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Original Article

Burnout prevalence and its associating factors among Malaysian healthcare workers during COVID-19 pandemic: An embedded mixed-method study.

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Abstract: Coronavirus Disease 2019 (COVID-19) has become a global health threat and has placed an extraordinary demand for healthcare workers around the world. In this study, we aim to examine the prevalence of burnout, its associating factors, and experience among Malaysian healthcare workers through an embedded mixed-method study design. We found that more than half of Malaysian health care workers in this sample experienced burnout. Direct involvement in COVID-19 screening or treatment, having a medical condition, and less psychological support in the workplace emerged to be the significant factors for personal-, work- and patient-related burnout. Participants described workload, uncertainties from the pandemic, challenged work-family balance and stretched workplace relationships as the sources of burnout. Exhaustion appeared to be the major symptom and many participants utilized problem-focused coping to deal with the adversities experienced during the pandemic. Participants reported physical, occupational, psychological, and social-related negative impacts emanating from burnout. As the pandemic trajectory is yet unknown, the findings provide early insight and guidance for possible interventions.

Keywords: psychological wellbeing; burnout; health personnel; caregiver; pandemic

1. Introduction

In late December 2019, an increasing number of patients with pneumonia of unknown aetiology were seen in Wuhan, China. The causative virus was later identified as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and this novel pneumonia is called Coronavirus Disease 2019 (COVID-19) (1). It immediately became a global public health threat due to its stronger infectivity even in the incubation period (2). With the rapid increase of cases reported outside China, the World Health Organization (WHO) declared the COVID-19 outbreak as a pandemic on 11th March 2020 (3). On 18th October 2020, 39.8 million people have been infected with COVID-19 with more than 1.11 million deaths reported worldwide.

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The high transmissibility of the virus without the presence of vaccines can severely stretch the health care workers (HCW) (4). On top of facing a higher risk of infection from patient care (5), lack of personal protective equipment (PPE), HCW also fear transmitting the infection to their families and struggle with guilt about patients and family members (6). During the previous SARS outbreak in 2003, stress was observed in 57% of a sample of HCW (7). In the COVID-19 pandemic, studies had shown higher anxiety levels among Chinese HCW as compared to the general population (8–10). About 42.5% of Thai HCW were identified to have at least mild anxiety symptoms (11). Another study revealed that 64.7%, 51.6%, and 41.2% of Turkish HCW had symptoms of depression, anxiety, and stress, respectively (12).

While several studies had outlined the prevalence of depression, anxiety, and stress, less is known on HCW burnout. Burnout can be defined as a syndrome resulting from chronic workplace stress that has not been successfully managed. Burnout is not synonymous with fatigue, stress or depression, and affect helping professions such as the health care workers. It is characterized by energy depletion or emotional exhaustion, negativism related to one's job, and reduced professional efficacy (13,14). Previous research linked burnout to various personal and patient care impacts such as decrease professionalism, empathy, patient safety, teamwork, and increase medical error and attrition (15–17). While a high prevalence of burnout was seen among HCW post-natural disasters (18,19), we postulated a similar occurrence in the pandemic setting. Burnout can result from increased work demand and decreased job resources along with value conflicts (20), and this link is further magnified during COVID-19. Burnout can also emanates from disproportionately huge effort and low satisfaction, making the most dedicated HCW vulnerable especially in the pandemic times (14).

In Malaysia, the health care system increased its COVID-19 preparedness since 6th January 2020 where screening and surveillance measures were strengthened. The first case was detected on 24th January 2020 and the Restriction of Movement Order (RMO) was put in place on 18th March 2020 (15). As of 16th December 2020, 86618 cases were detected with 422 deaths reported in the country. With the increasing trend of the confirmed cases, HCW continues to serve the country in the various roles of surveillance, screening, diagnosis, and treatment. Thus, we aim to examine the burnout prevalence and its association with demographic characteristics among Malaysian HCW and explore their burnout experience during the COVID-19 pandemic in an embedded mixed-method study. We hypothesized that burnout prevalence is high among HCW and factors such as direct involvement with COVID-19, being young, having a medical condition, being single, having no children or having inadequate child care support, inadequate psychological support in the workplace, and irregular spiritual routines were associated with a higher risk of developing burnout.

2. Materials and Methods

Participants

Using snowball sampling, we invited Malaysian assistant medical officers, doctors, health inspectors, hospital food preparation personnel, medical laboratory technologists, nurses, paramedics, pharmacists, physicians, physiotherapists, dieticians, therapists, psychologists, counsellors, radiographers, and social workers from public and private health care services to enrol in this study. The required sample size for the study with 9 predictors, anticipated effect size of 0.02 and 30% of non-response rate were 1126 (21).

Instrument

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The questionnaire package included socio-demographic questions and the Copenhagen Burnout Inventory (CBI). The demographic questions included workplace setting, involvement with COVID-19 patients, working hours, age, marital status, number of children, availability of child care at home, medical condition, perceived psychological support at workplace, and spirituality routines.

