 (0.92, 1.05)	0.86 (0.81, 0.92)	2821 (27.5)	0.86 (0.81, 0.92)
2021 (post-vaccination)							
Gender							<0.001
Men	1690 (30.5)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	2534 (28.6)	1.00 (reference)
Women	2032 (35.7)	1.21 (1.13, 1.29)	1.13 (1.06, 1.20)	0.99 (0.93, 1.05)	0.99 (0.93, 1.06)	2624 (27.5)	0.99 (0.93, 1.06)

Values are presented as number (%) or relative risk (95% confidence interval); All percentages are weighted to account for the sample design and ensure representative results. COVID-19, coronavirus disease 2019.

<sup>1</sup>Adjusted for age, income, education, employment, year, marital status, and presence of children.

**Table 4.** Adjusted relative risk of gender on psychosocial stress by region, age group, and period; pre-COVID-19, early pandemic, and post-vaccination period<sup>1</sup>

Regions <sup>2</sup>	Age (y)							
	30-34	<i>p</i> for heterogeneity	35-39	<i>p</i> for heterogeneity	40-44	<i>p</i> for heterogeneity	45-49	<i>p</i> for heterogeneity
Urban								
2017-2019 (pre-COVID-19)								
Gender		<0.001				<0.001		<0.001
Men	1.00 (reference)		1.00 (reference)		1.00 (reference)		1.00 (reference)	
Women	1.06 (1.02, 1.10)		1.01 (0.97, 1.05)		0.90 (0.87, 0.93)		0.86 (0.83, 0.90)	
2020 (early pandemic)								
Gender		<0.001		<0.001		<0.001		<0.001
Men	1.00 (reference)		1.00 (reference)		1.00 (reference)		1.00 (reference)	
Women	1.16 (1.08, 1.25)		1.10 (1.03, 1.17)		0.98 (0.92, 1.05)		0.85 (0.80, 0.91)	
2021 (post-vaccination)								
Gender		<0.001		<0.001		<0.001		<0.001
Men	1.00 (reference)		1.00 (reference)		1.00 (reference)		1.00 (reference)	
Women	1.22 (1.14, 1.31)		1.13 (1.06, 1.20)		0.99 (0.93, 1.05)		0.99 (0.93, 1.06)	
Rural								
2017-2019 (pre-COVID-19)								
Gender		0.753		0.993		0.918		0.147
Men	1.00 (reference)		1.00 (reference)		1.00 (reference)		1.00 (reference)	
Women	1.20 (1.08, 1.33)		1.03 (0.95, 1.12)		0.94 (0.87, 1.02)		0.95 (0.88, 1.03)	
2020 (early pandemic)								
Gender		0.753		0.993		0.918		0.147
Men	1.00 (reference)		1.00 (reference)		1.00 (reference)		1.00 (reference)	
Women	1.12 (0.93, 1.34)		1.05 (0.91, 1.21)		0.97 (0.84, 1.12)		1.04 (0.92, 1.18)	
2021 (post-vaccination)								
Gender		0.753		0.993		0.918		0.147
Men	1.00 (reference)		1.00 (reference)		1.00 (reference)		1.00 (reference)	
Women	1.02 (0.86, 1.21)		0.95 (0.81, 1.10)		0.94 (0.82, 1.07)		1.00 (0.88, 1.13)	

Values are presented as relative risk (95% confidence interval).  
COVID-19, coronavirus disease 2019.

<sup>1</sup>Adjusted for age, income, education, employment, year, marital status, and presence of children.

<sup>2</sup>Cities within metropolitan, special, autonomous, and provincial cities were categorized as urban, while counties were classified as rural based on geocodes in the data.

along with changes in these inequalities across pandemic periods, among Korean middle-aged adults. The risk of psychosocial stress for women increased throughout the study period, regardless of age. Our results support the hypothesis that the impact of COVID-19 on mental health varies across age and gender groups. In particular, we found that women aged 30 years to 39 years were more vulnerable than men of the same age range.

This study aligns with prior research that demonstrated a particularly profound decline in women's mental health due to the COVID-19 pandemic [26]. Previous research conducted in Spain indicated greater levels of depression, anxiety, and stress in women than men after the pandemic began [27]. In

Austria, women exhibited poorer mental health indicators than men after the start of the pandemic [28]. Similarly, a study from China revealed that women experienced heightened levels of anxiety, depression, and stress compared to men after the beginning of the COVID-19 pandemic [29].

