




ORIGINAL ARTICLE

# COVID-19-related discrimination, PTSD symptoms, and psychological distress in healthcare workers

Zui Narita,<sup>1</sup>  Ryo Okubo,<sup>2</sup> Yohei Sasaki,<sup>2</sup> Kazuyoshi Takeda,<sup>2</sup> Masaki Takao,<sup>3</sup> Hirofumi Komaki,<sup>2</sup> Hideki Oi,<sup>2</sup> Tetsuya Mizoue,<sup>4</sup> Takeshi Miyama<sup>2</sup> and Yoshiharu Kim<sup>1</sup>

<sup>1</sup>Department of Behavioral Medicine, National Institute of Mental Health, National Center of Neurology and Psychiatry, <sup>2</sup>Clinical Research & Education Promotion Division, <sup>3</sup>National Center of Neurology and Psychiatry Hospital, and <sup>4</sup>Department of Epidemiology and Prevention, Center for Clinical Sciences, National Center for Global Health and Medicine, Tokyo, Japan

**ABSTRACT:** To date, little effort has been made to examine if frontline workers who deal with COVID-19 patients are more likely to experience discrimination than second-line workers. Also, little information has appeared on how COVID-19-related discrimination affects PTSD symptoms in healthcare workers. We aimed to examine the association between COVID-19-related discrimination and frontline worker status. We further aimed to examine how COVID-19-related discrimination was associated with PTSD symptoms and psychological distress. We studied 647 healthcare workers. For the association between COVID-19-related discrimination and frontline worker status, we conducted multivariable logistic regression adjusting for age, sex and living alone. For the association of COVID-19-related discrimination with PTSD symptoms and psychological distress, we performed multivariable regression using hierarchical adjustments for age, sex, living alone, alcohol consumption, exercise and frontline worker status. Bias-corrected and accelerated bootstrap confidence intervals (CIs) were used. A total of 136 individuals worked on the frontline and the largest group were nurses ( $n = 81$ , 59.6%). Frontline workers had increased odds of COVID-19-related discrimination compared with second-line workers (odds ratio = 2.60, 95% CI = 1.37–4.96). COVID-19-related discrimination was associated with PTSD symptoms and psychological distress even at the highest level of adjustment ( $\beta = 0.67$ , 95% CI = 0.10–1.23;  $\beta = 2.43$ , 95% CI = 0.91–3.95, respectively). Frontline workers are more likely to experience COVID-19-related discrimination than second-line workers. Such discrimination may result in PTSD symptoms and psychological distress. Interventions to prevent COVID-19-related discrimination against healthcare workers, for example anti-discrimination campaigns, are important.

**KEY WORDS:** COVID-19, discrimination, nurses, psychological distress, PTSD.

**Correspondence:** Ryo Okubo, Department of Clinical Epidemiology, Translational Medical Center, National Center of Neurology and Psychiatry, 4-1-1 Ogawa-Higashi, Kodaira, Tokyo 187-8551, Japan. Email: ryo-okubo@ncnp.go.jp; rokubo0425@gmail.com

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Zui Narita, MD, PhD, MHS.

Ryo Okubo, MD, PhD.

Yohei Sasaki, MA.

Kazuyoshi Takeda, MD, PhD.

Masaki Takao, MD, PhD.

Hirofumi Komaki, MD, PhD.

Hideki Oi, RPh.

Tetsuya Mizoue, MD, PhD.

Takeshi Miyama, MD.

Yoshiharu Kim, MD, PhD.

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## INTRODUCTION

COVID-19 has become a global health threat since its emergence. Healthcare workers experience a substantial burden of COVID-19 (Mehta *et al.* 2021–3) and have higher odds of mental health problems including depression and anxiety than non-healthcare workers (Sasaki *et al.* 2021). A meta-analysis showed that healthcare workers were more severely affected by depression, anxiety, distress, insomnia, and indirect traumatization than other occupational groups (da Silva & Neto 2021). Above all, frontline workers dealing with COVID-19 patients may experience a devastating workload, drug shortage, lack of personal protection equipment, and self-isolation. Such individuals, mainly nurses, are more likely to experience unfavourable mental health outcomes than second-line workers (Lai *et al.* 2020).

Discrimination is a type of stigma that specifically refers to a problem of behaviour, whereas stigma as a whole is a broader concept that refers to a mark or sign of disgrace eliciting negative attitudes towards its bearer (Link & Phelan 2001; Thornicroft *et al.* 2007). Review articles suggested that COVID-19-related discrimination poses a serious threat to healthcare workers (Bagchi 2020; Singh & Subedi 2020). Indeed, one study showed that healthcare workers were more likely to experience COVID-19-related bullying (Dye *et al.* 2020). Another study showed that over a third of non-healthcare workers avoided healthcare workers for fear of infection (Taylor *et al.* 2020). Of note, however, little effort has been made to examine if frontline workers who deal with COVID-19 patients are more likely to experience such discrimination than second-line workers.

