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Original article

Psychosocial Work Conditions During the COVID-19 Pandemic and Their Influences on Mental Health Risk and Intention to Leave Among Public Health Workers: A Cross-sectional and Follow-up Study in Taiwan

Ming-Wei Lin [1,2], Yi-Ting Wang [2], Yawen Cheng [2,3,*]

[1] Department of Psychiatry, Taichung Armed Forces General Hospital, Taichung, Taiwan
[2] Institute of Health Policy and Management, College of Public Health, National Taiwan University, Taipei, Taiwan
[3] Department of Public Health, College of Public Health, National Taiwan University, Taipei, Taiwan

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ABSTRACT

Background: To examine the influences of psychosocial work conditions on mental health risk and intention to leave the public sector among workers of public health agencies in Taiwan.
Methods: We surveyed 492 public health workers in March 2022 during the COVID-19 pandemic. Information on job demands, job control, workplace justice, experiences of workplace violence and its type and origin, and mental health status (assessed by the 5-item Brief Symptom Rating Scale, BSRS-5) was obtained. Of them, 192 participated in a follow-up survey conducted in May 2023 that assessed mental health status, employment changes, and intention to leave.
Results: In the initial survey, 32.93% of participants reported poor mental health status, defined by having a score of BSRS-5 ≧ 10, and 48.17% experienced some form of workplace violence over the past year. Notably, high psychosocial job demands (OR = 3.64, 95% CI = 1.93–6.87), low workplace justice (OR = 2.58, 95% CI = 1.45–4.58), and workplace violence (OR = 2.38, 95% CI = 1.51–3.77) were significantly associated with increased risk of mental disorders. Among those who participated in the follow-up survey, 22.40% had persistent poor mental health, and 30.73% considered leaving or have left the public sector. Longitudinal analyses indicated that job demands predicted persistent mental disorders and intention to leave the public sector, and the experience of workplace violence added additional mental health risks.
Conclusion: The public health workforce is crucial for effective and resilient public health systems. Our findings that public health workers were at high mental health risk and had a high intention to leave the job warrant attention and policy interventions.

1. Introduction

The COVID-19 pandemic has presented unprecedented challenges to public health systems worldwide, with workers of public health agencies at the forefront of response efforts. Accumulating evidence has shown that public health workers were overwhelmed with heavy workloads and complicated tasks throughout the pandemic, resulting in psychological distress, burnout, depression, anxiety, and even post-traumatic stress disorder [1–6]. In addition to workloads, public health workers were also prone to hostility, threats, and harassment from the public when implementing disease control measures that intervene in people's autonomy. A recent survey conducted in the U.S. indicated that 32% of public health workers had experienced workplace violence from the public [7]. Some studies have also shown that adverse psychosocial work conditions and mental distress during the pandemic have led

Ming-Wei Lin: https://orcid.org/0000-0001-9539-8071; Yi-Ting Wang: https://orcid.org/0009-0004-1586-5784; Yawen Cheng: https://orcid.org/0000-0001-7112-8835
* Corresponding author. Institute of Health Policy and Management, College of Public Health, National Taiwan University, 17 Xu-Zhou Road, R617, Taipei, 11055, Taiwan.
E-mail address: ycheng@ntu.edu.tw (Y. Cheng).

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many public health workers to leave their jobs [8]. Yet, which types of psychosocial work hazards carried greater influence and whether the adverse experiences of adverse psychosocial work conditions during the pandemic persist in exerting influences on public health workers' mental health and intention to leave their jobs remain insufficiently investigated.

In Taiwan, public health agencies are divided into three administrative levels: central governmental agencies, departments of health of cities and counties, and health centers at the district and village levels. The official statistics from the Ministry of Health and Welfare show that there were 12,938 public health workers in 2021. Of them, 40% worked at central governmental agencies, 26% at city or county health departments, and 34% at local health centers. During the COVID-19 pandemic, the public health systems of Taiwan have exerted strong capabilities in disease control [9]. From the start of the pandemic in January 2020 and up until early December 2022, Taiwan implemented proactive and strict disease control measures, including travel restrictions, contact tracing, compulsory masking, body temperature monitoring, regular testing among certain occupational groups, and quarantine for infected individuals. Although there were controversies over the disease control policies being too restrictive and excessive, most people in Taiwan were cooperative and compliant. Unlike in some Western countries, no apparent confrontation against public health workers or health authorities was noticed in Taiwan. However, long working hours, heavy workloads, and burnout problems among frontline public health workers were evident.

