


ORIGINAL ARTICLE

Concerns and psychological well-being of healthcare workers during the COVID-19 pandemic in a tertiary care hospital in New South Wales

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COVID-19 pandemic, mental health, healthcare worker, psychological well-being, personal protective equipment.

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Abstract**Background:** In early 2020, the impending COVID-19 pandemic placed a once-in-a-generation professional and personal challenge on healthcare workers. Publications on direct physical disease abound. The authors wanted to focus on doctors' psychological well-being.**Aims:** To assess the impact of the COVID-19 pandemic on doctors' well-being and evaluate their concerns as the pandemic progressed.**Methods:** A mixed-methods, hospital-based survey was sent to doctors at the 650-bed tertiary referral hospital in NSW at two different periods (late-March and early May 2020). A validated mental well-being tool (Short Warwick Edinburgh Mental Well-being Scale (SWEMWBS)) was combined with COVID-19-specific questions.**Results:** Two hundred and thirty-five responses were obtained from 450 doctors, with a response rate of 32% in the first survey and 20% in the second. The majority (35%) of respondents were doctors-in-training, followed by staff-specialists (23%). The highest response was from frontline workers in both surveys, including the intensive care unit (27%), anaesthesia (21%) and emergency department (13%). 'Extreme concern' regarding personal protective equipment (PPE) shortage dropped from 22.6% to 2.2% and 'extreme concern' of contracting COVID-19 fell from 22.6% to 3.4% in the second survey. The proportion of respondents with a 'low' psychological well-being score improved from 38% to 27% between the two surveys. The resulting mean improvement in the SWEMWBS was 3.49 (95% confidence interval = 3.06–3.91, $P < 0.001$).**Conclusion:** Both COVID-19 specific concerns and psychological well-being improved greatly in the second survey. Possible explanations are the fall in COVID-19 cases in the district, improvements in PPE supply and supportive measures communicated to doctors during this period.**Introduction**

The COVID-19 pandemic has overwhelmed health and social systems worldwide with widespread political and economic ramifications. On healthcare workers (HCW), this pandemic has placed an enormous physical and psychological strain. Being at the front line of the COVID-19 outbreak response and preparedness, HCW

are not only vulnerable to COVID-19 infection more than the general population but also are attempting to provide the best care to their patients.^{1–3}

They face fears of contracting COVID-19 and passing it onto their loved ones, shortages of personal protective equipment, inadequate support as an individual and a HCW.^{4,5} Junior doctors also have concerns about this pandemic halting their education and adding to their training requirements.^{6,7} Additional challenges are faced by frontline doctors who provide services in the hospital emergency departments, COVID-19 and respiratory

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wards, intensive care units (ICU) and the laboratory while handling potentially infectious COVID-19 material, they are trying to adjust to an entirely new working environment. These fears may contribute to these healthcare workers' mental burden and can be a perfect recipe for moral injury.⁸

Hospitals have had to alter their workflow substantially to diagnose and treat patients efficiently while protecting their HCW' physical and mental health. The key priority areas recognised by the healthcare systems during the current pandemic, both in Australia and internationally, are: maintaining the well-being of HCW during the pandemic by developing a robust mental health support system; enhancing communications for delivery of current and reliable information; providing personal protective equipment (PPE) training and accessibility to HCW and minimising the interruption of their training and education.^{9,10}

We aimed to address this topic by evaluating the concerns of our doctors and the impact of this pandemic on their mental health.

Methods

The setting was a 650-bed tertiary referral university teaching hospital in NSW, Australia. Approval from the clinical research ethics committee was received before the initiation of this study (authorisation number AU202004-01).

Study design

Nested mixed-methods,¹¹ hospital-based survey with a predominantly quantitative design. The questionnaire responses were quantified by dichotomous and Likert 5-point rating scales. For the nested qualitative part of the study, we used open-ended questions.