This stratified analysis conducted in Korea, a region in which the impacts of the COVID-19 pandemic and the degree of social control varied markedly between urban and non-urban areas, illuminates the complex interplay between gender, pandemic response, and psychosocial stress over time. In urban regions, characterized by more rigorous control measures, women aged 30-39 years exhibited an increased susceptibility to heightened psychosocial stress both during the pandemic

and after the introduction of vaccinations. Gender gap in psychosocial stress persisted and even intensified in the post-vaccination period within this age group in urban regions. In contrast, rural areas exhibited a slightly different trend, with a relatively stable or reduced RR of psychosocial stress during the early stages of the pandemic and post-vaccination periods. These results underscore the heterogeneous impact of the pandemic on different demographic groups, influenced by policy responses and variations in social control measures, considering the unique transmission dynamics of the pandemic.

The rising demand for caregiving, which often results from increased time spent with family members, has been proposed as a plausible explanation for the observed gender gap in psychosocial stress [5,7,8,13,14,30,31]. Additionally, the COVID-19 pandemic may have exacerbated gender inequalities in the formal labor market, which could in turn have impacted the gender gap in mental health during this period. Despite the growing participation of women in the workforce, gender segregation persists in aspects such as job type, stability, and level of autonomy. This perpetuates traditional social norms that uphold the male breadwinner model, with men viewed as the “standard” workers [32]. The intersectional dynamics of gender and age are evident in the differential impact of the pandemic on mental health, which is influenced by gendered social conditions and the unequal burden of domestic work [33]. Consequently, less educated women with young children emerged as the group most susceptible to unemployment during the pandemic, a phenomenon some researchers have termed a she-cession or mom-cession [34]. According to the Korean Presidential Commission on Employment, women 35-39 years old experienced higher unemployment rates than other age groups [35]. The 2020 Economically Active Population Survey also reveals a so-called M-shaped curve in women’s employment rate by age, suggesting a substantial disruption in their early careers [36]. The weaker association between woman gender and experiencing psychosocial stress among individuals in their 40s may reflect the age-specific challenges encountered in employment.

Another potential reason for these findings is the greater proportion of healthcare workers among women, including roles such as nurses, public health practitioners, and nursing assistants. During the COVID-19 pandemic, these positions have involved particularly heavy caregiving responsibilities within the public sector. Both formal and informal caregiving

roles may have placed additional burdens on women workers, impacting their mental health during the pandemic [37]. However, as we were unable to obtain information on specific occupations, this issue remains a topic for future research and warrants further exploration.

In summary, the COVID-19 pandemic has resulted in unequal health outcomes for women. This could be associated with the underlying structural determinants of gender inequities, which mediate discriminatory values, norms, practices, and behaviors within households and communities [12].

This study did have certain limitations. First, the explanatory model only incorporated variables from available survey data, which may have introduced residual confounding factors, potentially biasing our estimates. Second, due to insufficient data, we were unable to evaluate the burden of family care responsibilities on either women or men. Future studies could benefit from the inclusion of such information. Despite these limitations, this study reveals an elevated risk of psychosocial stress among women during the pandemic, using a representative sample from the Korean population.

Examining the gender-based inequalities in the mental health effects of COVID-19 carries 2 primary implications. First, the findings of this study may serve as a reference in investigating the trajectory of gendered health inequalities during the pandemic. Utilizing a gender-based perspective is beneficial for intervening with vulnerable groups, both for immediate and sustained care [3]. Additional research is required to understand the pathways through which the pandemic response and economic downturn influence health inequalities [14].

This study further emphasizes the need to consider vulnerable groups during pandemic situations. All human beings are fundamentally vulnerable, an anthropological fact that becomes glaringly evident in the face of infectious diseases [38]. However, structural vulnerabilities are tied to specific political, economic, and social contexts, as well as discriminatory power dynamics [39]. Therefore, institutions and social relationships must address and compensate for these inequities in vulnerability. Strategies to alleviate caregiving burdens, promote job stability and security, and provide mental health support are needed.

In conclusion, the risk of substantial psychosocial stress has increased more in women than in men during the pandemic. This underscores the gendered impact of the COVID-19 pandemic and emphasizes the need for targeted interventions and policies for urban women aged between 30 years and 39 years.

## SUPPLEMENTAL MATERIALS

Supplemental material is available at <https://doi.org/10.3961/jpmph.23.170>.

## CONFLICT OF INTEREST

The authors have no conflicts of interest associated with the material presented in this paper.

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