To our knowledge, no study has been carried out to examine the work and mental health experiences of public health workers in Taiwan during the pandemic, and no study has investigated the long-term influences of adverse psychosocial work conditions on public health workers' mental health and job retention motivation. We conducted a cross-sectional survey among public health workers during the pandemic and a follow-up survey after 14 months when most of the disease control measures were relaxed. Psychosocial work characteristics during the pandemic were assessed with validated scales, including psychological job demands, job control, and workplace justice. Additionally, workers' experiences of workplace violence were investigated, specifically on its type and origins. Cross-sectional and longitudinal analyses were conducted to examine the associations of psychosocial work conditions with mental health risks and intention to leave the public sector among public health workers.

2. Materials and methods

2.1. Study design

We conducted an online survey from March 9 to March 16, 2022. At this time, Taiwan's public health system had been responding to the pandemic for more than two years, and strict disease control measures had continued to be implemented. Eligible participants for the initial survey were workers aged between 20 and 65 years and had worked at public health agencies for at least one year, including the Ministry of Health and Welfare, its subordinate agencies, public health departments of county and city governments, and district-level public health centers.

To recruit participants, we sent out a survey link through various channels, including personal networks, bulletin boards, and social media platforms of public health officers. Participants were informed of the purpose and details of this study before answering the questionnaire, and information on sociodemographic characteristics, types of work organizations, employment status, working conditions, self-rated health, and mental health status was obtained. Participants were also asked to provide their email addresses to receive a digital coupon as a token of appreciation for their participation. We sent out an invitation by email to the participants for a follow-up survey conducted from May 2 to May 14, 2023. The follow-up survey assessed participants' mental health status, employment changes, and intention to leave the job. For both surveys, data was collected anonymously through the SurveyCake platform. The study proposal was approved by the Research Ethics Committee of National Taiwan University (202112HS029).

2.2. Study participants

A total of 492 participants took part in the first survey and provided valid email addresses. They were all invited to participate in the follow-up survey, but 295 participants did not respond, and five responded but did not provide valid email addresses. This

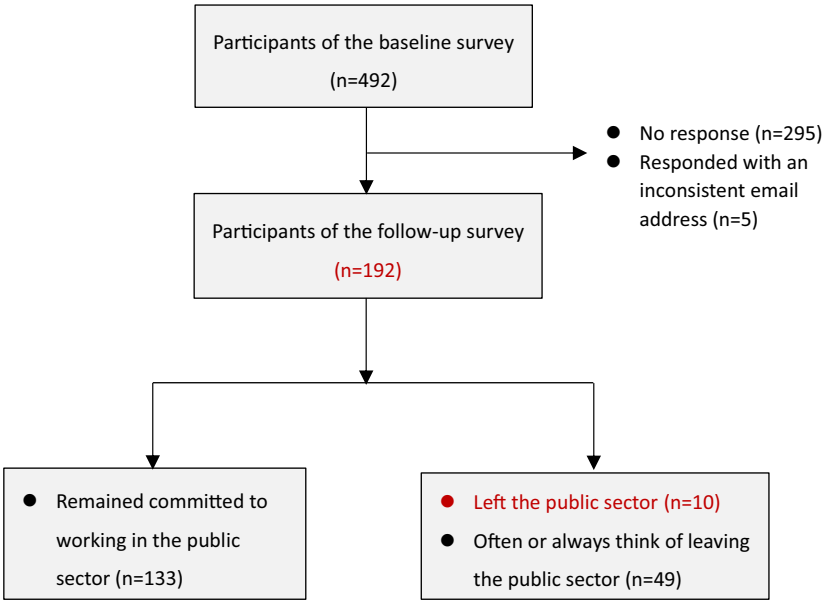

Fig. 1. Selection of study participants.

resulted in 192 participants (39.02%) being available for the follow-up study. The flow chart of the selection of study participants is depicted in Fig. 1.

