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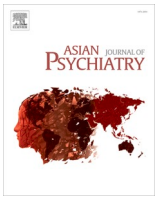

Prevalence of psychological distress on public health officials amid COVID-19 pandemic

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ABSTRACT

Objectives: While the coronavirus disease 2019 (COVID-19) pandemic has led to increased burnout among frontline healthcare workers (HCWs), little research has been done regarding the potential psychological burden among public health officials who have worked tirelessly to tackle the pandemic from an administrative perspective. This study aimed to determine the prevalence of burnout, depression, and job-related stress in Japanese public health officers amid the COVID-19 pandemic.

Methods: We conducted an anonymous, self-administered web-based cross-sectional survey including basic demographics, work-related questions, the Maslach Burnout Inventory, Patient Health Questionnaire-9, Utrecht Work Engagement Scale-3, and Brief Job Stress Questionnaire. 100 public health officers working in the public health centers (PHCs) in Okayama, Japan, answered the survey in December 2021 when the 5th surge in the number of COVID-19 was over.

Results: The prevalence of burnout, depression, and job-related stress was 27%, 43%, and 62%, respectively. The multivariate logistic analysis demonstrated that females, public health nurses, and those who suffered from a lack of support from their workplaces were significantly associated with psychological distress.

Conclusions: While we tend to focus on mitigation plans to help alleviate burnout of frontline HCWs, more focus is needed to help public health officers, and public health nurses, in particular, to alleviate their psychological distress and job-related stress to prevent further staff shortages and secure sustainable health systems.

1. Introduction

Since the emergence of coronavirus disease 2019 (COVID-19), healthcare workers (HCWs) have faced a considerable ever-changing burden encompassing handling direct patient care, designating administrative leadership, and responding to new SARS-CoV-2 variants (Ministry of Health and Labour and Welfare Japan, 2022; World Health Organization, 2022). This increase in workload and stress has worsened mental health issues in HCWs, specifically, burnout and depression, which many researchers have addressed (Amanullah and Ramesh Shankar, 2020; Brera et al., 2021; Busch et al., 2021; Celmece and Menekay, 2020; Correia and Almeida, 2020; Dionisi et al., 2021; Dogru-Huzmeli et al., 2021; Elhadi et al., 2020; Kodera et al., 2022; Kok et al., 2021; Leo et al., 2021; Lim et al., 2021; Liu et al., 2020; Matsuo et al., 2020; Miguel-Puga et al., 2020; Naldi et al., 2021; Ohue et al., 2021; Tan et al., 2020; Zhang et al., 2021).

Few people are aware of the psychological distress amongst public health officials amid the pandemic. Since early 2020, public health officials have been exposed to a significant workload. This work involved effort made to track COVID-19, provide up-to-date health-related information, promote infection prevention and vaccination, and coordinate with a number of stakeholders to implement COVID-19-related policies rapidly. In Japan, the Japanese public health centers (PHC), *hoken-jyo*, have served a critical role in response to COVID-19 in local communities (Imamura et al., 2021; Katsuda et al., 2011). In particular, the Japanese government has focused on an intensive retrospective contact tracing to identify those exposed to SARS-CoV-2. While the retrospective contact tracing effectively identified clusters of COVID-19 cases, as the number of COVID-19 cases skyrocketed, the burden on public health officers working at the PHC also increased considerably. Of note, the PHCs deal with not only COVID-19 but also other essential public health issues such as non-COVID-19 infectious diseases,

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environmental health, food hygiene, pharmaceutical inspections, and mental health.

Despite the significant roles of the PHCs and public health officers, the prevalence of psychological distress such as burnout or depression among public health officers during the COVID-19 pandemic has not been adequately defined. This study aimed to determine the prevalence of such psychological stress in Japanese public health officers working in the PHCs amid the COVID-19 pandemic and factors related to the outcomes using a cross-sectional survey.

2. Methods

2.1. Study design, setting, and participants

We conducted an anonymous, self-administered web-based cross-sectional survey. Participants included public health officials working in the PHCs in Okayama prefecture in Japan. The survey was exploratory, and we employed homogenous purposive samplings in December 2021 to public health officers who belonged to one of seven PHCs in Okayama prefecture. All the participants were engaged in various tasks involving ~~related~~ to COVID-19 management. The survey was thoroughly organized through an epidemiology expert consultation at Okayama University with piloting. Survey instructions and instruments were noted in Japanese. The participants were asked to complete the surveys from December 1 to 31, 2021. No financial incentives were provided for survey participation. The survey items included demographics of participants such as gender, job category, affiliation, years of experience, household size, work-related questions (*i.e.*, the busiest time with COVID-19-related work, the number of working days per week during the busiest time, subjective sense of being overwhelmed or supported with a six-point Likert scales). To secure participants' anonymity, their ages were not collected.

