


# Mental health symptoms in Australian general practitioners during the COVID-19 pandemic

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## ABSTRACT

**Background.** General practitioners (GPs) play a central role during the COVID-19 pandemic, and yet awareness of their mental health is limited. **Methods.** A nationwide online survey of self-identified frontline healthcare workers was conducted between 27 August and 23 October 2020. Participants were recruited through health and professional organisations, colleges, universities, government contacts, and media. A subset of the findings on GPs and hospital medical staff (HMS) was used for this study. **Results.** Of 9518 responses, there were 389 (4%) GPs and 1966 (21%) HMS. Compared with HMS, GPs received significantly less training on personal protective equipment usage or care for COVID-19 patients, and less support or communication within their workplace. GPs were significantly more concerned about household income, disease transmission to family and being blamed by colleagues if they became infected, all of which were associated with worse psychological outcomes. Significantly more GPs reported burnout, and experienced moderate-to-severe emotional exhaustion than HMS. Both groups used similar coping strategies, except fewer GPs than HMS used digital health applications or increased alcohol consumption. Less than 25% of either group sought professional help. **Conclusions.** GPs are vital in our healthcare systems, yet face unique workplace challenges and mental health stressors during the pandemic. Targeted workplace and psychological support is essential to protect wellbeing among the primary care workforce.

**Keywords:** anxiety, burnout, COVID-19, depression, general practitioners, mental health, primary care, survey.

## Introduction

Medical professionals can experience high levels of work-related stress (Riley 2004; Galbraith *et al.* 2021). Research shows doctors suffer higher rates of psychological distress, anxiety disorder, depression, suicidal ideation and occupational burnout when compared with the general population (Mata *et al.* 2015; Rotenstein *et al.* 2016; Ashraf *et al.* 2019). Intense work environments, fear of making mistakes, and difficulty balancing work and personal responsibilities are some common stressors related to poor mental health. The Coronavirus disease 2019 (COVID-19) pandemic poses an additional threat to mental health for healthcare workers globally. Being a frontline healthcare worker has been found in many studies to be an independent predictor of worse mental health outcomes, including depression, anxiety, post-traumatic stress disorder and insomnia during the pandemic (Krishnamoorthy *et al.* 2020; Sanghera *et al.* 2020; Seyed *et al.* 2020; Cénat *et al.* 2021; Smallwood *et al.* 2021a, 2021b, 2021c, 2021d; Thakur and Pathak 2021).

Notably, most studies examining the mental health impacts of the pandemic have focused on healthcare workers in secondary care (Digby *et al.* 2021; Hammond *et al.* 2021; Holton *et al.* 2021; Withiel *et al.* 2021), with the experiences and mental health of healthcare workers in primary health care (PHC) not to the fore. Yet, general practitioners (GPs) and other frontline healthcare workers in PHC have also faced

considerable challenges during the pandemic, including having to manage workplace exposure and the consequent risk of contracting COVID-19 themselves or transmitting the disease to their family and friends (Cabarkapa *et al.* 2020; Tse *et al.* 2020; Siddiqui *et al.* 2021). Unlike hospital medical staff (HMS), who usually work at relatively large health organisations, Australian GPs work in community clinics of variable size, and may be responsible for the oversight and management of all aspects of the daily running of the clinic. Consequently, GPs have to cope with different workforce pressures and/or financial burdens (Scott 2020; The Royal Australian College of General Practitioners 2020). Furthermore, PHC workers have reported challenges and training needs related to adopting new telehealth practices and using personal protective equipment (PPE; Lee *et al.* 2020; Sotomayor-Castillo *et al.* 2021).

Having an effective PHC system is critical, especially in times of crisis, as PHC is known to potentially be the most cost-effective and efficient way to enhance patients' physical and psychosocial health (PricewaterhouseCoopers Consulting Australia 2020; World Health Organization 2021). In countries like Australia and the UK, the PHC sector forms the fundamental basis of the national healthcare system (Kidd 2020b). Poor mental wellbeing in healthcare workers can affect the quality of patient care (Bauchner and Redberg 2020). It is therefore vital to understand the psychological health needs of our primary carers, so that targeted workplace and wellbeing support can be implemented.

