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## Psychological distress during the COVID-19 pandemic amongst anaesthesiologists and nurses

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Editor—The 2019 novel coronavirus disease (COVID-19) pandemic has overwhelmed healthcare systems worldwide, profoundly impacting the lives of anaesthesiologists, intensivists, and nurses caring for the critically ill. Such high-acuity patient care imposes a significant physical and cognitive burden, which is further compounded by increased workloads, staffing deficiencies, and equipment shortages. Participation in aerosol-generating procedures and frequent direct patient contact may increase risk of infection. Government-imposed containment measures may lead to social isolation and restrict access to usual coping mechanisms. Exposure to contagion may also engender concerns from staff living with older people and young children. The previous severe acute respiratory syndrome outbreak of 2003 saw emotional exhaustion, anxiety, depression, and burnout afflicting healthcare workers.<sup>1,2</sup> Similarly, studies on healthcare workers from China and Italy have described stress-related anxiety and depression during the COVID-19 pandemic.<sup>3,4</sup> These studies did not specifically examine intensive care providers, who may constitute a high-risk subgroup. We sought to determine the prevalence and severity of psychological distress amongst anaesthesiologists and nurses working in ICUs during this pandemic, and identify potential risk factors. We also studied their main concerns, perceptions of pandemic preparedness, training adequacy, and staff protection.

This observational, cross-sectional study was conducted at a 1240-bed tertiary academic medical centre in Singapore. During this pandemic, anaesthesiologists were rostered into ICUs in our hospital. Ethics approval was obtained from the institutional domain-specific review board (2020/00648) before commencement of the study. All anaesthesiologists (including trainees) and nurses working in ICUs were invited to participate with a one-time self-administered online questionnaire. The sampling period was June 11–15, 2020, during which Singapore saw 400 to 500 new cases daily, with a cumulative total exceeding 40 000 cases for a population of ~5.8 million. Two survey completion reminders were issued. All participants completed a 46-question, closed-ended, self-reporting questionnaire ([Supplementary Appendix 1](#)). No identifying information was collected. The anonymised questionnaire collected participant characteristics, medical history, and workplace characteristics, such as redeployment outside normal professional boundaries, direct COVID-19 patient care, workload during the pandemic,

and availability of personal protective equipment (PPE). We also explored perceptions and concerns surrounding the COVID-19 pandemic and direct impact of the COVID-19 pandemic, such as having received a quarantine order or knowing someone diagnosed with COVID-19. Key mental health outcomes were measured using two validated self-reporting instruments for identifying psychological distress: the 12-item General Health Questionnaire (GHQ-12) and Hospital Anxiety and Depression Scale (HADS). Two instruments were used to provide additional information, classify the type of psychological distress, and detect inconsistent conclusions. The GHQ-12 comprises 12 items describing aspects of anxiety, depression, and social functioning, with four possible responses each. Responses were coded and scored using a 2-point response system.<sup>1</sup> A cut-off above 3 was used to identify psychological distress.<sup>1,5</sup> The HADS comprises two subscales: seven questions each for anxiety and depression,<sup>6</sup> scored using a 4-point Likert scale. Anxiety and depression were scored separately, and scores above 10 indicated moderate emotional distress.<sup>5</sup> Univariate analyses were performed to identify differences within participant characteristics. Multivariate logistic regression models were used for both GHQ-12 and HADS outcomes to explore associations with the following variables: gender, occupation, work experience, marital status, knowing someone with diagnosed COVID-19, direct care of COVID-19 patients, redeployment outside usual professional boundaries, having been quarantined, and staff having more than one co-morbid condition.

Of 308 invited participants, a total of 270 anaesthesiologists (42.6%) and nurses (57.4%) responded. The response rate was 90.6% and 85.6% amongst anaesthesiologists and nurses, respectively. [Supplementary Appendix 2](#) describes participant characteristics. Most participants were female (70.7%), aged 25–35 yr (55.2%), with a majority (78.1%) directly involved in managing patients with COVID-19. The GHQ-12 identified psychological distress in 37.4% of respondents (median: 2.0; standard deviation [SD]: 2.88) ([Supplementary Appendix 3](#)). At least moderate anxiety was identified in 30.7% (median: 7.0; SD: 5.16) and depression in 30.0% of study participants (median: 7.0; SD: 5.02) using the HADS ([Table 1](#)). One-fifth (20.4%) of participants showed both anxiety and depression, which was proportionately higher in nurses (13.7%) compared with anaesthesiologists (6.7%), although not statistically significant ( $P=0.097$ ). Cronbach's alpha values for the GHQ-12 (0.803) and HADS (0.934) showed satisfactory internal consistency. Statistically

**Table 1** Summary of the results of the Hospital Anxiety and Depression Scale (HADS) instrument, displaying unadjusted and adjusted odds ratios. \*Anxiety. †Depression. CI, confidence interval; COVID-19, coronavirus disease 2019; OR, odds ratio.