2.2. Measurements

2.2.1. Maslach Burnout Inventory (MBI)

We measured burnout with the Japanese translated version of the Maslach Burnout Inventory–Human Services Survey (MBI-HSS). Higashiguchi et al. validated the instrument in measuring burnout in Japanese workers (Higashiguchi et al., 1998). The survey consists of 22 items with three domains: emotional exhaustion (EE), depersonalization (DP), and personal accomplishment (PA). Each item has a 7-point Likert scale from "never" or 0 to "daily" or 6. Although there were no clearly defined cut-off values for burnout, we defined a 27 or higher EE score and a 10 or higher DP score (the most common cut-off) as burnout based on previous research (Doulougeri et al., 2016). Maslach et al., the developer of the original MBI, noted in their article that PA was an independent subscale without correlation with EE and DP subscales. Thus, we did not include low PA scores (33 or lower; the most commonly used cut-off) as a definition of burnout (Maslach and Jackson, 1981).

2.2.2. Patient Health Questionnaire-9 (PHQ-9)

The PHQ-9 is an instrument used to screen for major depression; it consists of a self-assessment questionnaire with nine items scored on a four-point scale (Muramatsu et al., 2018). We defined a score ≥ 10 as consistent with a clinical diagnosis of depression.

2.2.3. Utrecht Work Engagement Scale-3 (UWES-3)

The UWES is a self-reported questionnaire that includes three dimensions of rigor (high levels of energy and mental resilience for work), dedication (feelings of enthusiasm or inspiration), and absorption (being entirely concentrated on work). While the initial version of the UWES had 17 items, the UWES-3, which consists of only three items, was validated in five languages, including Japanese, as a reliable indicator of work engagement in 2017 (Schaufeli et al., 2017). Each item has a 7-point Likert scale from "never" or 0 to "daily" or 6. We used the Japanese version of the UWES-3 in this study.

2.2.4. Brief Job Stress Questionnaire (BJSQ)

The BJSQ is a widely used screening tool to identify workers having psychological distress in Japan (Tsutsumi et al., 2017). While the full BJSQ consists of 57 items, we used seven items associated with psychological job demands. Each item has a 4-point Likert scale from "low stress" or 1 to "high stress" or 4. Those who selected "somewhat high stress" or 3 or "high stress" or 4 in more than or equal to six items in men, or more than or equal to five items in females, were considered to have job-related stress.

2.2.5. Statistical analysis

Continuous variables were summarized with median, interquartile ranges (IQR), and 95% confidence interval (CI). Categorical variables were analyzed *via* percentage (%) and odds ratio (OR). We used the Mann-Whitney U test to explore differences in the variables given their non-normal distribution. We used Fisher's exact test for associations between categorical variables and employed multivariate logistic regression analyses to evaluate factors associated with different psychological statuses. Data analysis was performed with JMP version 15.1.0 (SAS Institute Inc., Cary, North Carolina). The threshold for significance was defined as $p < 0.05$.

2.2.6. Ethical approval

This study protocol was approved by the institutional review board of Okayama University Hospital (reference no. 2111-029). All research methods were performed in accordance with relevant guidelines and regulations. Completion of the surveys was deemed as an indication of participant consent.

3. Results

3.1. Basic demographics and work-related information

Table 1 summarizes the participants' demographic characteristics and work-related information. The median years of experience as public health officers was 6.0 years (IQR 2.8–18.0 years). The female gender was predominant (80/100 [80%]) among the participants, and 72% were originally affiliated with non-infection-related departments. During the COVID-19 pandemic, due to staff shortage in the Infectious Disease Control Division, a number of public health officers from other departments were temporally redistributed to assist in COVID-19-related work. By job category, 66% of the participants were public health nurses, and 32% were office workers without health-related credentials, pharmacists, dietitians, or veterinary doctors.