2.3. Assessment of psychosocial work conditions

The Chinese version of the Job Content Questionnaire (C-JCQ), grounded in Karasek's Demand-Control model, was employed to assess psychosocial job demands and job control [10]. The scale of psychosocial job demands consisted of five items, namely fast work, hard work, work requiring concentration, hectic work, and insufficient manpower, and the scale of job control consisted of 7 items, including learning new things, non-repetitive work, creative work, work involving multiple tasks, developing one's abilities, having room for own decisions, and lots of say. Furthermore, the modified scale of workplace justice was adopted to assess workers' perception toward the manner of the management, including items on respect, information on major policies, work evaluation, work arrangement, reliable information, and trust [11]. All items were rated on a 4-point Likert scale, ranging from 1 (strongly disagree) to 4 (strongly agree). For each scale, a summarized score was calculated and further categorized into tertiles of low, medium, and high groups. The same classification method was used in previous studies [12,13]. The Cronbach's alpha coefficients of psychosocial job demands, job control, and workplace justice scales were 0.82, 0.68, and 0.90, respectively, indicating high internal reliability.

In this study, we assessed participants' encounters with workplace violence with a single-item question: in the past year, had you ever experienced any of the following four types of workplace violence, and examples were given for each type: physical violence (e.g., beating, kicking, pushing, pinching, pulling), verbal abuse (e.g., abusive language, verbal humiliation, yelling, cynical comments), psychological aggression (e.g., threats, intimidation, discrimination, exclusion, bullying), and sexual harassment (e.g., inappropriate sexual suggestiveness or behaviors). Participants were asked to report the types they believed they had experienced, and the responses were coded as either yes or no. The same question had been used in national working condition surveys in Taiwan [14], and a simpler version assessing three types of violence, i.e., physical, psychological, and sexual, was used in the global survey conducted by the International Labour Organization in 2021 [15]. Participants who had experienced any above-mentioned workplace violence were asked further to identify the most predominant source of violence from a list of possible choices, including supervisors, colleagues, subordinates, people they served or the general public, and workers of other government offices or institutions. The responses were classified into internal violence (encompassing supervisors, colleagues, or subordinates) and external violence (encompassing the public or workers of other institutions).

2.4. Assessment of mental health status

Mental health status was assessed using the 5-item Brief Symptom Rating Scale (BSRS-5), which captured psychological symptoms experienced over the past week [16,17]. The items included trouble sleeping, feeling tense or keyed up, feeling easily annoyed or irritated, feeling blue or sad, and feeling inferior to others. Each item was rated on a 5-point Likert scale ranging from 0 (not at all) to 4 (extremely). The scores of all the items were summed up to obtain a total score. The Cronbach's alpha coefficient for the BSRS-5 in this study was 0.86. This study used a cutoff point of $\geq$10 to define poor mental health, which was considered to have moderate to severe mental disorders based on previous studies [18]. In this study, we defined persistent poor mental health as having BSRS-5 scores $\geq$10 at baseline and in the follow-up survey.

Table 1
Characteristics of study participants of the baseline survey

	Total (n = 492)		Prevalence of poor mental health (BSRS ≧ 10) (n = 162)		p
	n/mean	(%)/SD	n	(%)	
All	492	(100)	162	(32.93)	
Sex					0.681
Male	107	(21.75)	37	(34.58)	
Female	385	(78.25)	125	(32.47)	
Age (years)					0.016
20–29	113	(22.97)	29	(25.66)	
30–39	253	(51.42)	97	(38.34)	
40–49	90	(18.29)	30	(33.33)	
50–65	36	(7.32)	6	(16.67)	
Level of agency					0.567
Central	191	(38.82)	67	(35.08)	
City or county	159	(32.32)	53	(33.33)	
District	142	(28.86)	42	(29.58)	
Working hours (week)	45.85	11.61			<.001***
≦40	141	(28.66)	34	(24.11)	
>40 ~ ≦48	174	(35.37)	48	(27.59)	
>48 ~ ≦60	154	(31.30)	67	(43.51)	
>60	23	(4.67)	13	(56.52)	
Psychosocial job demands					<.001***
Low	153	(31.10)	29	(18.95)	
Medium	194	(39.43)	58	(29.90)	
High	145	(29.47)	75	(51.72)	
Physical job demands					0.005**
Low	157	(31.91)	38	(24.20)	
High	335	(68.09)	124	(37.01)	
Job control					0.003**
High	181	(36.79)	45	(24.86)	
Medium	173	(35.16)	58	(33.53)	
Low	138	(28.05)	59	(42.75)	
Workplace justice					<.001***
High	185	(37.60)	38	(20.54)	
Medium	145	(29.47)	33	(22.76)	
Low	162	(32.93)	91	(56.17)	
Workplace violence: any type					<.001***
None	255	(51.83)	50	(19.61)	
Yes	237	(48.17)	112	(47.26)	
Workplace violence: verbal					<.001***
None	278	(56.50)	60	(21.58)	
External	90	(18.29)	39	(43.33)	
Internal	124	(25.20)	63	(50.81)	
Workplace violence: psychological					<.001***
None	336	(68.29)	73	(21.73)	
External	57	(11.59)	28	(49.12)	
Internal	99	(20.12)	61	(61.62)	
Self-rated health					<.001***
Good (fair, good, very good)	379	(77.03)	77	(20.32)	
Poor (poor, very good)	113	(22.97)	85	(75.22)	