Characteristic	HADS-A*		P-value	Unadjusted OR (95% CI)	Adjusted OR (95% CI)	P-value	HADS-D†		P-value	Unadjusted OR (95% CI)	Adjusted OR (95% CI)	P-value
	<11,	≥11,					<11,	≥11,				
	n (%)	n (%)					n (%)	n (%)				
Overall	188 (69.6)	82 (30.4)					189 (70.0)	81 (30.0)				
Gender												
Male	63 (23.3)	16 (5.9)	0.020	1.0	1.0	0.060	57 (21.1)	22 (8.1)	0.620	1.0	1.0	0.325
Female	125 (46.2)	66 (24.4)		2.1 (1.1–3.9)	2.9 (1.3–6.1)		132 (48.9)	59 (21.9)		1.2 (0.6–2.0)	1.4 (0.7–2.8)	
Occupation												
Physician	85 (31.4)	30 (11.1)	0.187	1.0	1.0	0.772	83 (30.7)	32 (11.9)	0.502	1.0	1.0	0.770
Nurse	103 (38.1)	52 (19.2)		1.4 (0.8–2.4)	0.9 (0.5–1.8)		106 (39.3)	49 (18.1)		1.2 (0.7–2.0)	0.9 (0.5–1.8)	
Knew someone diagnosed with COVID-19												
Yes	21 (7.8)	14 (5.2)	0.184	1.6 (0.8–3.4)	0.8 (0.3–1.9)	0.572	27 (10)	8 (3.0)	0.323	0.7 (0.3–1.5)	0.6 (0.2–1.5)	0.230
No	167 (61.9)	68 (25.2)		1.0	1.0		162 (60.0)	73 (27.0)		1.0	1.0	
Treated a patient with COVID-19												
Yes	139 (51.5)	72 (26.7)	0.011	2.5 (1.2–5.3)	2.9 (1.3–6.5)	0.011	143 (53.0)	68 (25.2)	0.131	1.7 (0.9–3.3)	1.5 (0.7–3.1)	0.265
No	49 (18.1)	10 (3.7)		1.0	1.0		46 (17.0)	13 (4.8)		1.0	1.0	
Redeployed to areas outside of usual clinical practice												
Yes	71 (26.3)	42 (15.6)	0.039	1.7 (1.0–2.9)	1.6 (0.9–2.8)	0.124	71 (26.3)	42 (15.6)	0.029	1.8 (1.1–3.0)	1.8 (1.0–3.1)	0.042
No	117 (43.3)	40 (14.8)		1.0	1.0		118 (43.7)	71 (26.3)		1.0	1.0	
Subject of a quarantine order or stay-at-home notice												
Yes	18 (6.7)	21 (7.8)	0.001	3.3 (1.6–6.5)	3.6 (1.6–8.1)	0.020	29 (10.7)	10 (3.7)	0.521	0.8 (0.4–1.7)	0.7 (0.3–1.8)	0.487
No	170 (63.0)	61 (22.6)		1.0	1.0		160 (59.3)	71 (26.3)		1.0	1.0	
More than one co-morbid condition												
Yes	8 (3.0)	11 (4.1)	0.007	3.5 (1.3–9.0)	3.2 (1.1–9.4)	0.030	8 (3.0)	11 (4.1)	0.006	3.6 (1.4–9.2)	4.7 (1.6–13.5)	0.005
No	180 (66.7)	71 (26.3)		1.0	1.0		181 (67.0)	70 (26.3)		1.0	1.0	

significant associations with psychological distress were found for the presence of multiple co-morbidities in staff, direct involvement in COVID-19 patient care, receiving a quarantine order, and redeployment outside normal professional boundaries (Table 1). Insomnia, based on the first item of the GHQ-12, was reported by 45 participants (16.7%). Redeployment to work outside areas of usual clinical practice was reported by 41.9% of participants. The majority (59.3%) perceived their workload to be similar to pre-pandemic levels. Just 12.2% of participants had family, friends, or colleagues diagnosed with COVID-19. Formal PPE training was received by 256 (94.8%) participants with 149 (55.2%) being confident in correct usage and their ability to protect from infection. Situations where recommended PPE was unavailable were encountered by 46 (17.0%). Risks of getting infected (83.6%) and infecting family members (78.0%) were the top two concerns (Supplementary Appendix 2).

This study shows significant psychological distress amongst anaesthesiologists and nurses working in ICUs in the context of the COVID-19 pandemic. While lower than reported in the outbreak epicentre in China, which reported depression in 50.4% and anxiety in 44.6% of healthcare workers, we found a two-fold higher prevalence of anxiety and up to three-fold higher prevalence of depression than reported amongst general healthcare workers in Singapore and Italy during this pandemic.<sup>3,4,7</sup> Many would regard even pre-pandemic work in such high-acuity environments as stressful and emotionally exhausting, thus potentially accounting for the differences compared with general healthcare workers. Indeed, pre-pandemic studies of occupational stress identified similar levels of anxiety and stress (29.0–35.7%) in ICU physicians and nurses using the GHQ-12.<sup>5,8</sup> Thus, the contention that COVID-19 has provoked all the elements of psychological distress in respondents still requires testing.

Our study has limitations. Socio-economic status, which may influence outcomes and intervention planning, was not assessed. Neither a pre-crisis baseline nor follow-up to assess the temporal changes in psychological distress was available. Being a single-centre snapshot, further studies in other populations are necessary for generalisability. Lastly, clinical interviews by a psychiatrist would have been ideal. Nonetheless, we identified risk factors for psychological distress that may be useful for identifying at-risk individuals, and respondent concerns of the infection risk, adequacy of PPE, and redeployment outside normal professional boundaries are still issues that need to be addressed.

The psychological distress prevalent amongst providing anaesthesia and intensive care providers during this pandemic necessitates policies for screening of at-risk

individuals and adoption of early psychological support interventions for affected staff.<sup>9,10</sup>

## Declarations of interest

The authors declare that they have no conflicts of interest.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.bja.2020.07.005>.

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## Trial under fire: one New York City anaesthesiology residency programme's redesign for the COVID-19 surge

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