Regarding participants' subjective workload, 77% answered that they had the busiest time with COVID-19-related tasks in May or August 2021, when the third and fourth 3rd and 4th surges of COVID-19 occurred in Japan. During these periods, 23% of the participants had to work at their offices seven days a week without rest due to the demands of their COVID-19-related jobs. Based on the 5-point Likert scales (0 Very little, 3 Neutral, 5 Very high), the participants' median score of feeling overwhelmed was high at 4.5 (IQR 4.0–5.0). The median scores of support from the workplace and job autonomy were 3.0 (IQR 2.3–4.0) and 3.0 (IQR 3.0–5.0), respectively. Participants had relatively good support from their families, with a median score of 4.0 (IQR 3.0–5.0).

3.2. The extent of psychological distress

Table 2 summarizes participants' answers to the MBI, PHQ-9, UWES-3, BJSQ, and the prevalence of burnout, depression, and job-related stress. Among the participants, mean UWES-3 scores of each subcomponent were relatively low at Vigor (2.8/6.0, 95% confidence interval (CI) 2.5–3.1) and Absorption (2.7/6.0, 95% CI 2.4–3.0), in particular. 27%, 43%, and 62% suffered from burnout, depression, and job-related

Table 1
Demographic characteristics of the study participants.

Characteristic	Value	IQR
Years in experience		
Median	6.0	2.8–18.0
Gender, no. (%)		
Female	80 (80.0)	
Male	20 (20.0)	
Affiliation, no. (%)		
Infectious Disease Control Division	15 (15.0)	
Other	72 (72.0)	
No answers	13 (13.0)	
Job category, no. (%)		
Public health nurse	66 (66.0)	
Nurse	2 (2.0)	
Other	32 (32.0)	
Size of household		
Median	3.0	1.0–4.0
Busiest time with COVID-19-related work		
October/2020	2 (2.0)	
December/2020	10 (10.0)	
April/2021	4 (4.0)	
May/2021	37 (37.0)	
July/2021	1 (1.0)	
August/2021	40 (40.0)	
September/2021	1 (1.0)	
Number of working days per week for COVID-19 response during the busiest time, no. (%)		
7 days	23 (23.0)	
5–6 days	22 (22.0)	
3–4 days	26 (26.0)	
1–2 days	17 (17.0)	
0 days	12 (12.0)	
Feeling overwhelmed (0 Very little, 3 Neutral, 5 Very high)		
Median	4.5	4.0–5.0
Support from workplace (0 Very little, 3 Neutral, 5 Very high)		
Median	3.0	2.3–4.0
Support from family (0 Very little, 3 Neutral, 5 Very high)		
Median	4.0	3.0–5.0
Autonomy in work (0 Very little, 3 Neutral, 5 Very high)		
Median	3.0	2.0–3.0
Total number of participants	100	

Abbreviations: CI, confidence interval; COVID-19, coronavirus disease 2019; SD, standard deviation.

stress, respectively.

We then stratified participants based on variables to examine the difference in the prevalence of burnout, depression, or job-related stress (Table 3). Female participants had higher odds of having job-related stress compared to men (odds ratio [OR] 4.1, 95% CI 1.5–11.5, $p = 0.009$). Regarding burnout, those who felt a lack of support from their workplaces had a 2.9 times higher odds of experiencing burnout (OR 2.9, 95% CI 1.0–8.0, $p = 0.041$). Public health nurses had higher odds of burnout than others, but the difference was not statistically significant. However, public health nurses had significantly higher odds of depression and job-related stress than those in other job categories (OR 4.0, 95% CI 1.3–12.8, $p = 0.019$ and OR 7.1, 95% CI 2.8–17.9, $p < 0.0001$, respectively). No other variables were related to higher odds of depression.

Table 2
Results of psychological scales and prevalence of burnout, depression, and job-related stress.

Measures	Median	IQR
MBI		
Emotional exhaustion	17.0	8.0–26.8
Depersonalization	4.0	1.0–6.8
Personal accomplishment	23.5	14.0–32.0
PHQ-9	8.0	4.0–12.8
UWES-3		
Vigor	3.0	2.0–4.0
Dedication	3.0	2.3–4.0
Absorption	3.0	2.0–4.0
BJSQ	5.5	4.0–6.0
Prevalence	No. (%)	
Burnout		
Yes	27 (27.0)	
No	73 (73.0)	
Depression		
Yes	43 (43.0)	
No	57 (57.0)	
Job-related stress		
Yes	62 (62.0)	
No	38 (38.0)	

Abbreviations: BJSQ, brief job stress questionnaire; CI, confidence interval; MBI, Maslach Burnout Inventory; PHQ-9, Patient Health Questionnaire-9; UWES, Utrecht Work Engagement Scale.