The survey was distributed through SurveyMonkey to hospital medical staff at two different periods. The first stage of the survey was sent at the height of the pandemic's first wave in late March to early May 2020. During this period, the total confirmed cases of COVID-19 in the Hunter New England exceeded 278, including nine admitted patients across the local health district and workflow was escalated to 'Tier-2' of the pandemic preparedness response. During this time, lockdowns of all but essential services were in place in the community. The second stage of the survey was sent when there were no admitted cases in the hospital, no community cases in the Hunter New England and workflow was de-escalated to 'Tier-1'. The pandemic preparedness/COVID-19 coordination risk matrix used in Hunter New England Local Health District included six tiers for a step-wise response, corresponding to the seriousness of the

pandemic locally. 'Tier-1' was activated when there were no confirmed COVID-19 admitted cases, inpatient workflow was normal, but outpatient clinics mainly were run by telephone or telehealth. 'Tier-2' of the COVID-19 coordination matrix meant to be activated if the confirmed COVID-19 inpatient cases were more than three, ward-based teams were established and redeployment of junior medical staff was done.

We selected priority areas for the survey based on the perceived challenges that HCW face during a pandemic and their potential psychological impacts and chose to focus on the following areas: Concerns about PPE training and shortages, the transmission of the virus to self and family, the effect on postgraduate training and teaching, impact on mental well-being and their recommendations about the best method of support and communication from the employer. Hence, we included 32 questions in our survey (see Supporting Information Appendix for the survey questions). We co-designed the survey questions in collaboration with the Chair of 'Well-being Group' and Clinical Superintendent of John Hunter Hospital.

The Short Warwick Edinburgh Mental Well-being Scale (SWEMWBS), a validated 7-question tool for assessing a population's mental well-being (non-commercial licence registration ID: 521664129), was incorporated into the questionnaire.^{12,13} We also formulated COVID-19 specific questions to assess anxiety, adequacy of sleep, fears about transmitting the infection to self and family. For capturing the participants' suggestions on maximising the employer's role and an effective mode of information/communication, we used open-ended qualitative questions enabling the content of the recommendations to be participant-led.

The survey link was sent to around 450 doctors randomly at the John Hunter Hospital through their hospital emails. Participants were allowed to terminate the survey at any time they desired. The survey was anonymous, and participants were assured of the confidentiality of the information they provided.

Statistical analysis

Downloadable Excel templates from the Warwick Medical School website were used to process the SWEMWBS. Each respondent score was entered for each question as a numerical value between 1 (none of the time) and 5 (all of the time). The score was then converted to a final score using the conversion table for SWEMWBS. According to the final score, the well-being score was categorised as 'low' well-being where the total score was less than 20, 'moderate' for 20–27 and 'high' for greater than 27. Descriptive statistics, including the median and inter-quartile range for non-normally distributed values of

the well-being score at each time period, were calculated. Some participants answered the questionnaire in both time periods producing paired data, while others only answered in one period producing unpaired data. A mixed linear model with a fixed effect for the 'change' in the final score between the first and second time period and a random effect on each individual was fitted to deal with this mixture of paired and unpaired data. The model was fitted in Stata 15.1 statistical software, which used maximum likelihood to compute *P*-values and confidence intervals (CI).¹⁴ Our COVID-19 specific non-validated well-being questions were analysed using the same methods based on the ordinal 5-point Likert scale answers.

Results

Participants

Four hundred and fifty doctors at the John Hunter Hospital were asked to participate in this study. In total, 235 out of 450 doctors responded to the survey at least once, 146 out of 235 responded to the first survey and 89 to the second survey, and 79 to both surveys. The response rate was 32% in the first survey and 20% in the second survey.

Demographic characteristics

Of the respondents, 57.5% were female, and 42.5% were male. The majority of the respondents were doctors in training/trainee registrars (35% in both surveys), followed by staff specialists (23% vs 37%). We had the highest response from frontline workers in both surveys, including doctors from the ICU, 27% in the first survey and 20% in the second survey. During the first survey, when we had ward-based teams, 25% of respondents were deployed in the dedicated COVID-19 ward (10% in the COVID-19-orange zone and 15% in the COVID-19 red-zone) (Table 1).

Personal protective equipment-related questions

Most respondents, 86.9% in the first survey and 95.5% in the second survey, confirmed they had received face to face training for donning and doffing of PPE. On where and how to access the PPE (N95 masks, surgical masks, gloves, gowns and safety goggles), 73.9% stated yes in the first survey, and 85.4% stated yes in the second survey. A majority, 78.0%, were confident about proper donning and doffing in the first survey and 85.4% in the second survey.