Discrimination is linked to poorer mental health, for example PTSD symptoms. One study showed that discrimination based on, for example gender identity, was associated with PTSD symptoms (Reisner *et al.* 2016). Another study showed that racial discrimination was associated with PTSD symptoms (Bird *et al.* 2021). Findings were similar in a report evaluating the association between COVID-19-related anti-Asian discrimination and PTSD symptoms (Hahm *et al.* 2021). In healthcare workers, COVID-19-related discrimination was associated with poorer mental health (Labrague *et al.* 2021) including depression and anxiety (Campo-Arias *et al.* 2021; Correia da Silva *et al.* 2022; Monterrosa-Castro *et al.* 2020; Moro *et al.* 2022). Note that here we refer specifically to discrimination rather than to stigma as a whole or to other types of stigma, for example ignorance and prejudice (Thornicroft

*et al.* 2007). To date, however, little information has appeared on how COVID-19-related discrimination affects PTSD symptoms in healthcare workers.

In the present study, we studied 647 workers at a healthcare institution to address two research questions. First, we studied if frontline workers had increased odds of COVID-19-related discrimination compared with second-line workers. Next, we evaluated how COVID-19-related discrimination affected PTSD symptoms and psychological distress in healthcare workers. We hypothesized that frontline workers are more likely to have COVID-19-related discrimination than second-line workers and that such discrimination would lead to PTSD symptoms and psychological distress.

## METHODS

### Participants

This cross-sectional study used a survey to obtain data from workers in the National Center of Neurology and Psychiatry (NCNP). From 24 to 26 February 2021, all of the 1437 workers in the NCNP were invited to complete questionnaires. The NCNP Institutional Review Board approved the present study (A2020-121). All participants provided written informed consent. Of the 657 participants who completed the survey, 10 were excluded due to inappropriate responses. Thus, we analysed data from 647 participants.

### Frontline worker status

Participants were asked the following question with a yes/no answer option: 'Have you ever engaged in COVID-19-related work?'. Participants were also asked to select a single occupation they spent the most time on from the following answer options: (1) administrators, (2) physicians, (3) nurses, (4) medical staff other than office workers, (5) medical office workers, (6) other office workers, (7) information technology officers, (8) researchers, (9) janitors or security officers, and (10) other jobs. Those who selected 'yes' in the first question and either of (2), (3), or (4) in the second question were regarded as frontline workers. Other individuals were regarded as second-line workers.

### COVID-19-related discrimination

Participants were asked the following questions with a yes/no answer option: (1) 'Have you or your family ever

experienced verbal discrimination related to COVID-19?', (2) 'Have you ever perceived discrimination related to COVID-19?'. Endorsing either of these experiences constituted COVID-19-related discrimination. We developed these items specifically for this survey based on a past report (Do Duy *et al.* 2020).

### PTSD symptoms

To evaluate PTSD symptoms, we used the three-item Posttraumatic Diagnostic Scale (PDS) (Itoh *et al.* 2017), a validated scale derived from the original PDS (Foa *et al.* 1997). The three-item PDS evaluated the symptom severity over the past month corresponding to B1 (intrusive images), B2 (nightmares), and B5 (physical reactions when reminded of the trauma) of the DSM-IV criteria (American Psychiatric Association 1994). Each item was self-reported on four-point response options ranging from 0 (not at all or only one time) to 3 (five or more times a week/almost always), with possible total scores ranging from 0 to 9. Our data showed good internal consistency (Cronbach's  $\alpha = 0.79$ ). A greater score suggests worse PTSD symptoms.

### Psychological distress

We used the Japanese version of the Six-item Kessler Psychological Distress Scale (K6) (Furukawa *et al.* 2008) to assess psychological distress. Each item was self-reported on five-point response options ranging from 0 (no distress) to 4 (maximum stress), with possible total scores ranging from 0 to 24. Our data showed good internal consistency (Cronbach's  $\alpha = 0.89$ ). A greater score suggests greater psychological distress.

### Sociodemographic factors

We studied sociodemographic characteristics that may confound the association between COVID-19-related discrimination and frontline worker status or the association between mental health outcomes and COVID-19-related discrimination. We used the following variables: age, sex (male or female), living alone (yes or no), alcohol consumption (<once a week or  $\geq$ once a week), and exercise (<1 h/week or  $\geq$ 1 h/week).