3.3. Multivariate logistic analysis

The results of the multivariate logistic analysis are shown in Table 4. Those who felt a lack of support from the workplace had significantly higher odds of burnout and depression after adjusting with other variables (OR 9.9, 95% CI 2.1–46.3, $p = 0.004$ and OR 3.8, 95% CI 1.2–12.2, $p = 0.023$, respectively). Public health nurses were found to have significantly higher odds of having job stress compared to those with other job categories (OR 5.5, 95% CI 1.4–21.8). There was no significant association between different psychological statuses and other variables, including gender and original affiliation.

4. Discussion

In this study, we found that not only frontline HCWs, but public health officers working in Japanese PHCs have suffered from burnout, depression, and job-related stress amid the COVID-19 pandemic. Overall, the prevalence of these psychological burdens was high at 27.0% for burnout, 43.0% for depression, and 62.0% for job-related stress. Public health nurses, who served critical roles in the public health centers, were more likely to suffer from psychological distress, especially job stress. Also, lack of support from the workplace was associated with burnout and depression. The results suggest that further intervention is necessary to help public health officers endure periods of demanding work.

To date, there is only one study targeting public health workers' burnout during the COVID-19 pandemic, including 225 participants from 31 States in the United States (US) (Stone et al., 2021). While the study suffered from a low response rate (7.5%), the researchers showed a high prevalence of burnout and anxiety/depressive disorder (66.2% and 45.6%), respectively, likely due to increased workload as well as frequent leadership turnover with the politicization of public health. Compared to the US study, 27% of public health officers had a burnout in our study, which could stem from environmental factors or cultural differences, as shown in previous studies done in Japan, with relatively lower burnout prevalence at the baseline than those from the US or European countries (Aronsson et al., 2017; Nishimura et al., 2021a, 2019, 2021b). However, it needs to be noted that the prevalence of burnout in public health officers was as high as in frontline HCWs,

Table 3
Prevalence of burnout, depression and job-related stress depending on variables.

	Burnout		Depression		Job-related stress	
Variable	OR (95% CI)	*P* value	OR (95% CI)	*P* value	OR (95% CI)	*P* value
Gender						
Male	[Reference]	NA	[Reference]	NA	[Reference]	NA
Female	2.4 (0.65–9.1)	.261	2.7 (0.90–8.2)	.082	4.1 (1.5–11.5)	.009
Job category						
Others	[Reference]	NA	[Reference]	NA	[Reference]	NA
Public health nurses	2.4 (0.99–5.8)	.052	4.0 (1.3–12.8)	.019	7.1 (2.8–17.9)	< 0.0001
Affiliation						
Infectious Disease Control Division	[Reference]	NA	[Reference]	NA	[Reference]	NA
Others	0.99 (0.28–3.5)	1.00	0.59 (0.19–1.81)	.399	0.31 (0.081–1.2)	.091
Subjective feeling of overwhelmed						
No	[Reference]	NA	[Reference]	NA	[Reference]	NA
Yes[a]	8.1 (0.45–144.1)	.154	17.0 (0.96–301.5)	.053	1.3 (0.34–5.3)	.677
Support from workplace						
Yes[a]	[Reference]	NA	[Reference]	NA	[Reference]	NA
No	2.9 (1.0–8.0)	.041	1.9 (0.84–4.5)	.121	1.2 (0.54–2.8)	.618
Support from family						
Yes[a]	[Reference]	NA	[Reference]	NA	[Reference]	NA
No	0.80 (0.32–2.0)	.624	0.76 (0.34–1.7)	.504	1.6 (0.69–3.7)	.281
Autonomy in Work						
Yes[a]	[Reference]	NA	[Reference]	NA	[Reference]	NA
No	0.98 (0.34–2.8)	.974	1.1 (0.43–2.9)	.823	0.54 (0.19–1.5)	.245

Abbreviations: CI, confidence interval; NA, not applicable; OR, odds ratio.
[a] Those who answered 4 (high) or 5 (very high) were caterorized as "Yes" in the variables.

Table 4
Multivariate logistic analysis of selected predictors on prevalence of burnout, depression and job-related stress.