The Australian COVID-19 Frontline Healthcare Workers Study investigated the prevalence and severity of workplace, social, and financial disruptions, and their impact on mental health, in Australian healthcare workers during the first year of the COVID-19 pandemic (Smallwood *et al.* 2021a). This paper reports a subset of findings from GPs and HMS. We aimed to investigate whether there are any differences between GPs and HMS in terms of their workplace challenges and stressors, the prevalence and predictors of mental health issues, and their coping strategies utilised during the COVID-19 pandemic. We hypothesised that the prevalence and predictors of mental illness, as well as the coping strategies adopted, would significantly differ between medical staff working in primary and secondary care.

## Methods

### Study design

The full study methodology has been published (Smallwood *et al.* 2021a). In brief, a nationwide, voluntary, anonymous, online survey was conducted between 27 August and 23 October 2020, concurrent with the second wave of the pandemic in Australia, which predominantly affected the city of Melbourne in the state of Victoria. At the time of this survey, strict and prolonged stay-at-home orders were in place

in Melbourne, Victoria, with varying levels of restrictions nationwide. Restrictions on face-to-face consultations were in place during this time, and GPs were required to bulk bill all telehealth services (The Royal Australian College of General Practitioners 2022). Australian healthcare workers from all health roles, who self-identified as frontline health workers in secondary or primary and community care, were invited to participate. Information regarding the survey was widely disseminated across Australia by hospital leaders, professional societies, colleges, universities, associations, government health departments and the media. Completion of the survey took approximately 20 min.

Participants completed the survey either directly via the online survey link or via the study website (<https://covid-19-frontline.com.au/>). Data were collected and managed using REDCap electronic data capture tools (Harris *et al.* 2009). Online consent was obtained from the participants before commencement of the survey. Each participant completed the survey once.

Data collected included demographics, professional background and work arrangements, the impact of the pandemic on employment and finances, organisational leadership and workplace change, exposure to COVID-19, and health and recreational habits. Five validated psychological measurement tools were included: the Generalised Anxiety Disorder scale, Patient Health Questionnaire, abbreviated Impact of Event Scale, abbreviated Maslach Burnout Inventory and abbreviated CD-RISC-2 scale to measure resilience (Smallwood *et al.* 2021d).

### Statistical analysis

Only data from HMS and GPs were included in this analysis. All analyses were performed using SPSS version 26.0 (IBM Corp., Armonk, NY, USA) or SAS version 9.4 (SAS Institute, Cary, NC, USA). Demographic and socioeconomic characteristics were reported descriptively. For each mental health scale, outcomes were merged into dichotomous categories (none-to-mild or moderate-to-severe symptoms). The associations between medical staff role (GP or HMS) and predictor variables, including workplace changes, training and confidence, impacts on relationships, and mental health outcomes, were assessed using Chi-squared tests with results presented as counts and percentages. Likert scale measures of confidence and resilience were reported as means and standard deviations, and were compared using the independent samples *t*-test.

Predictors of mental illness symptoms and coping strategies were identified through logistic regression models. Covariates examined in univariable analyses included: age; sex; state; lives alone; lives with children; lives with elderly people; frontline area; practice location; works with COVID-19 patients; anticipates working with COVID-19 patients; received PPE training; concern of transmitting COVID-19 to family; worried about being blamed by

colleagues, close friends or relatives infected with COVID-19; changed relationships with partner or friends or family or colleagues; changed household income; household income concerns; and pre-existing mental illness. Multivariable models were developed using stepwise selection and backward elimination procedures before undergoing a final assessment for clinical and biological plausibility. Variables with a  $P < 0.10$  on univariable analyses or those deemed to be clinically relevant were considered for inclusion in the multivariable models. Results from the regression models are presented as odds ratios (OR) with 95% confidence intervals (95% CI) and forest plots. A two-sided  $P$ -value  $< 0.05$  was chosen to indicate statistical significance.