### Statistical analysis

Statistical analyses were performed by using Stata 15 (Stata Corp LP, College Station, TX, USA). First, we

used multivariable logistic regression to examine the association between COVID-19-related discrimination and frontline worker status, adjusting for age, sex, and living alone. Note that a limited number of events ( $n = 48$ ) enables us to only adjust for age, sex, and living alone in the logistic model (Peduzzi *et al.* 1996). Next, we conducted multivariable regression to examine the association of COVID-19-related discrimination with PTSD symptoms and psychological distress. For the latter association, we fitted three regression models using hierarchical adjustments. Model 1 evaluated the unadjusted association. Model 2 adjusted for age, sex, living alone, alcohol consumption, and exercise. Model 3 adjusted for all variables in Model 2 and frontline worker status. We used bias-corrected and accelerated bootstrap confidence intervals (CIs) to obtain accurate information (Cumming 2014; Felsenstein 1985; Lumley *et al.* 2002). The size of the bootstrap sample was set at 1000 with 95% CIs (Carpenter & Bithell 2000).

## RESULTS

### Demographics of the study population

Table 1 shows the demographics of the study population. A total of 136 individuals worked on the frontline and the largest group were nurses ( $n = 81$ , 59.6%). Details of occupations are shown in Table S1. A total of 136 individuals (21.0%) were frontline workers. Overall, 48 workers (7.4%) experienced COVID-19-related discrimination. Compared to second-line workers, frontline workers were more likely to experience COVID-19-related discrimination, be younger, be male, live alone, and exercise 1 h/week or more. They were less likely to drink alcohol once a week or more and had higher scores in the three-item PDS and the K6.

### Odds of COVID-19-related discrimination in frontline workers compared with second-line workers

Table 2 summarizes the odds ratio (OR) of COVID-19-related discrimination in frontline workers compared with second-line workers. The OR was slightly attenuated with the inclusion of covariates in the model, but remained statistically significant in both unadjusted and adjusted associations (OR = 2.70, 95% CI = 1.46–4.99; OR = 2.60, 95% CI = 1.37–4.96, respectively).

**TABLE 1** Demographics of the study population

	Overall ( <i>n</i> = 647)	Frontline workers ( <i>n</i> = 136)	Second-line workers ( <i>n</i> = 511)
COVID-19-related discrimination, no. (%)			
No	599 (92.6)	117 (86.0)	482 (94.3)
Yes	48 (7.4)	19 (14.0)	29 (5.7)
Age, mean (SD), y	42.7 ± 10.9	40.3 ± 10.6	43.3 ± 11.0
Sex, no. (%)			
Male	208 (32.2)	55 (40.4)	153 (29.9)
Female	439 (67.9)	81 (59.6)	358 (70.1)
Living alone, no. (%)			
No	489 (75.8)	98 (72.1)	391 (76.8)
Yes	156 (24.2)	38 (27.9)	118 (23.2)
Alcohol consumption, no. (%)			
Less than once a week	368 (57.0)	82 (60.3)	286 (56.1)
Once a week or more	278 (43.0)	54 (39.7)	224 (43.9)
Exercise, no. (%)			
Less than 1 h/week	418 (64.6)	81 (59.6)	337 (66.0)
1 h/week or more	229 (35.4)	55 (40.4)	174 (34.1)
Three-item PDS scores	0.85 ± 1.54	1.02 ± 1.65	0.81 ± 1.51
K6 scores	4.71 ± 4.60	4.79 ± 5.19	4.69 ± 4.44

Data are Mean ± SD or *n* (%).

**TABLE 2** Odds of COVID-19-related discrimination in frontline workers compared with second-line workers

	COVID-19-related discrimination	
	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Frontline worker status		
Second-line worker	Reference	Reference
Frontline worker	<b>2.70** (1.46, 4.99)</b>	<b>2.60** (1.37, 4.96)</b>
Age	NA	0.98 (0.95, 1.01)
Sex		
Male	NA	Reference
Female	NA	1.43 (0.69, 2.95)
Living alone		
No	NA	Reference
Yes	NA	1.25 (0.60, 2.59)

CI, confidence interval; NA, not applicable; OR, odds ratio.

\*\**P* < 0.01.

Bold values suggest significantly increased odds.

### Association between mental health outcomes and COVID-19-related discrimination

Table 3 summarizes associations between three-item PDS scores and COVID-19-related discrimination by

multivariable regression using hierarchical adjustments. The coefficient was slightly attenuated with the inclusion of covariates in the models, but remained statistically significant in all of them (Model 1:  $\beta = 0.72$ , 95% CI = 0.21–1.23; Model 2:  $\beta = 0.69$ , 95% CI = 0.15–1.24; Model 3:  $\beta = 0.67$ , 95% CI = 0.10–1.23), suggesting that individuals experiencing such discrimination had worse PTSD symptoms. Interestingly, adding frontline worker status in the model did not substantially change the coefficient.