The CBI is an instrument to measure occupational burnout with excellent psychometric properties and is available in the public domain. It has three dimensions that are personal-related (6 items), work-related (7 items), and patient-related burnout (6 items). Each item was rated on a scale of always/to a very high degree (100), often/to a high degree (75), sometimes/somewhat (50), seldom/to a low degree (25) and never/to a very low degree (0) (22). CBI has also been validated in pandemic context with Cronbach coefficient alpha of 0.94 (23). For this study, we used the Malay translated CBI (CBI-M) where it has been validated with Cronbach coefficient alpha of 0.83 to 0.87 (24). We calculated the average scores for each dimension where the average score of 50% or above is treated as burnout (25).

As burnout phenomenon in pandemic context is less understood, we undertook a mixed method approach to capture the participants burnout experience in COVID-19. Through mixed-method embedded design and descriptive phenomenological approach, the HCW experience serve as a supportive finding to explain the main quantitative data from the questionnaire (26,27). We invited participants that were categorized as burnout from their CBI responses to answer four open-ended questions. We piloted the questions to ensure that it was able to capture the intended research questions. The final questions were as below:

1. What caused burnout in yourself?
2. What were the burnout symptoms that you experienced?
3. How did you try to cope with the symptoms?
4. How did the symptoms affect your work or your life (if any)?

Data collection

In line with the RMO, we conducted the study online using Google Form from 21st April 2020 till 20th May 2020. During the beginning of the data collection, Malaysia was in its third month of facing COVID-19 and under the second phase of RMO. We sent the invitation link through the Ministry of Health official website and HCW related Non-Governmental Organisations Facebook pages. In the informed consent, we explained to the participants on the anonymity and confidentiality of the data. There were no monetary incentives given but the participants were given an option to know their burnout level and several helplines were provided to them.

Data analysis

We analysed the quantitative component using SPSS version 24. We applied descriptive statistics to examine personal-, work-, and patient-related burnout prevalence. We performed simple and multiple logistic regression for all independent variables (except for the category of HCW and workplace setting) to investigate a significant relationship between dimensions of burnout. We presented both crude and adjusted odds ratios along with 95% confidence interval (CI) and *p-value*. In order to evaluate for nonresponse bias, we also compared the prevalence for the first 50% versus the last 50% participants who enrolled in the study.

As for the qualitative data, we analysed the data using thematic analysis in computer-assisted software, Atlas.Ti version 7.9. NSR open-coded and organized the coding into themes. MSBY reviewed the coding and themes and their agreement was generally

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concordant. In order to enhance the trustworthiness of the findings, we also used data sources triangulation and code-recode procedures during the data analysis process (28).

3. Results

3.1 Participants characteristics

A total of 933 HCW completed the online instruments with a response rate of 82.9%. We excluded 40 entries due to incomplete quantitative responses or duplicates. The demographic characteristics of the participants were summarized in Table 1. The highest participation was from doctors, social workers, and assistant medical officers. Majority of the participants worked in government hospitals, had indirect involvement with COVID-19 patients, worked 60 hours or more weekly, aged less than 40 years old, married, had children, had adequate child care support at home, had no medical condition, perceived that they received adequate psychological support at work and practiced regular spiritual routine.

Table 1. Demographic characteristics of the HCW enrolled in the study (n = 893).

Demographic characteristics	***n* (%)**
Healthcare workers categories	
Doctor	203 (22.7)
Social worker	128 (14.3)
Assistant medical officer	120 (13.4)
Medical laboratory technologist	99 (11.1)
Hospital food preparation personnel	88 (9.9)
Physiotherapist / Dietician / Therapist	69 (7.7)
Nurse	47 (5.3)
Radiographer	41 (4.6)
Pharmacist	40 (4.5)
Paramedic	25 (2.8)
Health inspector / Public health assistant	22 (2.5)
Psychologist / Counsellor	11 (1.2)
Workplace setting	
Government hospitals	607 (68.0)
Health Clinics	134 (15.0)
District Health Offices	52 (5.8)
Medical Laboratories	39 (4.4)
Private hospitals	35 (3.9)
Private Clinics	26 (2.9)
Involvement with COVID 19 pandemic	
Direct (Treating/Screening)	406 (45.5)
Indirect	487 (54.5)
Working hours in COVID 19 pandemic	
Less than 60 hours per week	257 (28.8)
60 hours per week or more	636 (71.2)
Age	
Less than 40 years	682 (76.4)
40 years and above	211 (23.6)
Marital status	
Single	274 (30.7)
Married	619 (69.3)
No of children	

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No	337 (37.7)
Yes	556 (62.3)
Child care support at home during COVID 19 pandemic	402 (45.0)
Had child at home with adequate support	152 (17.0)
Had child at home with inadequate support	
Medical condition	
Nil	708 (79.3)
Yes	185 (20.7)
Perceived psychosocial support at the workplace	622 (69.7)
Adequate	271 (30.3)
Inadequate	
Spirituality routines	
Regular	757 (84.8)
Irregular	136 (15.2)

3.2 Prevalence of HCW burnout in COVID-19 setting

The overall prevalence of personal-, work-, and patient-related burnout in this sample of Malaysian HCW was 53.8%, 39.1%, and 17.4% respectively. There were no significant difference all three burnout prevalence between the first 50% versus last 50% of the participants. Personal-related burnout was highest among HCW in district health officers, work-related burnout was highest among HCW in medical laboratories and patient-related burnout was highest among HCW in private clinics. Participants who were directly involved in screening or treating COVID-19 patients, aged less than 40 years, married, had no children, had inadequate child care support at home, had a medical condition, perceived that they received inadequate psychosocial support at work or had irregular spiritual routines were found to be more burnout in all three dimensions of CBI (Table 2).