## Ethics approval

Online consent was obtained from the participants before commencement of the survey. The Royal Melbourne Hospital Human Research Ethics Committee provided ethics approval for the study (HREC/67074/MH-2020).

## Results

### Demographics and work environment

Of 9518 responses to the survey, 389 (4%) GPs and 1966 (21%) HMS provided complete responses (Table 1). There were significant differences in age ( $P < 0.001$ ), sex ( $P < 0.001$ ),

**Table 1.** Participant demographics and relationships.

Characteristic	GP ( $n = 389$ )		HMS ( $n = 1966$ )		P-value
	<i>n</i>	%	<i>n</i>	%	
Age (years)					$< 0.001$
20–30	16	4.1	364	18.5	
31–40	129	33.2	664	33.8	
41–50	116	29.8	521	26.5	
$\geq 50$	128	32.9	417	21.2	
Sex					$< 0.001$
Male	72	18.5	701	35.7	
Female	315	81.0	1251	63.6	
Non-binary	0	0.0	6	0.3	
Prefer not to say	2	0.5	8	0.4	
Living with others					
Lives alone	34	8.7	278	26.7	0.004
Children $< 16$ years at home	198	50.9	848	43.1	0.005
$\geq 1$ elderly person home	38	9.8	147	7.5	0.125
Current physical health					0.003
Excellent/good	307	78.9	1670	84.9	
Fair/poor	82	21.1	296	15.1	
Underlying health conditions	155	39.8	460	23.4	$< 0.001$
Impact of COVID-19 on relationships					
Closer or stronger relationship with:					
Partner	107	27.5	641	32.6	0.048
Family	129	33.2	568	28.9	0.092
Friends	46	11.8	227	11.5	0.875
Colleagues	101	26.0	550	28	0.418
Worse relationship with:					
Partner	62	15.9	268	13.6	0.231
Family	54	13.9	376	19.1	0.014
Friends	102	26.2	634	32.2	0.019
Colleagues	67	17.2	356	18.1	0.678
No effect	102	26.2	443	22.5	0.115

**Table 2.** Workplace environment and exposure to COVID-19.

Characteristic	GP (n = 389)		HMS (n = 1966)		P-value
	n	%	n	%	
Australian State					<0.001
Victoria	210	54.0	1545	78.6	
New South Wales	82	21.1	175	8.9	
Queensland	46	11.8	86	4.4	
South Australia	20	5.1	54	2.7	
Western Australia	17	4.4	53	2.7	
Tasmania	8	2.1	25	1.3	
Northern Territory	3	0.8	15	0.8	
ACT	3	0.8	13	0.7	
Location of practice					<0.001
Metropolitan area	283	72.8	1729	87.9	
Regional/remote area	106	27.2	237	12.1	
Health organisation type					
Public	46	11.8	1853	94.3	<0.001
Community	372	95.6	310	15.8	<0.001
Private	16	4.1	524	26.7	<0.001
Other	19	4.9	67	3.4	0.156
Current employment status					<0.001
Full time	172	44.2	1313	66.8	
Part time	200	51.4	591	30.1	
Casual/other	17	4.4	62	3.2	
Change in working hours since the pandemic commenced					
Increased paid hours	68	17.5	362	18.4	0.664
Increased unpaid hours	136	35.0	568	28.9	0.017
Decreased paid or unpaid hours	89	22.9	264	13.4	<0.001
No change	131	33.7	907	46.1	<0.001
Change in household income since the pandemic commenced					<0.001
Increased	41	10.5	185	9.4	
Decreased	232	59.6	657	33.4	
No change	116	29.8	1124	57.2	
Concerns about household income	165	42.4	456	23.2	<0.001
Redeployed to a new area of work	29	7.5	293	14.9	<0.001
Confidence working in new area, mean (s.d.)*	5.45 (1.33)	n = 29	5.10 (1.33)	293	0.748
Change in work role	90	23.1	465	23.7	0.827
Confidence working in new role, mean (s.d.)*	5.15 (1.17)	n = 89	5.17 (1.18)	n = 461	0.642
Exposure to COVID-19 and perceived preparedness					
Currently working with people infected with COVID-19	57	14.7	960	48.8	<0.001
Anticipates working with people infected with COVID-19	246	73.9	808	80.4	0.012
Received training to care for patients with COVID-19	119	30.6	1549	78.8	<0.001
Confidence in caring for people with COVID-19, mean score (s.d.)*	3.70 (1.61)	n = 302	4.87 (1.53)	n = 1769	0.011
Received training on PPE during the pandemic	119	30.6	1549	78.8	<0.001
Confidence in usage of PPE, mean score (s.d.)*	4.25 (1.82)	n = 302	5.26 (1.49)	n = 1769	<0.001
Needs more training regarding PPE or managing people with COVID-19	247	81.8	1003	56.7	<0.001