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

2.5. Employment changes and intention to leave the job

In the follow-up survey, participants were asked to provide information on employment and position changes. Those who had left the public sector were identified, and those who remained in the public sector were asked further if they ever considered leaving the public sector. The responses were measured using a 5-point Likert scale ranging from 1 (never) to 5 (always), with responses of "often" or "always" indicating a positive intention to leave.

2.6. Analysis

Descriptive analyses were conducted, and the Chi-square test was employed to examine the differences in mental health risks and intention to leave the public sector across participants with

different work conditions. Multiple logistic regression was performed to identify factors influencing mental health risks and intention to leave. All analyses were performed using SAS 9.4.

3. Results

As shown in Table 1, study participants of the baseline survey were predominantly female (78.25%) and in their thirties (51.42%). Regarding the level of agency, 38.82% served in central agencies, 32.32% worked in the departments of health in the city or county governments, and 28.86% were employed in public health centers. The average working hours in the previous week were long (45.85 hours/week), with 71.34% exceeding 40 hours and 35.98% exceeding 48 hours.

Regarding workplace violence, 48.17% reported experiencing some form of workplace violence in the past year, with the verbal type being the most common (43.50%), followed by psychological violence (31.71%). The prevalence rates of physical and sexual violence were below 3% and thus were not presented in Table 1. Regarding the origin, as shown in Table 1, workplace violence of both verbal and psychological forms was more likely to come from the inside than from the outside. Of the participants who reported internal verbal violence, 70.97% experienced it from supervisors, and of the participants who reported psychological violence, 54.55% experienced it from supervisors (data not shown).

Concerning general health and mental health status, as high as 22.97% of participants rated their health as poor or very poor, and as high as 32.93% had a BSRS-5 score ≧ 10. Results of the bivariate analysis, also shown in Table 1, indicated that participants with long working hours, high psychological and physical job demands, low job control, low workplace justice, and experiences of workplace violence reported a higher prevalence of poor mental health.

Logistic regression analyses were conducted to evaluate the associations of psychosocial job demands, physical job demands, job control, workplace justice, and any workplace violence with poor mental health, as shown in Model 1 of Table 2. The results indicated that having high levels of psychosocial job demands (OR = 3.64, 95% CI = 1.93–6.87), low levels of workplace justice (OR = 2.58, 95% CI = 1.45–4.58), and experience of workplace violence in the past year (OR = 2.38, 95% CI = 1.51–3.77) were associated with significantly higher risks of mental disorders. In Model 2 of Table 2, we replaced the variable of any workplace violence with the two most dominant types, with their sources further specified. The results indicated that participants who experienced psychological violence coming from inside had significantly higher risks for poor mental health (OR = 2.84, 95% CI = 1.53–5.29).

Of the 192 participants who responded to the follow-up survey, 30.73% reported having poor mental health as defined by BSRS-5 score ≧ 10 at the time of the follow-up (data not shown in Table), 22.40% had poor mental health in both surveys and 30.73% (n = 49) often or always considered leaving or have left (n = 10) the public sector.

Distributions of participants with BSRS ≧ 10 at both baseline & follow-up and that of participants who had left or had the intention to leave the public sector at follow-up were examined across sex, age, and work-related factors (Table 3). Similar to the findings in the initial survey, participants with high psychological job demands, low workplace justice, and experiences of workplace violence reported a significantly higher prevalence of persistent poor mental health. Furthermore, participants with higher psychosocial job demands and lower workplace justice were more likely to consider leaving the public sector. The results of descriptive and bivariate analyses are presented in Table 3.