Table 4 summarizes associations between K6 scores and COVID-19-related discrimination by multivariable regression using hierarchical adjustments. The coefficient was statistically significant in all of the models (Model 1:  $\beta = 2.45$ , 95% CI = 0.89–4.00; Model 2:  $\beta = 2.40$ , 95% CI = 0.88–3.92; Model 3:  $\beta = 2.43$ , 95% CI = 0.91–3.95), suggesting that individuals experiencing such discrimination had worse psychological distress. Again, adding frontline worker status in the model did not decrease the coefficient.

## DISCUSSION

As hypothesized, we found that frontline workers had higher odds of COVID-19-related discrimination than second-line workers, and such discrimination was associated with PTSD symptoms and psychological distress. These associations remained significant after adjusting for potential confounders. Our findings are consistent with a previous study showing the association of stigma as a whole with PTSD symptoms and psychological distress (Lu *et al.* 2021). The present study is to our knowledge the first to suggest that frontline workers may have more chance of experiencing COVID-19-related discrimination compared with other workers. Further, this is the first study to show the association between COVID-19-related discrimination and PTSD symptoms.

Frontline workers were more than twice as likely to experience COVID-19-related discrimination compared with second-line workers. Healthcare workers as a whole are more likely to experience COVID-19-related bullying than individuals engaged in other occupations (Dye *et al.* 2020). Considered together, the increased odds of COVID-19-related discrimination in frontline workers would be more substantial when compared with other occupational groups. In our sample, 7.4% of healthcare workers experienced COVID-19-related discrimination, which was comparable to that of a previous study showing that 8.0% had COVID-19-related harassment, bullying or hurt (Dye *et al.* 2020).

**TABLE 3** Association between three-item PDS scores and COVID-19-related discrimination

	Model 1 $\beta$ (95% CI)	Model 2 $\beta$ (95% CI)	Model 3 $\beta$ (95% CI)
COVID-19-related discrimination			
No	Reference	Reference	Reference
Yes	<b>0.72** (0.21, 1.23)</b>	<b>0.69* (0.15, 1.24)</b>	<b>0.67* (0.10, 1.23)</b>
Age		-0.01 (-0.02, 0.001)	-0.01 (-0.02, 0.002)
Sex			
Male	NA	Reference	Reference
Female	NA	0.13 (-0.13, 0.38)	0.13 (-0.13, 0.40)
Living alone			
No	NA	Reference	Reference
Yes	NA	0.18 (-0.13, 0.48)	0.17 (-0.13, 0.48)
Alcohol consumption			
Less than once a week	NA	Reference	Reference
Once a week or more	NA	0.06 (-0.20, 0.32)	0.07 (-0.19, 0.32)
Exercise			
Less than 1 h/week	NA	Reference	Reference
1 h/week or more	NA	0.09 (-0.16, 0.35)	0.09 (-0.17, 0.34)
Frontline worker status			
Second-line worker	NA	NA	Reference
Frontline worker	NA	NA	0.12 (-0.23, 0.48)

Model 1: Unadjusted. Model 2: Adjusted for age, sex, living alone, alcohol consumption, and exercise. Model 3: Adjusted for all variables in Model 2 and frontline worker status.

CI, confidence interval; NA, not applicable; PDS, Posttraumatic Diagnostic Scale.

\* $P < 0.05$ , \*\* $P < 0.01$ .

Bold values suggest significantly worse PTSD symptoms.

**TABLE 4** Association between K6 scores and COVID-19-related discrimination

	Model 1 $\beta$ (95% CI)	Model 2 $\beta$ (95% CI)	Model 3 $\beta$ (95% CI)
COVID-19-related discrimination			
No	Reference	Reference	Reference
Yes	<b>2.45** (0.89, 4.00)</b>	<b>2.40** (0.88, 3.92)</b>	<b>2.43** (0.91, 3.95)</b>
Age		-0.01 (-0.04, 0.03)	-0.01 (-0.04, 0.03)
Sex			
Male	NA	Reference	Reference
Female	NA	0.01 (-0.82, 0.84)	0.00 (-0.83, 0.83)
Living alone			
No	NA	Reference	Reference
Yes	NA	0.70 (-0.20, 1.59)	0.70 (-0.19, 1.59)
Alcohol consumption			
Less than once a week	NA	Reference	Reference
Once a week or more	NA	0.16 (-0.59, 0.91)	0.15 (-0.60, 0.90)
Exercise			
Less than 1 h/week	NA	Reference	Reference
1 h/week or more	NA	-0.16 (-0.95, 0.63)	-0.15 (-0.94, 0.64)
Frontline worker status			
Second-line worker	NA	NA	Reference
Frontline worker	NA	NA	-0.15 (-1.09, 0.79)

Model 1: Unadjusted. Model 2: Adjusted for age, sex, living alone, alcohol consumption, and exercise. Model 3: Adjusted for all variables in Model 2 and frontline worker status.