(Continued on next page)

**Table 2.** (Continued).

Characteristic	GP (n = 389)		HMS (n = 1966)		P-value
	n	%	n	%	
Worried their role will lead to them transmitting COVID-19 to family					<0.001
Not worried	22	7.3	240	13.6	
Neutral	18	6.0	210	11.9	
Very worried	262	86.8	1319	74.6	
Worried about being blamed by colleagues if they contract COVID-19					0.019
Strongly or somewhat disagree	54	13.9	386	19.6	
Neither agree nor disagree	57	14.7	302	15.4	
Strongly or somewhat agree	278	71.5	1278	65.0	
Workplace communication during the pandemic has been useful and timely					<0.001
Strongly or somewhat disagree	101	26.0	358	18.2	
Neither agree nor disagree	65	16.7	234	11.9	
Strongly or somewhat agree	223	57.3	1374	69.9	
Workplace actively supported their wellbeing and mental health during the pandemic					<0.001
Strongly or somewhat disagree	110	28.3	375	19.1	
Neither agree nor disagree	67	17.2	370	18.8	
Strongly or somewhat agree	212	54.5	1221	62.1	

\*Rated on 7-point Likert scale: 1 = very unconfident; 4 = neutral; 7 = very confident.

physical health ( $P = 0.003$ ) and home caring responsibilities ( $P = 0.005$ ) between GP and HMS participants. GPs worked predominantly in primary care (86%) with some also having roles in hospital departments or COVID-19 testing. HMS most commonly worked in medical specialty areas (53%), emergency departments (17%), anaesthetics and surgery (17%), and intensive care (10%). Both GPs and HMS experienced increased working hours; however, more GPs (35%) than HMS (29%) reported increased unpaid hours ( $P < 0.001$ ; Table 2). Significantly more GPs (60%) experienced a reduction in household income ( $P < 0.001$ ) or had income concerns ( $P < 0.001$ ) compared with HMS.

Only 31% of the GPs received any training to care for COVID-19 patients or use PPE, in which they lacked confidence (Table 2). GPs were significantly less likely than HMS to feel that their mental health was supported by their workplace ( $P < 0.001$ ), or report that they received useful and timely communication from their workplace ( $P < 0.001$ ). Significantly more GPs compared with HMS were worried about transmitting the disease to family ( $P < 0.001$ ) or being blamed by colleagues if they contracted COVID-19 ( $P = 0.019$ ).

## Mental health

Anxiety and burnout were the most frequently self-reported psychological problems, with burnout reported by more GPs than HMS ( $P = 0.008$ ; Table 3). From the objective symptom scale data, significantly more GPs reported symptoms consistent with moderate-to-severe emotional

exhaustion, compared with HMS ( $P = 0.002$ ). However, HMS were more likely than GPs to have low levels of personal accomplishment ( $P = 0.011$ ).