Table 2
Logistic regression models of poor mental health (BSRS-5 ≧ 10) in participants of the baseline survey

	Model 1 (n = 492)			Model 2 (n = 492)		
	OR	(95%CI)	p	OR	(95%CI)	p
Sex						
Male	1			1		
Female	0.82	(0.48, 1.38)	0.451	0.78	(0.46, 1.33)	0.357
Age						
20–29	1			1		
30–39	1.44	(0.83, 2.50)	0.196	1.38	(0.79, 2.41)	0.256
40–65	0.79	(0.41, 1.52)	0.476	0.74	(0.38, 1.45)	0.383
Psychosocial job demands						
Low	1			1		
Medium	1.81	(1.03, 3.19)	0.039*	1.74	(0.99, 3.08)	0.057
High	3.64	(1.93, 6.87)	<.001***	3.52	(1.84, 6.75)	<.001***
Physical job demands						
Low	1			1		
High	1.10	(0.65, 1.86)	0.734	1.12	(0.65, 1.91)	0.691
Job control						
High	1			1		
Medium	1.34	(0.79, 2.27)	0.283	1.31	(0.77, 2.25)	0.321
Low	1.39	(0.77, 2.49)	0.273	1.37	(0.76, 2.50)	0.300
Workplace justice						
High	1			1		
Medium	0.82	(0.47, 1.44)	0.495	0.82	(0.47, 1.45)	0.505
Low	2.58	(1.45, 4.58)	0.001**	2.14	(1.17, 3.90)	0.014*
Workplace violence: any type						
No	1			—	—	—
Yes	2.38	(1.51, 3.77)	<.001***	—	—	—
Workplace violence: verbal						
None	—	—	—	1		
External	—	—	—	1.26	(0.63, 2.54)	0.515
Internal	—	—	—	1.52	(0.83, 2.78)	0.178
Workplace violence: psychological						
None	—	—	—	1		
External	—	—	—	2.10	(0.95, 4.61)	0.066
Internal	—	—	—	2.84	(1.53, 5.29)	0.001**

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

Table 3
Distributions of participants with BSRS ≧ 10 at baseline & follow-up and that of participants who had left or had the intention to leave the public sector at follow-up across sex, age, and work-related factors ($n = 192$)

	Participants in the follow-up survey ($n = 192$)		BSRS ≧ 10 at baseline & follow-up ($n = 43$)		p	Intention to leave or already left ($n = 59$)		p
	n/mean	(%)/SD	n	(%)		n	(%)	
Total	192	(100)	43	(22.40)		59	(30.73)	
Sex					0.499			0.936
Male	43	(22.40)	8	(18.60)		13	(30.23)	
Female	149	(77.60)	35	(23.49)		46	(30.87)	
Age (yrs)					0.652			0.490
20–29	44	(22.92)	11	(25.00)		15	(34.09)	
30–39	109	(56.77)	26	(23.85)		36	(33.03)	
40–49	29	(15.10)	5	(17.24)		6	(20.69)	
0–65	10	(5.21)	1	(10.00)		2	(20.00)	
Levels of agency					0.830			0.408
Central	71	(36.98)	16	(22.54)		18	(25.35)	
City or county	70	(36.46)	17	(24.29)		25	(35.71)	
District	51	(26.56)	10	(19.61)		16	(31.37)	
Working hours (week)					0.618			0.420
≦40	56	(29.17)	11	(19.64)		16	(28.57)	
40 ~ ≦48	66	(34.38)	13	(19.70)		17	(25.76)	
48 ~ ≦60	64	(33.33)	17	(26.56)		23	(35.94)	
>60	6	(3.13)	2	(33.33)		3	(50.00)	
Psychological job demands					<.001***			0.006**
Low	50	(26.04)	7	(14.00)		8	(16.00)	
Medium	86	(44.79)	13	(15.12)		26	(30.23)	
High	56	(29.17)	23	(41.07)		25	(44.64)	
Physical job demands					0.162			0.059
Low	71	(36.98)	12	(16.90)		16	(22.54)	
High	121	(63.02)	31	(25.62)		43	(35.54)	
Job control					0.343			0.272
High	67	(34.90)	11	(16.42)		17	(25.37)	
Medium	65	(33.85)	17	(26.15)		19	(29.23)	
Low	60	(31.25)	15	(25.00)		23	(38.33)	
Workplace justice					0.007**			0.046*
High	61	(31.77)	8	(13.11)		16	(26.23)	
Medium	58	(30.21)	10	(17.24)		13	(22.41)	
Low	73	(38.02)	25	(34.25)		30	(41.10)	
Workplace violence: any type					0.003**			0.050*
None	92	(47.92)	12	(13.04)		22	(23.91)	
Yes	100	(52.08)	31	(31.00)		37	(37.00)	
Workplace violence: verbal					0.012*			0.350
None	105	(54.69)	15	(14.29)		28	(26.67)	
External	36	(18.75)	11	(30.56)		14	(38.89)	
Internal	51	(26.56)	17	(33.33)		17	(33.33)	
Workplace violence: psychological					0.011*			0.039*
None	126	(65.63)	20	(15.87)		31	(24.60)	
External	23	(11.98)	8	(34.78)		10	(43.48)	
Internal	43	(22.40)	15	(34.88)		18	(41.86)	