	Burnout		Depression		Job Stress	
Variable	OR (95% CI)	*P* value	OR (95% CI)	*P* value	OR (95% CI)	*P* value
Gender						
Male	[Reference]	NA	[Reference]	NA	[Reference]	NA
Female	2.6 (0.24–28.3)	.428	1.7 (0.28–10.0)	.565	1.6 (0.29–8.5)	.604
Job category						
Others	[Reference]	NA	[Reference]	NA	[Reference]	NA
Public health nurses	5.9 (0.89–39.4)	.052	2.2 (0.54–9.1)	.270	5.5 (1.4–21.8)	.014
Support from workplace						
Yes[a]	[Reference]	NA	[Reference]	NA	[Reference]	NA
No	9.9 (2.1–46.3)	.004	3.8 (1.2–12.2)	.023	0.67 (0.21–2.1)	.497

Abbreviations: CI, confidence interval; NA, not applicable; OR, odds ratio.
[a] Those who answered 4 (high) or 5 (very high) were caterorized as "Yes" in the variables.

including internists and primary care physicians (Kuriyama et al., 2022; Matsuo et al., 2020; Nishimura et al., 2021a, 2021b). Also, those who felt a lack of support from their workplaces were more likely to have suffered from burnout. In Okayama prefecture, where seven PHCs exist, three PHC directors resigned in early 2021, reportedly due to considerable workload. As represented by the study result and the simultaneous resignation, lack of support to public health officers may cause a vicious cycle of staff shortage, further increase in workload and job-related stress, and burnout leading to potential leave or resignation from work. Since public health centers play a crucial role in handling health emergencies, including the COVID-19 pandemic, both national- and regional-level governments may need to provide mental health support and address staff shortages in order to help public health officers in this challenging time. Also, global-level cooperation to facilitate mental health research of vulnerable people, including public health officers, is crucial (Chen et al., 2021).

People in Japan have enjoyed universal health coverage (UHC) since the 1960s, which is extremely rare in the world (Matsumura et al., 2019; Nishizawa et al., 2020). While we tend to focus on frontline HCWs or high-level health system issues when discussing UHC, regional PHCs and public health officials have a crucial roles in sustaining UHC. As for COVID-19 countermeasures, they have made a considerable contribution to rigorous epidemiological analysis, supported those requiring quarantine at home, and coordinated with the central government and healthcare facilities to secure effective implementation of rapidly-changing policies amid the pandemic (Katsuda et al., 2011). In particular, public health nurses, who suffer from a considerably higher prevalence of psychological distress, have served essential roles in the tasks. However, the COVID-19 pandemic has exacerbated underlying health disparities, moral injury, and depression and anxiety in the general public (Choudhary et al., 2022; Deng et al., 2021; Tandon, 2021), posing threats to the sustainability of UHC. To prevent fragmentation of our health system and secure UHC, support to public health nurses and effective task shifts to split tasks of public health nurses to other job categories are warranted.

Several limitations need to be noted in this study. First, the study results were based on a cross-sectional survey at PHCs in a single Japanese prefecture. Thus, causal relationships between burnout, depression, and job-related stress and the COVID-19 pandemic may not be concluded. Participation from nationwide public health centers or government offices is necessary to secure the generalizability of the results. Also, the organizational climate of each public health center might confound the prevalence of psychological distress (Thompson and Rose, 2011). Despite these limitations, our study is the first to report the prevalence of psychological distress and job-related stress among public health officers in Japan amid the COVID-19 pandemic. Next, to clarify the long-term effect of the COVID-19 pandemic on public health officers, a longitudinal study may be necessary in the future.

While researchers, healthcare administrators, and governments have focused on mitigation plans to help alleviate burnout of frontline HCWs, the present study suggests that more focus is needed to help public health officers to alleviate their psychological distress and job-related stress, possibly with contingency plans to address staff shortages and mental health support systems. Multi-center studies involving different countries are warranted for future research to establish factors related to burnout, depression, and job-related stress among public health officers during the COVID-19 pandemic or potential future public health emergencies.

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CRediT authorship contribution statement

Conceptualization, H.H. and T.M.; Methodology, H.H. and T.M.; Software, Y.N.; Validation, Y.N. and T.M.; Formal analysis, Y.N.; Investigation, Y.N.; Resources, Y.N.; Data curation, H.H. and F.O.; Writing – original draft, Y.N.; Writing – review & editing, T.M., H.H., Y. K. and F.O.; Supervision, F.O.; Project administration, T.M. All authors have read and agreed to the published version of the manuscript.

Conflicts of interest

The authors declare no conflicts of interest in association with the present study.

Data Availability Statement

The datasets generated and analyzed during the current study are available from the corresponding author on reasonable request.

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