In GPs, independent predictors for anxiety symptoms included having concerns about household income ( $P < 0.001$ ), prior mental illness ( $P = 0.004$ ) and worse relationships with family ( $P < 0.001$ ; Fig. 1). GPs were less likely to have anxiety symptoms if they had better relationships with their partner ( $P = 0.024$ ) or lived in regional areas ( $P = 0.012$ ). Independent predictors for depressive symptoms included prior mental illness ( $P < 0.001$ ), worse relationships with their partner ( $P = 0.001$ ) or colleagues ( $P = 0.024$ ) and worry about being blamed by colleagues for contracting COVID-19 ( $P = 0.045$ ). Independent predictors for post-traumatic stress disorder included worse relationships with family ( $P < 0.001$ ), having income concerns ( $P = 0.013$ ), working with COVID-19 patients ( $P = 0.037$ ) and prior mental illness ( $P = 0.019$ ). Independent predictors for emotional exhaustion included worse relationships with friends ( $P = 0.001$ ) and worry about being blamed by colleagues for contracting COVID-19 ( $P = 0.013$ ). Having better relationships with family ( $P = 0.038$ ) and having received PPE training ( $P = 0.048$ ) were both associated with a sense of higher personal accomplishment.

## Coping strategies and predictors of coping strategy use

Similar coping strategies were adopted by both GPs and HMS, with some notable differences. Significantly fewer GPs used

**Table 3.** Mental health.

Occupation Variable	GP (n = 389)		HMS (n = 1966)		P-value
	n	%	n	%	
Pre-existing mental illness					0.003
No or prefer not to say	272	69.9	1512	76.9	
Yes	117	30.1	454	23.1	
Self-reported mental health issues experienced since the pandemic					
Anxiety	220	56.6	1092	55.5	0.714
Burnout	225	57.8	993	50.5	0.008
Depression	66	17.0	394	20.0	0.162
Post-traumatic stress disorder	14	3.6	65	3.3	0.770
Other mental health issue	9	2.3	47	2.4	0.927
No mental health issues	80	20.6	491	25.0	0.064
Mental health issues assessed by validated scales					
Burnout – depersonalisation					0.279
Low	228	59.5	1099	56.5	
Moderate to high	155	40.5	845	43.5	
Burnout – emotional exhaustion					0.002
Low	96	25.1	645	33.2	
Moderate to high	287	74.9	1299	66.8	
Burnout – personal accomplishment					0.011
Low	81	21.1	532	27.4	
Moderate to high	302	78.9	1411	72.6	
Anxiety – GAD7					0.105
None to mild	316	81.2	1524	77.5	
Moderate to severe	73	18.8	442	22.5	
Depression – PHQ9					0.866
None to mild	324	83.5	1646	83.9	
Moderate to severe	64	16.5	317	16.1	
Impact of events/trauma – IES-6					0.743
None to mild	243	63.1	1253	64.0	
Moderate to severe	142	36.9	705	36.0	
Resilience – CD-RISC-2 (mean (s.d.))	3.18 (0.71)	n = 387	3.23 (0.72)	n = 1963	0.083

Burnout-depersonalisation: 0–3 = low, 4–18 = moderate-to-high; burnout-emotional exhaustion: 0–6 = low, 7–18 = moderate-to-high; burnout-personal accomplishment: 0–12 = low, 13–18 = moderate-to-high (Riley et al. 2018); abbreviated Impact of Event Scale (IES-6): 0–9 = none-to-minimal, >9 = moderate-to-severe (Thoresen et al. 2010); Generalised Anxiety Disorder scale (GAD7): 0–9 = none-to-mild, 10–21 = moderate-to-severe (Spitzer et al. 2006); Patient Health Questionnaire (PHQ9): 0–9 = none-to-mild, 10–27 = moderate-to-severe (Kroenke et al. 2001).

digital applications to track their physical health ( $P = 0.018$ ; Table 4) or increased alcohol consumption ( $P < 0.001$ ) during the pandemic compared with HMS. GPs were significantly more likely than HMS to see a doctor or psychologist for mental support ( $P = 0.027$ ). Overall, <25% of both groups sought professional help. Independent predictors of drinking more alcohol to cope during the pandemic included working with COVID-19 patients ( $P = 0.007$ ) and worse relationships with family ( $P = 0.013$ ; Fig. 2). Independent predictors of seeking help from a doctor or psychologist for mental