Table 2. Prevalence of burnout during the COVID-19 pandemic based on participants' characteristics (n = 893).

Demographic characteristics	Personal-related burnout *n* (%)	Work-related burnout *n* (%)	Patient-related burnout *n* (%)
Healthcare workers categories			
Overall	480 (53.8)	349 (39.1)	155 (17.4)
Doctor	129 (63.5)	104 (51.2)	54 (26.6)
Social worker	44 (34.4)	22 (17.2)	10 (7.8)
Assistant medical officer	74 (61.7)	51 (42.5)	32 (26.7)
Medical laboratory technologist	65 (65.7)	53 (53.5)	15 (15.2)
Hospital food preparation personnel	34 (39.1)	17 (19.5)	2 (2.3)
Physiotherapist / Dietician / Therapist	27 (39.1)	18 (26.1)	8 (11.6)
Nurse	26 (55.3)	21 (44.7)	7 (14.9)
Radiographer	23 (56.1)	17 (41.5)	8 (19.5)
Pharmacist	31 (77.5)	21 (52.5)	8 (20.0)
Paramedic	10 (40.0)	9 (36.0)	7 (28.0)
Health inspector / Public health assistant	14 (63.6)	14 (63.6)	3 (13.6)
Psychologist / Counsellor	3 (27.3)	2 (18.2)	1 (9.1)
Workplace setting			
Government hospitals	318 (52.4)	230 (37.9)	105 (17.3)
Health Clinics	73 (54.5)	49 (36.6)	25 (18.7)

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District Health Offices	33 (63.5)	26 (50.0)	9 (17.3)
Medical Laboratories	22 (56.4)	20 (51.3)	3 (7.7)
Private hospitals	13 (50.0)	9 (34.6)	6 (23.1)
Private Clinics	21 (60.0)	15 (42.9)	7 (20.0)
Involvement with COVID 19 pandemic			
Direct (Treating/Screening)	255 (62.8)	197 (48.5)	100 (24.6)
Indirect	225 (46.2)	152 (31.2)	55 (11.3)
Working hours in COVID 19 pandemic			
Less than 60 hours per week	176 (68.5)	151 (58.8)	65 (25.3)
60 hours per week or more	304 (47.8)	298 (31.1)	90 (14.2)
Age			
Less than 40 years	396 (58.1)	292 (42.8)	138 (20.2)
40 years and above	84 (39.8)	57 (27.0)	17 (8.1)
Marital status			
Single	160 (58.4)	127 (46.4)	61 (22.3)
Married	320 (51.7)	222 (35.9)	94 (15.2)
No of children			
No	201 (59.6)	155 (46.0)	76 (22.6)
Yes	279 (50.2)	194 (34.9)	79 (14.2)
Child care support at home during COVID 19 pandemic			
Had child at home (adequate support)	172 (42.8)	109 (27.1)	42 (10.4)
Had child at home (inadequate support)	107 (70.4)	85 (55.9)	37 (24.3)
Medical condition			
Nil	351 (49.6)	252 (35.6)	110 (15.5)
Yes	129 (69.7)	97 (52.4)	45 (24.3)
Perceived psychosocial support at the work-place	256 (41.2)	158 (25.4)	64 (10.3)
Adequate	224 (82.7)	191 (70.5)	91 (33.6)
Inadequate			
Spirituality routines			
Regular	394 (52.0)	276 (36.5)	122 (16.1)
Irregular	86 (63.2)	73 (53.7)	33 (24.3)

3.3 Demographic associations with burnout

Significant demographic associations with personal-, work-, and patient-related burnout were shown in Table 3 and Table 4. At the univariate level, we found that younger age, being single, no children, medical condition, long hours, inadequate child care support at home, inadequate self-perceived psychosocial support at work, and irregular spirituality routines were significantly associated with all dimensions of burnout. At multivariate level, younger age, direct involvement with COVID-19 patients, long hours, medical condition, inadequate self-perceived psychological support at work, and inadequate child care support were significantly associated with personal-related burnout. Direct involvement with COVID-19 patients, long hours, medical condition, adequate self-perceived psychological support at work, inadequate child care support, and irregular spirituality routines were significantly associated with work-related burnout. Younger age, direct involvement with COVID-19 patients, medical condition, and inadequate self-perceived psychological support at work were significantly associated with patient-related burnout.

Table 3. Significant associations between demographic characteristics and burnout using simple logistic regression (n = 893).