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.
p values were calculated based on Chi-square tests, except for categories that have numbers of observations fewer than 5. For the latter, p values are calculated based on Fisher exact tests.

In the subset of participants who participated in the follow-up survey, logistic regression analyses, as shown in Table 4, indicated that high levels of psychosocial job demands (OR = 4.85, 95% CI = 1.33–17.73) and having experienced workplace violence (OR = 2.85, 95% CI = 1.23–6.59) were associated with significantly higher risks of persistent poor mental health, and high levels of psychological job demands (OR = 4.22, 95% CI = 1.31–13.55) were associated with a significantly higher risk of intention to leave the public sector.

4. Discussion

While the public health sectors of Taiwan acted swiftly and effectively in pandemic control efforts, our study showed that as high as 32.93% of public health workers had poor mental health, as defined by BSRS-5 score ≧ 10. Additionally, our findings revealed an alarmingly high prevalence of workplace violence – as high as 48% of surveyed public health workers had experienced workplace violence over the past year. In sharp contrast, with the same assessment tools, a national survey of representative employees conducted by the Ministry of Labor of Taiwan in 2016 showed that the prevalence rates of poor mental health were 3.79% and 5.19% in male and female employees, and the prevalence rates of verbal and psychological workplace violence in employees of both genders were 8.57% and 4.20%, respectively. To our surprise, in our survey, participants experiencing internal violence appeared to outnumber those experiencing workplace violence coming from the public.

Our findings of high mental health risks and high prevalence rates of workplace violence echoed that of previous studies [1–6]. Although direct comparisons should be made with caution, our findings suggest that public health workers in Taiwan were at a greater risk for workplace violence than their counterparts in other countries. For instance, an online survey of 26,174 US public health workers during the pandemic indicated that 32% had experienced any type or combination of workplace violence that encompassed discrimination, bullying, harassment, and job-related threats [5,7]. Furthermore, our findings indicated that public health workers in Taiwan appeared to experience more internal workplace violence

Table 4
Logistic regression models of persistent poor mental health and intention to leave or already left the public sector

	BSRS ≧ 10 at baseline & follow-up ($n = 192$)			Intention to leave or already left ($n = 192$)		
	OR	(95%CI)	p	OR	(95%CI)	p
Sex						
Male	1			1		
Female	1.14	(0.42, 3.13)	0.799	0.82	(0.36, 1.91)	0.651
Age						
20–29	1			1		
30–39	0.53	(0.20, 1.37)	0.187	0.68	(0.30, 1.55)	0.356
40–65	0.26	(0.08, 0.91)	0.035*	0.33	(0.11, 0.98)	0.046*
Psychosocial job demands						
Low	1			1		
Medium	1.06	(0.35, 3.19)	0.918	2.48	(0.93, 6.58)	0.069
High	4.85	(1.33, 17.73)	0.017*	4.22	(1.31, 13.55)	0.016*
Physical job demands						
Low	1			1		
High	0.86	(0.32, 2.33)	0.772	1.19	(0.52, 2.74)	0.682
Job control						
High	1			1		
Medium	2.36	(0.86, 6.48)	0.095	1.42	(0.60, 3.37)	0.423
Low	1.61	(0.57, 4.53)	0.367	1.92	(0.80, 4.61)	0.145
Workplace justice						
High	1			1		
Medium	0.92	(0.31, 2.73)	0.880	0.68	(0.28, 1.66)	0.398
Low	1.33	(0.43, 4.15)	0.622	1.21	(0.47, 3.11)	0.700
Workplace violence: any type						
No	1			1		
Yes	2.85	(1.23, 6.59)	0.015*	1.63	(0.80, 3.31)	0.176

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

than external workplace violence. This unexpected finding deserves further investigation. We suspect that a hierarchical command system embedded in the disease control system and a long-existing bureaucratic culture shared in the public sector may play some roles in the occurrence of internal workplace violence.