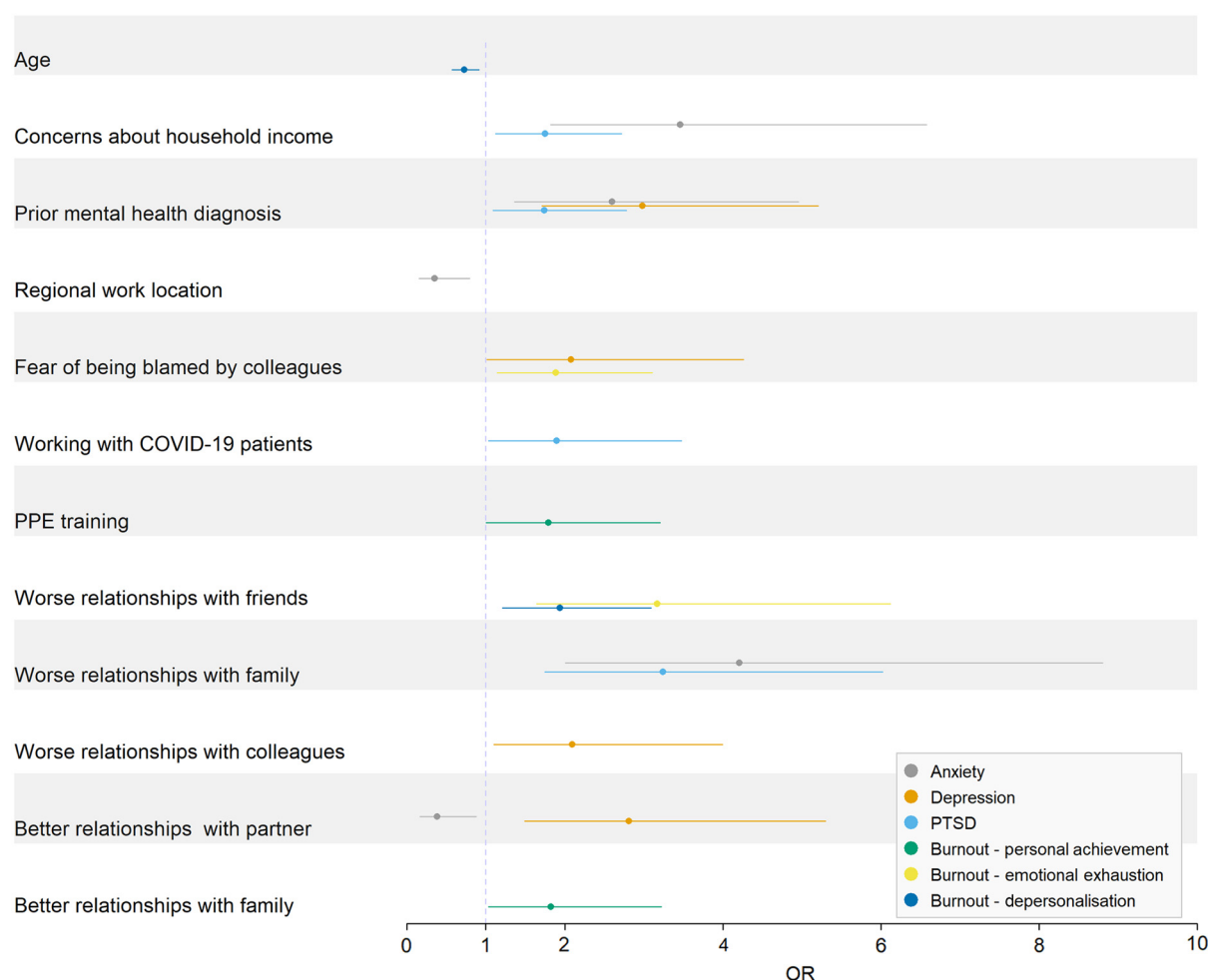
health included having prior mental illness ( $P < 0.001$ ) and worse relationship with their partner ( $P = 0.001$ ).