CI, confidence interval; K6, Kessler Psychological Distress Scale; NA, not applicable.

\* $P < 0.05$ , \*\* $P < 0.01$ .

Bold values suggest significantly worse psychological distress.

Nevertheless, due to a limited number of individuals who experienced COVID-19-related discrimination, the logistic model only adjusted for age, sex, and living alone (Peduzzi *et al.* 1996). Thus, the interpretation of the analysis should bear this in mind.

While previous studies showed that COVID-19-related discrimination was associated with depression and anxiety (Campo-Arias *et al.* 2021; Correia da Silva *et al.* 2022; Monterrosa-Castro *et al.* 2020; Moro *et al.* 2022), we showed its association with PTSD symptoms and psychological distress. For PTSD symptoms, we studied intrusive images, nightmares, and physical reactions when reminded of the trauma (corresponding to B1, B2, and B5 of the DSM-IV criteria, respectively; American Psychiatric Association 1994). Note that we did not evaluate other symptoms, namely reliving of the trauma (B3) and being emotionally upset when reminded of the trauma (B4). Importantly, the association did not substantially change after controlling for frontline worker status, suggesting that such discrimination may be linked to PTSD symptoms irrespective of having direct contact with COVID-19 patients. Similar findings were seen when studying psychological distress. The psychological distress caused by COVID-19-related discrimination may lead to depression and anxiety (Campo-Arias *et al.* 2021; Correia da Silva *et al.* 2022; Monterrosa-Castro *et al.* 2020; Moro *et al.* 2022), which warrants future studies employing mediation analyses to contextualize these associations.

The present study has five limitations. First, the data were cross-sectional and we need to carefully interpret the findings. On the other hand, it is unlikely that COVID-19-related discrimination leads to frontline worker status and that PTSD symptoms and psychological distress lead to experiencing COVID-19-related discrimination. Thus, dealing with patients on the frontline may bring a higher chance of experiencing COVID-19-related discrimination, and such discrimination may result in worse mental health outcomes. Second, we had a small number of individuals who experienced COVID-19-related discrimination and thus included a limited number of covariates in the logistic model (Peduzzi *et al.* 1996). A larger sample is warranted to address this issue. Third, participants self-reported the information including discrimination against their families, which may have caused a cognitive bias. Also, examination by certified psychiatrists would have provided more accurate information on PTSD symptoms although the three-item PDS used in this study was a validated measurement. Fourth, the data were obtained from workers at a single healthcare

institution in Japan, and thus our findings may have limited generalizability. For instance, the vaccination rate was 99.8% in this institution, whereas the rate should be lower in other countries. Fifth, we did not obtain detailed information on COVID-19-related discrimination, for example frequency. A validated and quantitative measurement of discrimination is warranted.

## CONCLUSIONS

Frontline workers are more likely to experience COVID-19-related discrimination than second-line workers. Such discrimination may result in PTSD symptoms and psychological distress. Interventions to prevent COVID-19-related discrimination against healthcare workers, for example anti-discrimination campaigns, are important.

## RELEVANCE FOR CLINICAL PRACTICE

Our findings added to the growing evidence on the role of COVID-19-related discrimination on mental health. We suggest that interventions to prevent such discrimination against healthcare workers, for example anti-discrimination campaigns, are crucial. The psychological impact of COVID-19-related discrimination on healthcare workers may lead to a lower quality of healthcare. Bias against healthcare workers needs to be dismantled.

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## ETHICAL APPROVAL

Ethical approval was obtained from the National Center of Neurology and Psychiatry Institutional Review Board (A2020-121).

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Not applicable.

## DATA AVAILABILITY STATEMENT

The National Center of Neurology and Psychiatry Institutional Review Board imposes strict rules on sharing

the data as these are classified according to ethical restrictions due to privacy concerns. Anonymized data are available to researchers and institutions upon request.

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## SUPPORTING INFORMATION

Additional Supporting Information may be found in the online version of this article at the publisher's website:

**Table S1** Details of the participants' occupations.