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Burnout dimension and demographic characteristics	Crude odds ratio (95% CI)	p-values
Personal-related burnout		
Age: Less than 40 years old	2.09 (1.53-2.87)	<0.001
Relationship status: Single	1.31 (0.98-1.75)	0.064
Children: None	1.47 (1.12-1.93)	0.006
Suffering from some medical illness	2.34 (1.66-3.31)	<0.001
Direct involvement with COVID-19	1.97 (1.50-2.57)	<0.001
Work more than 60 hours per week	2.37 (1.75-3.22)	<0.001
Child support at home: Inadequate	2.35 (1.61-3.42)	<0.001
Perceived psychosocial support received at work: Inadequate	6.81 (4.79-9.70)	<0.001
Spirituality routines: Irregular	1.59 (1.09-2.31)	0.017
Work-related burnout		
Age: Less than 40 years old	2.02 (1.44-2.84)	<0.001
Relationship status: Single	1.55 (1.16-2.06)	0.003
Children: None	1.59 (1.21-2.10)	0.001
Suffering from some medical illness	2.00 (1.44-2.77)	<0.001
Direct involvement with COVID-19	2.08 (1.58-2.73)	<0.001
Work more than 60 hours per week	3.15 (2.34-4.25)	<0.001
Child support at home: Inadequate	2.29 (1.61-3.27)	<0.001
Perceived psychosocial support received at work: Inadequate	7.01 (5.11-9.63)	<0.001
Spirituality routines: Irregular	2.02 (1.40-2.92)	<0.001
Patient-related burnout		
Age: Less than 40 years old	2.90 (1.70-4.92)	<0.001
Relationship status: Single	1.60 (1.12-2.29)	0.010
Children: None	1.76 (1.24-2.49)	0.002
Suffering from some medical illness	1.75 (1.18-2.59)	0.005
Direct involvement with COVID-19	2.57 (1.79-3.68)	<0.001
Work more than 60 hours per week	2.05 (1.43-2.94)	<0.001
Perceived psychosocial support received at work: Inadequate	4.41 (3.07-6.33)	<0.001
Child support at home: Inadequate	1.70 (1.12-2.58)	0.013
Spirituality routines: Irregular	1.67 (1.08-2.58)	0.022

* Only statistically significant (p-value <0.05) characteristics were shown in the table.
* 95% CI: 95% confidence interval

Table 4. Significant associations between demographic characteristics and burnout using multiple logistic regression (n = 893).

Burnout dimension and demographic characteristics	Nagelkerke R^2	Adjusted odds ratio (95% CI)	p-values
Personal-related burnout	0.288		
Age: Less than 40 years old		1.55 (1.05-2.27)	0.027
Suffering from some medical illness		2.78 (1.87-4.13)	<0.001
Direct involvement with COVID-19		1.60 (1.17-2.18)	0.003
Work more than 60 hours per week		1.82 (1.29-2.58)	0.001
Perceived psychosocial support received at work: Inadequate		5.50 (3.80-7.97)	<0.001

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Child support at home: Inadequate		1.87 (1.19-2.95)	0.007
Work-related burnout	0.338		
Suffering from some medical illness		2.31 (1.56-3.42)	<0.001
Direct involvement with COVID-19		1.68 (1.22-2.32)	0.002
Work more than 60 hours per week		2.65 (1.87-3.75)	<0.001
Child support at home: Inadequate		1.92 (1.22-3.02)	0.005
Perceived psychosocial support received at work: Inadequate		5.81 (4.12-8.19)	<0.001
Spirituality routines: Irregular		1.94 (1.26-2.99)	0.003
Patient-related burnout	0.200		
Age: Less than 40 years old		1.86 (1.03-3.39)	0.041
Suffering from some medical illness		1.85 (1.20-2.86)	0.006
Direct involvement with COVID-19		2.21 (1.50-3.26)	<0.001
Perceived psychosocial support received at work: Inadequate		3.49 (2.38-5.13)	<0.001

* Only statistically significant (p-value <0.05) characteristics were shown in the table.
* 95% CI: 95% confidence interval

3.4 Qualitative findings

3.4.1 Sources of burnout

72.7% HCW with a high burnout score responded to the open-ended questions. Through thematic analysis, we found the most described sources of burnout were workload (long hours, working with extra precaution measures, team dynamic disruptions, the diffuse impact of pandemic, and bureaucracy matters). Some participants also described uncertainties from the pandemic (unpredictability of pandemic course, frequent SOP and role changes, quarantine, and disruption in career plan), challenged work-family balance (disruption of work-family balance, confinement impact to family, fear of transmitting COVID-19 to family, and financial loss) and stretched workplace relationship (superiors, colleagues, and patients) as contributors to their burnout (Table 5).

Table 5. Common self-reported causes of burnout in HCW.