## Discussion

### Summary

To our knowledge, this is the first Australian study to specifically examine the psychosocial impacts of the





**Fig. 1.** Personal and professional predictors of adverse mental health outcomes among GPs.

COVID-19 pandemic on GPs. We identified unique workplace challenges and stressors, more burnout issues, a significantly higher prevalence of moderate-to-severe emotional exhaustion, and different coping strategies adopted by GPs compared with HMS. Predictors for both mental health symptoms and coping strategy use by GPs have been described. These findings are important for developing strategies to prevent psychosocial workplace harms and guiding the creation of targeted workplace wellbeing supports in PHC.

### Strengths and limitations

The relatively large sample size in our study enabled comparison of the workplace challenges and psychological impacts of COVID-19 between GPs and HMS, and also examination of independent predictors of poor mental health and use of coping strategy among our GP respondents. The response rate in the current survey could not be calculated due to the widespread distribution of the survey. There was potential risk of selection bias and response bias, which may over- or under-represent the exposure to COVID-19,

changes in working conditions and impacts on mental health. The proportion of responses received from Victoria, where the majority of COVID-19 cases and restrictions had occurred at the time of the survey, is a likely indication of selection bias. The participants in this survey were skewed towards women respondents. The current study was a single time-point measure to minimise burden on healthcare workers; however, longitudinal data would provide insight into changes in mental health and working conditions throughout the ongoing pandemic.

### Comparison with existing literature

Compared with HMS, GP respondents felt less supported by their workplace, and that the communication received from their workplace was perceived to be suboptimal. This issue is important, as previous research demonstrated that PHC workers who were satisfied with their organisational support experience significantly lower stress levels than those who were less satisfied (Lee *et al.* 2020). GPs who worked in smaller practices, in particular those in regional

**Table 4.** Coping strategies and help-seeking behaviour.

Occupation Variable	GP (n = 389)		HMS (n = 1966)		P-value
	n	%	n	%	
Uses digital Apps to track physical health, activity or diet					0.018
No	230	59.1	1034	52.6	
Yes	159	40.9	932	47.4	
Activities to manage possible mental health issues since the pandemic started					
Maintained exercise	189	48.6	854	43.4	0.062
Increased exercise	104	26.7	513	26.1	0.793
Yoga, meditation or similar	96	24.7	488	24.8	0.952
Maintained or increased social interaction with family and friends	133	34.2	595	30.3	0.126
Used a psychological wellbeing App (e.g. Smiling Mind, Headspace or other)	53	13.6	278	14.1	0.789
Increased alcohol use	66	17.0	529	26.9	<0.001
Other strategy	70	18.0	262	13.3	0.016
None of the above	48	12.3	257	13.1	0.694
Was the App used to support psychological wellbeing useful?					0.304
No	3	5.9	29	10.5	
Yes	48	94	246	89.5	
Are you still using the App to support psychological wellbeing?					0.290
No	11	21.0	78	28.3	
Yes	41	79.0	198	71.7	
Sought help for stress or mental health issues from other sources					
Doctor or psychologist	76	19.5	296	15.1	0.027
Employee support program at place of work	5	1.3	59	3.0	0.057
Professional support program outside of work	12	3.1	40	2.0	0.198
Other	19	4.9	59	3.0	0.058
None of the above	292	75.1	1566	79.7	0.043