In regards to the concerns about the potential PPE shortages, 22.6% of respondents were extremely

Table 1 Respondents' demographics (*n* = 235)

	First survey (<i>n</i> = 146/235)	Second survey (<i>n</i> = 89/235)
	<i>n</i> (%)	<i>n</i> (%)
Gender		
Females	84 (57.5)	51 (57.3)
Males	62 (42.5)	38 (42.7)
Position		
Staff specialists	34 (23.3)	33 (37.1)
Registrars (doctors in training)	51 (34.9)	30 (33.7)
Junior medical officers (PGY 2 and 3)	44 (30.2)	12 (13.5)
Interns (PGY 1)	17 (11.6)	5 (5.6)
Medical students [§]	0 (0)	9 (10.1)
Current deployment area		
Emergency department	19 (13.1)	12 (13.5)
Anaesthesia	18 (12.3)	14 (15.7)
ICU	27 (18.5)	26 (29.2)
Ward based	39 (26.7)	0 (0)
COVID-19 ward red-zone [†]	16 (14.8)	N/A
COVID-19 ward orange-zone [‡]	11 (10.2)	N/A
Non-COVID-19 ward	81 (75.0)	N/A
Speciality based	38 (26.0)	32 (35.9)
Laboratory	5 (3.4)	5 (5.6)

[†]COVID-19 ward red-zone was a ward where confirmed cases of COVID-19 were admitted.

[‡]COVID-19 ward orange zone was a ward where suspected cases of COVID-19 were admitted who were waiting for test results.

[§]In the first survey, due to the first wave of COVID-19, clinical placements for the medical students were suspended and recommenced during the second survey.

ICU, intensive care unit.

concerned in the first survey when we were at the height of the first wave, as compared to only 2.2% extremely concerned in the second survey.

Employer provided adequate information on the epidemiology, diagnosis and management of COVID-19 cases

Overall, 93.2% of respondents in the first survey and 98.8% of respondents in the second survey agreed that their employer provided them with adequate information on the epidemiology, diagnosis and management of the COVID-19.

Concern about contracting the virus through work

In the first survey, 22.6% were extremely concerned about the risk of contracting COVID-19 through their work compared to only 3.4% extremely concerned in

the second survey to acquire COVID-19 through their work.

Regarding transmitting the virus to family members, 35.6% were extremely concerned in the first survey compared to 8.9% extremely concerned in the second survey (Table 2).

Effect of COVID-19 on training

The trainee registrars were overall more concerned about the impact of COVID-19 on their training in the first survey (Table 3).

Impact on doctors' well-being

There was a highly significant improvement in doctors' mental well-being between the two survey periods. Measured on a validated scale (SWEMWBS), mental well-being increased from a median of 18.6 out of 35 up to 23.2 in the 79 respondents who answered both surveys. Interestingly, the 67 respondents who only answered the first survey began with a higher median well-being score of 25. When combined in our statistical model, the estimated mean improvement in well-being between the two survey periods was 3.49 (95% CI = 3.06–3.91, $P < 0.001$) (Table 4; see Supporting Information for detailed SWEMWBS).

For the non-validated well-being questions score, a negative change was seen in the second survey compared with the first survey, indicating an improvement in well-being (-5.53, 95% CI = -6.58 to -4.07, $P < 0.001$). The higher score meant more concerned or anxious; therefore, the negative change indicated improvement (Table 2).

In the first survey, 41.8% of respondents stated that they did not have an adequate sleep, compared with 21.3% of respondents in the second survey.

Also, 23.3% of doctors declared they did not feel supported as HCW and as individuals in the first survey, compared with only 5.6% in the second survey.

Seeking support

A majority of respondents, 72.6% in the first survey and 64.0% in the second survey, stated that they would contact peers to receive support if feeling anxious or concerned. Fifty-one (21.7%) respondents ticked the 'other' option and commented that they would seek support from their families and friends.

More than 50% did not know how to access the employee assistance programme.