Theme	Coding	Quotations
Workload	Working longer than usual hours	"I am involved in setting up the quarantine and low risk treatment centre, and I've been working until late. Once I reached home, I just bed down. At this stage there are many unexpected things - those big number of late night admissions, working late night...you just need to prepare for all kind of possibilities." (P811, Dietician)

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	Working with extra precaution measures	"The fatigue is constant. We need to stand for three to four hours in full PPE while handling samples." (P119, Lab technologist)
	Affect team dynamic that previously functioned well	"Some staffs were reallocated to screening and emergency team, some had to undergo quarantine and the loads just keep increasing." (P49, Assistant medical officer)
	Affect every healthcare worker, including outside COVID-19 centre	"Even I am not in a COVID-19 treatment centre, our hospital receives more patients with other complaints. The load become unbearable with small number of manpower." (P871, Medical intern)
	Bureaucracy matters	"There are loads of paper works to be done especially towards the end of the month. I have to sleep less to get them over and done with." (P740, Nurse)
Uncertainty from pandemic	Unpredictability of the pandemic course	"I'm scared that the pandemic will last until next year. The leave is frozen and I can't go back to my hometown. I just hope this feeling will not escalate to depression." (P744, Pharmacist)
	Frequent SOP changes	"I need to brainstorm on ways to regulate the staffs, especially front liners. The constant change of SOP does affect the service. It is also tiresome to keep briefing the staffs." (P104, Assistant medical officer)
	Frequent change of roles	"I am currently reallocated in the medical department. It is uncertain how long will I be in this department. Someday, I have to work in the screening area, someday in COVID-19 ward and other places." (P22, Medical resident) "I feel anxious to handle Patient Under Investigation admissions in the quarantine centre. I have to deal both with my current role (in quarantine centre) and my original job scope that is sanitary water inspection and sampling. I feel this is physically and emotionally taxing." (P813, Health inspector)
	Quarantine	"I've become more burnout after becoming Patient Under Investigation myself. I was quarantined after being exposed to a COVID-19 patient in clinic." (P2, General practitioner)
	Own plan change	"My wedding and master's program registration needed to be postponed due to COVID-19." (P746, Medical resident)
Challenged work-family balance	Affecting previous work-family dynamic	"My children are taken care by my elderly parents at home. They are all bored and the house is in wreck as they are 24 hours at home. I wanted to help with the chores but I came back from work completely tired." (P874, Medical resident)
	Confinement impact	"I feel so burnt out as I couldn't visit my family who resides in other state." (P99, Assistant medical officer)

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	Fear to pass virus to family members	"I find this emotionally exhaustive, I feel so stressed as I fear to be infected with this deadly virus. I feel that I have risk myself and my family to treat other patients." (P275, Assistant medical officer)
	Financial loss	"My husband salary were cut. I let out my anger to my three year old toddler and the stress keeps building up." (P229, Lab technologist)
Stretched workplace relationship	Superiors	"I needed to work on the same data entry six times just for a patient. You could just extract the information from the system but our new specialist insists to do it the old-fashioned way. I just think it's not wise to do that when you are working in a hospital with full IT access." (P866, Medical resident) "I got severe headaches and feeling frustrated as I was frequently scolded from my superiors. The superiors were also tired and let off the steam to us." (P872, Medical intern)
	Colleagues	"I have to answer the WhatsApp on work-related even after working hours. I am always pressured by the doctors. The other technologists seem to not understand their role and gave the burden to me." (P801, Lab technologist)
	Patients attitude	"In this pandemic times, I got so tired when patients come to the hospital without the right indication. Some patients came for trivial complaints. And the interns ordered wrong films too." (P421, Radiographer) "Some patients did not declare that they had close contacts with COVID-19 patients. And when I knew about it, I continuously feel anxious. I feel scared that I could spread the virus. I hope there will be a proper mechanism to fine patients who give wrong information, so they will be more transparent." (P480, Radiographer)

3.4.2 Burnout symptoms

The most reported symptoms were overwhelming exhaustion (emotional, physical, and frustration). HCW also described symptoms of cynicism (distant attitude towards work and making callous comments on patients) and reduced professional accomplishment (loss of enthusiasm, feeling underperforming, and low self-esteem) (Table 6).

Table 6. Common self-reported symptoms of burnout in HCW.

Theme	Coding	Quotations
Exhaustion	Emotional exhaustion	"It's more of emotional exhaustion rather than physical." (P820, Pharmacist) "Exhausted mentally, and sometimes this leads to physical exhaustion as well." (P531, Medical intern)
	Physical exhaustion	"I'm just too tired even to think." (P617, Lab technologist)