Our findings that heavy workloads and workplace violence, especially psychological violence coming from the inside, carried significant influences on workers' mental health risks were similar to that found in previous studies in nurses [19–21]. In this study, poor mental health observed among public health workers during the COVID-19 pandemic could be attributed to tremendous workloads and stressful work conditions imposed by the disease control policies of COVID-19. Nevertheless, while mental health improvement was expected after the COVID-19 pandemic because workloads should have been greatly reduced, our findings indicated that 22.4% continued having poor mental health, underscoring persistent mental health challenges in this work sector. Similar findings can be found in previous studies. For instance, Lee et al tracked the changes in stress levels among healthcare providers who had experienced the SARS epidemic of 2003 and found a persistently higher risk for mental health problems one year after the outbreak [22], and a recent follow-up study demonstrated the long-lasting mental health impacts of the COVID-19 pandemic among health professionals [23]. Similar to healthcare providers, our findings suggested that adverse workplace experiences and immense psychological strain experienced during the pandemic might continue to impact the mental well-being of public health workers. Qualitative research is also needed to understand better the nature, origins, and contextual factors driving workplace violence. These findings underscore the urgent need for in-depth investigation and intervention efforts to support frontline workers in both the healthcare and public health sectors.

It is alarming to find a high proportion of public health workers often or always considering leaving the public sector even in the post-pandemic period. Our findings that heavy psychological job demands were associated with an increased intention to leave align with previous research, mainly in the nursing career [24], highlighting the role of work-related stressors in shaping workers' career intentions. However, contrary to previous research [25], we did not find a significant association between the experience of workplace violence and intention to leave the job. A small sample size could explain this discrepancy. Future research is needed to understand the reasons for public health workers stay or leave the profession.

This study has several limitations. First, because study participants were recruited online on a self-referral basis, the representativeness of the study population is questionable. The directions of self-selection bias were uncertain. While it's possible that individuals enduring unfavorable work conditions and aspiring for improvements might have been more motivated to participate, it's equally plausible that those grappling with adverse work conditions, particularly high workloads, could have faced difficulties in joining the study due to time limitations. We assessed the representativeness of our study population by comparing the distributions of work organizations and sociodemographic characteristics of our study participants with those of general public health workers. It revealed that in our study, public health workers were slightly younger than the general public health workers, and those from the City and County level were slightly over-representative but those from the local health centers were slightly under-representative. Nevertheless, the distributions of gender and education levels were similar to the public health workforce.

Secondly, it is possible that individuals with severe mental illness may have left their positions, leading to an underestimation of mental health problems in the study sample. Thirdly, only a small proportion of initial participants (192 out of 492; 39.02%) responded to our invitation for the follow-up survey. Although the follow-up subgroup shared similar distributions to the initial group in terms of age, sex, level of agency, and most of the work characteristics, self-selection bias is still possible, which would limit the representativeness of our findings.

Lastly, the fact that the recruitment process relied on participants' email addresses, which might have changed or closed off due to job changes, might pose another limitation to this study. However, after reviewing all the email addresses, we found that only 24 out of the total 492 participants had used their official emails to respond to our invitation. In other words, this problem existed but its impacts should be minor.

Despite the limitations mentioned above, this study still provides valuable insights into the psychosocial work conditions of public health workers in Taiwan and their concurrent and long-term impacts on workers' mental well-being and career intentions during and after the COVID-19 pandemic. Our findings underscore the pressing need for workplace interventions among public health workers of Taiwan and elsewhere to tackle heavy psychological job demands, widespread workplace violence, especially from the inside, and alarmingly high prevalence of mental health problems.

Statement

During the preparation of this work the authors did not use AI-assisted technology.

Conflicts of interest

The authors have no conflicts of interest to report for this article.

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