Table 2 Non-validated well-being questions

	Likert 5-rating scale					Change	P value	95% Confidence interval (CI)
	Extremely concerned	Moderately concerned	Somewhat concerned	Slightly concerned	Not at all concerned			
I am concerned about contracting COVID-19 through my work?	33 (22.6%)	43 (29.4%)	34 (23.3%)	31 (21.2%)	5 (3.4%)	-1.12	<0.001	-1.38 to -0.86
I am concerned about transmitting the virus to my family?	3 (3.4%)	12 (13.5%)	17 (19.1%)	40 (44.9%)	17 (19.1%)	-0.909	<0.001	-1.25 to -0.569
I am concerned that the current COVID-19 situation is impacting on my personal well-being?	8 (8.9%)	18 (20.2%)	22 (24.7%)	25 (28.1%)	16 (17.9%)	-0.787	<0.001	-1.05 to -0.524
I am concerned that COVID-19 is affecting my ability to care for my family as I did before the pandemic?	19 (13.1%)	38 (26.0%)	38 (26.0%)	37 (25.3%)	14 (9.6%)	-0.74	<0.001	-1.07 to -0.41
I feel anxious about the current COVID-19 situation?	1 (1.1%)	13 (14.6%)	21 (23.6%)	30 (33.7%)	24 (26.9%)			
	22 (15.1%)	27 (18.5%)	32 (21.9%)	36 (24.6%)	29 (19.8%)			
	3 (3.4%)	12 (13.5%)	16 (17.9%)	19 (21.3%)	39 (43.8%)			
	Extremely anxious	Moderately anxious	Somewhat anxious	Slightly anxious	Not at all anxious			
	12 (8.2%)	55 (37.7%)	38 (26.0%)	31 (21.2%)	10 (6.8%)	-1.01	<0.001	-1.26 to -0.754
	0 (0.0%)	9 (10.1%)	21 (23.6%)	36 (40.2%)	23 (25.8%)			

Table 3 Effect of COVID-19 on post-graduate training and teaching

Respondents	Survey 1 (March 2020) (n = 51)	Survey 2 (May 2020) (n = 30)
	n (%)	n (%)
Impact of COVID-19 on postgraduate training		
Extremely concerned	13 (25.5)	5 (16.6)
Moderately concerned	13 (25.5)	6 (20.0)
Somewhat concerned	10 (19.6)	3 (10.0)
Slightly concerned	7 (13.7)	8 (26.7)
Not at all concerned	8 (15.7)	8 (26.7)
Concerns about the reduction in access to educational supervision		
Extremely concerned	8 (15.7)	4 (13.3)
Moderately concerned	17 (33.3)	4 (13.3)
Somewhat concerned	8 (15.7)	6 (20.0)
Slightly concerned	8 (15.7)	11 (36.7)
Not at all concerned	10 (19.6)	5 (16.7)

Table 4 SWEMWBS scores and distribution

	Survey 1	Survey 2
Total number of responses	146	89
% of low well-being	38	27
% of moderate well-being	55	65
% of high well-being	7	8
Median score	22.4	23.2
Interquartile range	7	5
Total SWEMWBS score change	3.49 (95% CI = 3.06–3.91, P < 0.001)	

CI, confidence interval; SWEMWBS, Short Warwick Edinburgh Mental Well-being Scale.

Recommendations about the best method of support and communication from the employer

A majority of the participants suggested that the best method of support from the employer was to continue providing updates on pandemic planning, including transparency regarding PPE shortages and procurement.

In regards to the best mode of communication by the employer, a majority (80%) preferred email.

Analysis of staff specialists versus junior medical officers responses

In both surveys, most (83.6% in the first survey and 51.7% in the second survey) of the respondents were junior medical officers (JMO).

Overall, the staff specialists were more concerned in both surveys than the JMO. The staff specialists were

extremely concerned as compared to the JMO about contracting the virus from work (22% vs 11%), transmitting it to their families (36% vs 16%), impact on their well-being (11% vs 8%) and were more anxious (7% vs 5%).

Discussion

This is the first study to examine the impact of the COVID-19 pandemic on the well-being of HCWs in the Hunter New England, NSW. Our study captured the concerns of HCW during the first peak and early post-peak period. This study demonstrated profound variations of responses across the first and the second survey. During the height of the first wave, most respondents were concerned about potential PPE shortages, acquiring the virus and transmitting to their loved ones and were also more worried about the impact of the current pandemic on their teaching and training.

Interestingly, staff specialists were more concerned and anxious than the JMO in both surveys, which can be attributed to their greater responsibilities and the challenges they face. They are expected to be vital in decision-making about their patients and managing staff and resources under times of great stress. Conversely, should these senior HCW become infected, the ramifications could be significant.