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		"I feel like crawling to my car when work finishes. It feels like the hospital and my house are so far away (than it is)."(P231, Lab technologist) "I sometimes don't drive home because I was just too tired and I slept in the on call room instead." (P167, Specialist doctor) "Working for a day sometimes feels like a week because we are tired physically and mentally. It might appear easy but donning PPE takes time and we wear them for so long." (P153, Lab technologist)
	Frustration	"Mentally exhausted, as we need to care for other person and their well-being, while we have our own struggle at home with these home schooling (due to COVID-19). Both of us are working, kids need to be sent to their grandparents, homework keep coming through those WhatsApp group everyday leaving us feeling even more hopeless. I cannot help but feel very guilty to the kids." (P244, Specialist doctor)
Cynicism	Distant attitude towards work	"The first sign for me was fatigue, then feeling weary, I just go like, "Another mass sampling!". Third, I become demotivated, numb and work just to finish them (rather than wholeheartedly). Only God understand the fatigue." (P894, Assistant medical officer) "...I don't think this (working in COVID-19) is worth it." (P277, Medical resident) "I have to work from 8am to 5pm while other people can enjoy their quarantine at home." (P191, Lab technologist) "I am easily angry over my job and there was once I nearly punch someone." (P719, Health inspector)
	Callous comments about patients or others	"I am so resentful of those patients who seems disgusted by the front liners wearing PPE." (P333, Paramedic) "I feel sick hearing COVID-19 word. Every patients use COVID-19 as excuses. I just feel like telling people off when they say that word." (P742, Pharmacist)
Reduce personal accomplishment	Loss of enthusiasm or work purpose	"I've lost motivation to continue my usual work." (P861, Allied health worker) "I've no motivation to come to work almost every morning as the annual leave is frozen. The patient load is huge and the workforce is barely adequate." (P605, Pharmacist)
	Feeling underperforming	"Exhausted and not productive at work." (P540, Hospital food preparation personnel) "I feel tired and sleepy after working only half day through. I have no energy to work in the evening." (P794, Pharmacist) "I feel numb and lack of motivation at the morning. I don't feel prepared mentally to start work since the job scope changes during COVID-19."

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		(P811, Social worker)
	Low self-esteem	"I just feel giving up on everything." (P447, Lab technologist) "I feel hopeless and useless for the past 3 weeks, life is just work." (P18, Medical resident)

3.4.3 Coping with burnout

The most described coping among HCW was problem-focused coping (active and planning), followed by positive thinking coping (positive reinterpretation, acceptance, and humour). Participants also utilized support seeking to cope including emotional, instrumental, and spiritual support. The least mentioned coping was maladaptive coping that were self-distraction, behavioural disengagement, venting, and substance abuse (Table 7).

Table 7. Common self-reported coping strategies among burnt-out HCW.

Theme	Coding	Quotations
Problem-focused coping	Active coping	"I arranged myself for counselling session and psychiatric assessment" (P842, Specialist doctor) "I take intermittent break and do some light exercises when I feel exhausted or drenched in sweats from wearing PPE for hours to handle diagnostic tests." (P155, Lab technologist) "Teamwork, sharing the load with your teammates, and getting the support from the management keep me going. I stayed at the accommodation centre provided by the ministry." (P811, Dietician)
	Planning	"There's a lot on my mind every time I wake up. My body feels heavy. Sometimes I had decision-paralysis. But I try to set up realistic aims and 'just do it'." (P854, Pharmacist)
Positive thinking coping	Positive reinterpretation	"Just stay strong and remind myself that the public needs me" (P85, Assistant medical officer) "...just try to think positive. Sometimes when you got stressed up, I sing or dance a bit, as long as I feel positive. I also ask for help when necessary. My team is the best." (P153, Lab technologist)
	Acceptance	"Accept the situation wholeheartedly, put my reliance to God and keep moving forward." (P894, Assistant medical officer) "I just come to work and return home when work is done. I have to keep going as this is what I do for a living." (P118, Lab technologist)
	Humour	"I try to crack some jokes." (P283, Social worker)

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Seeking social support	Emotional support	"I shared my feelings with 90% of my colleagues who are also burnt out." (P866, Medical resident) "I shared what happened during the day to my spouse." (P197, Assistant medical officer)
	Instrumental support	"I talk about it to my colleagues, share some experience, because it is not an individual problem so we help out each other." (P153, Lab technologist)
	Spirituality	"I keep praying to Allah that this will be over soon." (P71, Assistant medical officer) "I recite the Quran to find some peace." (P356, Social worker)
Maladaptive coping	Self-distraction	"I tried to find other source of happiness to forget about work stress. Those stress will be gone for a while but I still be troubled about the workload there and then." (P519, Medical intern)
	Venting	"I JUST VENT MY ANGER AT HOME." (P726, Medical resident) "Sometimes I accidentally take it out on patients, but if I am too frustrated or angry I just take it out on them. It might taint the image of healthcare worker but some patients are rude too." (P533, Medical resident)
	Behavioural disengagement	"I just asked my housemen to do all (the duties)." (P476, Medical resident) "I kind of ignore the stress." (P890, Assistant medical officer)
	Substance abuse	"I take alcohol after work (to ease the stress)." (P848, Assistant medical officer)

3.4.4. Impact

The impact can be generally categorized into occupational, physical, psychological, and social. The most described impact was physical (headaches, muscular pain, sleep disturbance, ailments, palpitations, appetite loss, and near accidents). Participants also reported occupational impacts such as lack of focus, loss of enthusiasm, and low productivity. Described psychological impacts included irritability, anger outburst, and anxiety symptoms, while social impacts included affected family relationships and quality of life. Some participants observed no impact from their burnout in any of these categories.

Table 8. Common self-reported burnout impact in HCW.

Theme	Coding	Quotations
Occupational	Lack of focus	"The burnout takes away my focus at work especially when dealing with fussy patients." (P589, Assistant medical officer) "This burnout does affect my concentration and decision making ability." (P400, Specialist doctor) "I did not realize that I drive to a different health clinic because I was sleepy. I was working long hours till late night and needed to

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		response to WhatsApp messages to make sure the supplies are adequate." (P195, Pharmacist)
	Loss of enthusiasm	"I feel like not coming out from my car to work." (P75, Allied health member) "I feel less motivated to give my best to the patients." (P241, Medical resident) "I feel less prepared psychologically especially when starting the duties at the morning. The MCO had many sports and recreational outlets closed, when I need them to reduce the work stress." (P811, Social worker)
	Lack of productivity	"Yes, I am not productive as I used to. I cannot continue my postgraduate revision due to exhaustion." (P634, Medical resident) "Day by day I was not able to give the quality of work expected from me." (P781, Assistant medical officer)
	Affecting professional relationship with patients	"These burnout sometimes affect our communication with patients." (P426, Paramedic)
	Affecting professionalism	"I tend to find excuses to be absent from work." (P676, Medical resident)
	Escape fantasies	"There is not much in terms of personal life quality. I always sit down and think how do I run away from all these." (P210, Lab technologist) "I feel like quitting and thinking about just staying at home." (P361, Radiographer)
	Sick leave	"I have to take a lot of sick leave from physical illness resulting from burnout." (P608, Assistant medical officer)
Physical	Headaches	"My body is exhausted, I got frequent headaches as my mind is focusing hard on the never-ending job." (P862, Lab technologist)
	Muscular pain	"I got muscle aches at my back, shoulders and neck." (P111, Medical resident)
	Sleep disturbance	"Every time I got home, I fall asleep easily and frequently awake at night. The sleep quality is bad." (P203, Assistant medical officer) "In this pandemic time, it's really hard to fall asleep and wake up at the morning to work. I had panic attacks at nights and was awake several times because of palpitation." (P587, Pharmacist)
	Ailments	"I had frequent episodes of upper respiratory tract infection." (P781, Assistant medical officer) "My blood pressure and heart rate went up many times." (P174, Lab technologist)

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	Palpitations	"I always get palpitations and difficulty sleeping at night. I am scared that I might have done some mistakes, I feel worthless." (P676, Medical resident)
	Loss of appetite	"I have lost appetite, feel down and less happy." (P640, Assistant medical officer)
	Near / Multi vehicle accidents	"I got so exhausted and involved with an accident. My car crashed into three other cars due to microsleep. Thank God, both of my children were unhurt." (P761, Medical resident)
Psychological	Irritability	"I become easily angry and irritable while waiting for my own COVID-19 test result. I am worried for my family if I am infected. I seem to lose my passion in this career." (P598, General practitioner) "I came back from work with unstable emotion and everything is not right. I lashed it out to my innocent children." (P520, Hospital food preparation personnel)
	Anger outburst	"I am easily enraged over small mistakes by the interns during ward round." (P63, Specialist doctor) "I had more fights with family members and coworkers." (P846, Medical resident)
	Anxiety symptoms	"I get chest pain episodes since COVID-19 started. It just happened when I kept thinking about work or schedules." (P154, Lab technologist) "Every time I get sore throat, tired or runny nose, I think it is COVID-19. The anxiety is real." (P210, Lab technologist) "I work in fear. I came to work thinking all of worst possibilities. After work, I disinfect all of my belongings just to prevent possible transmission." (P424, Pharmacist) "I get exhausted mostly from frequent PPE changes when attending patients. I am tired mentally. I am worried that I could spread the virus that I had to distract myself from those thinking. I avoid socializing with my family because of this worry." (P677, Medical intern)
	Extreme guilt	"Mentally exhausted, as we need to care for other person and their well-being...kids need to be sent to their grandparents... I cannot help but feel very guilty to the kids." (P132, Specialist doctor)
	Feeling worthless	"I feel useless and aimless." (P588, Nurse)
Social	Family relationship	"This (pandemic) made things very difficult for me and my partner." (P601, Medical resident)

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		"I fell asleep as soon as I reached home. I've lost the time with my wife and kids." (P632, Lab technologist)
	Life quality	"I've spent all my energy at work and I have barely any time to do anything else I like doing." (P597, Nurse) "I cannot do any social activities or going back to my family during the break. I just lay down and unable to wake up even to have proper meal." (P800, Lab technologist)
No impact	Coping well	"It didn't affect me much. I am used to this." (P165, Medical intern) "I started to feel those burnout symptoms towards the end of the week but I find them manageable." (P197, Allied health member) "There is no obvious signs that it impact my work quality. We are used to on-call and overtime so that helps us to adapt to the pandemic." (P719, Lab technologist)

4. Discussion

To our knowledge, this is among the few studies that looks into the impact of COVID-19 pandemic on HCW from a mixed-method perspective. Our quantitative findings indicate that more than half of Malaysian HCW in this sample experienced burnout. The finding was similar to the studies done on Singapore HCW (49.2%), and Indian HCW (44.6%) (29,30), and lower than the prevalence obtained from the United Kingdom HCW (79%) (31). Through use of the Maslach Burnout Inventory, other studies revealed similar prevalence - Spanish HCW (15%-82%), Romanian residents (76%), Italian HCW (25%-53%), Wuhan HCW (13%-61%) and Japan (31.4%) (32–36). While studies comparing burnout occurrence among types of HCW and workplace settings is limited, we found that health inspectors and HCW in medical laboratories had the highest prevalence of work-related burnout. On top of their regular job scopes, health inspectors were heavily involved with COVID-19 contact tracing, screening, and decontamination processes (37). HCW in medical laboratories needed to keep up as the country upgraded its COVID-19 diagnostic capacity by 86% (38). A study in Japan revealed that laboratory medical personnel was 6.1 times more likely to develop burnout as compared to physicians during COVID-19 (36).