Overall, well-being was low during the first survey with associated more anxiety and feelings of less support. In the second survey, levels of concern and stress were lower and overall well-being was higher. These striking findings can be attributed to falling in community prevalence of COVID-19 over the course of this study, increasing familiarity with the COVID-19 situation, reinstatement of normal hospital workflow during the second survey and growing support from the organisation. The following practical measures were introduced by our organisation between the first and the second survey: area-wide webinars to provide up-to-date information on both the local situation and safety and management protocols; establishment of supportive forums in which HCW at all levels could express their concerns and support each other such as the 'Well-being' group. Additionally, the hospital training resources were diverted to specific training on PPE and infection control. Finally, rounding by senior staff, including management, would reassure HCW that they were being supported.

Indeed, this pandemic's actual physical and psychological toll on frontline providers is yet to be fully realised and likely will not be for years to come. But data coming from the hardest-hit countries, such as Italy, Spain, the USA and the UK, indicate how this pandemic is affecting the well-being of HCW.^{15–17} In these countries, HCW

have been required to work under stressful conditions to manage ever-increasing numbers of confirmed and suspected cases without PPE, make difficult decisions involving ethical implications and grieve over the deaths of fellow clinicians. HCW on the front lines in those countries equate battling COVID-19 to facing a world war. An Italian cross sectional study reported substantial proportion of mental health issues in their frontline HCW, particularly younger females.¹⁸ A study from Singapore showed that HCW caring for patients with COVID-19 reported anxiety, depression and stress.¹⁹ At the early stages of the COVID-19 pandemic, a Wuhan study found that 34.4% of medical and nursing staff had mild mental health disturbances while 6.2% had severe disturbances, while in another study of 1521 Chinese HCW 14.1% had psychological abnormalities.^{20,21} Increasing work demands on healthcare professional conflict with their duties to family and friends, which causes psychological stress.

Although, we are lucky that in Australia, the enormity of COVID-19 cases is nothing comparable to Europe, the USA and the UK as we have far fewer cases and associated mortality and were spared from heavy losses compared to many high-income countries. With the timely essential lockdowns and social distancing measures, we were able to curtail the first wave. But, from the daunting experiences of our fellow doctors from the hardest-hit countries and now with the emergence of the second COVID-19 wave in Australia, our HCW are anticipating the unflinching stressors that necessitate the rapid development and scaling up of a robust model of well-being support for them.²² A recent Australian study explored the concerns of HCW from multiple states during the COVID-19 pandemic and found that deficiencies in work health and safety, PPE and workplace culture have resulted in a loss of psychological and physical safety of HCW at work associated with an occupational moral injury.⁸ Another study showed that Australian nurses and midwives had significantly higher level of anxiety, depression and stress during the pandemic than the general Australian adult population.²³

Our study has several limitations. First, it is a single-centre study that only targeted the medical staff but not other HCW in the hospital, potentially missing different experiences and perspectives across the network. Also, the response rate was 32% in the first survey and 20% in the second survey, hence the composition of respondents

differed in the two time periods, with a higher proportion of staff specialists in the second time period. Given the differences in responses of junior doctors versus staff specialists, one might expect this to confound comparisons of the two time periods. However, this would be expected artefactually to increase measures of mental distress in the second time period, whereas this actually decreased; second some analyses were paired (i.e. analysed answers from the same individual in the two time periods) and third, the use of a mixed-effects model with time period as a variable and individual as a random effect would have adjusted for this difference. We designed this survey as mixed-methods research with primarily closed-ended questions requiring quantitative responses. Therefore, we could not explore in-depth the reactions and opinions of our respondents. Furthermore, there was an over-representation of the frontline workers in both surveys, who possibly had greater concerns about the COVID-19 pandemic and responded to the surveys more than the non-frontline workers, potentially leading to response bias. Another limitation of the survey results, in general, is that they may not be as valid as results obtained using other data collection methods.

Conclusion

The COVID-19 pandemic has imposed a significant level of impact on the psychological well-being of HCW. Although done on a small scale, this study is generalisable to other healthcare organisations within Australia. It can inform potential foci for the research priorities to improve well-being amongst HCW and devise policies that can support them during this challenging time and address these concerns. Healthcare organisations should focus on supportive conversations, clear guidance when recommendations exist, attempts to minimise misinformation and efforts to reduce anxiety.^{24,25}

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Supporting Information

Additional supporting information may be found in the online version of this article at the publisher's web-site:

Appendix S1: Short Warwick Edinburgh Mental Well-being Scale.