Our findings corroborate a previous study in China which revealed higher anxiety in HCW who had direct involvement with COVID-19 (39). In contrast, studies conducted among Wuhan and Romanian HCW showed lower burnout occurrence in HCW working in front lines (32,34). Consistent with other studies, HCW working more than 60 hours per week has been shown to have higher burnout scores. Long hours is associated with prolonged contact, prolonged PPE wearing and sleep deprivation, and this may accentuate burnout development (9).

In terms of personal demographics, younger HCW were at higher risk to develop burnout and similar findings were found in studies conducted in the United Kingdom, Spain, Turkey, and Japan (12,31,33,36). This is consistent with previous research on burnout dynamics that suggested organizational newcomers are more prone to develop burnout when work demands outpace their resources to cope (40). Married HCW and having children were associated with decreased odds of developing burnout and these are consistent with studies measuring depression, anxiety, and stress on HCW in COVID-19 (12,41). Family may function as social support for HCW and strong social support was linked to lower risk of burnout (42). Although it was not described in previous studies, we found that inadequate child care support during COVID-19 increased the odds of developing

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burnout. Long hours and unpredictable schedules can further stretch HCW during the pandemic whereby they could not find child care support (43).

Through multivariate regression analysis, we found that having a medical condition and inadequate perceived psychological support at the workplace increased the odds of developing burnout. The medical condition might predispose HCW more to exhaustion. While a study in Turkey found no association between having a medical condition and psychological distress in pandemic (12), a study in United Kingdom HCW revealed a significant association between background illness and burnout (31). HCW who receives adequate psychological support at work have the outlet to discuss their experiences, concerns, and emotions, and various studies have shown its association with HCW psychological wellbeing during COVID-19 (4,9,12,31).

Spiritual intelligence was found to positively impact work performance among Malaysian nurses and deemed as an important quality to cope with stressful work demand (44). While the relationship between spiritual practices and HCW burnout in pandemic context has not yet been established, our data support previous findings where spiritual practices were found to correlate negatively with burnout (45). Spiritual practices provide a source of comfort and hope in adversities and are increasingly recognized as an important resource in addressing burnout (46).

Our qualitative findings can be categorized into sources of burnout, burnout symptoms, coping strategies, and impact. While sources of burnout among HCW are less described in the literature, we found that the themes (workload, uncertainty from the pandemic, challenged work-family balance and stretched work relationship) were partially similar and also unique when compared to the stressors experienced by general employee contexts (safety, infobesity, quarantine, stigma and job insecurity) (47). As compared to the general public who were mostly in quarantine, HCW struggled with workload and work-family balance as they were providing patient care. HCW also faced additional strain as they had to wear PPE and fear of transmitting the virus to their family when returning home. As for the symptoms, in line with the long trajectory of COVID-19, our findings accord with studies that showed exhaustion as the major symptoms experienced by burnt-out HCW, followed by cynicism and reduced personal accomplishment (32,33).

Despite the challenges faced in pandemic times, many burnt-out HCW described problem-focused, positive thinking, and support seeking to cope as compared to maladaptive coping. This parallels the study in New York which found that most HCW engaged in physical activities, support groups, and spiritual practices as part of the stress-reduction activities (48). Positive thinking or optimism has been found to reduce stress and exhaustion among HCW in Turkey during COVID-19 (49). However, similar to a study by Chor et al. (2020), some HCW resorted to maladaptive coping, coping skills intervention may play some role in addressing burnout among HCW (50). Many HCW described physical impacts followed by occupational, psychological, and social impacts and this seems to be consistent with a study in Italy that reported irritability, appetite change, sleep disturbance, muscle tension and exaggeration reactions as major perceived impact among its HCW (35). These findings strongly indicate that 'wellbeing support' to HCW during the pandemic is critical and vital to ensure their wellbeing – well HCW, well society!

Our study has a number of limitations. First, the sample size was relatively small compared to the actual HCW population in Malaysia. However, we found no significant prevalence differences between the first 50% and last 50% participants scores which could suggest low nonresponse bias in the sample (51). Second, the non-probability sampling used in this study limit its generalisability to a larger context. Third, the findings came from cross-sectional and qualitative study design, and is not causal-effect. Fourth, as burnout and socio-demographic variables were captured from self-reported instrument, there might be a possibility of reporting bias. However, the findings offers an early insight on HCW burnout in Malaysian context and some guidance for possible interventions. As COVID-19 trajectory is yet unknown, longitudinal studies on burnout intervention and wellbeing measures for HCW are desirable.

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