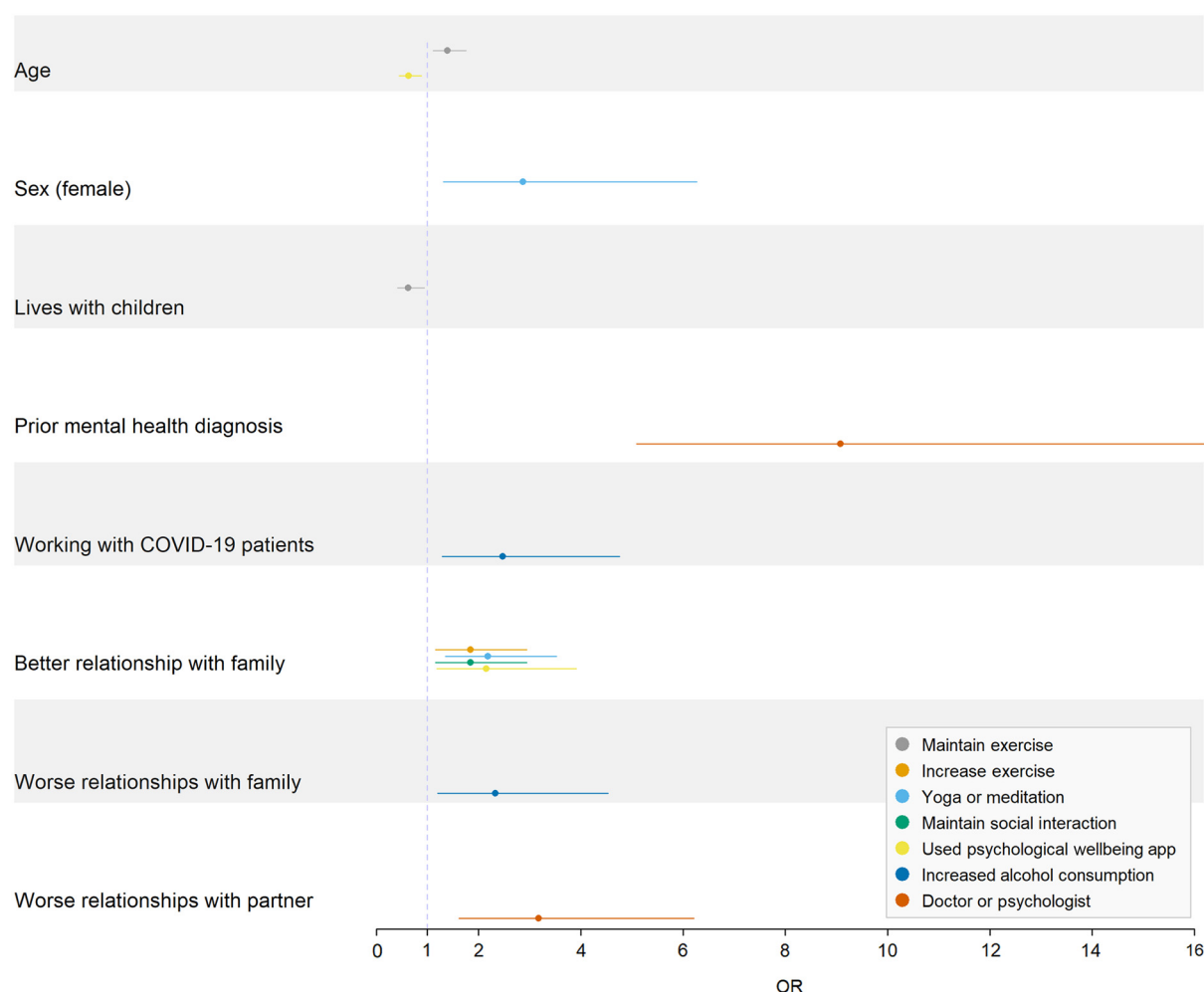
or remote areas (27% in our study), may have had insufficient workplace resources to keep up with and implement changing protocols. The burden related to a plethora of information from multiple different guidelines during the COVID-19 pandemic has been shown in many studies to increase stress levels among PHC workers (Gray and Sanders 2020; Prescott *et al.* 2020; Wright *et al.* 2020; Crowley *et al.* 2021; Dutour *et al.* 2021; Lum *et al.* 2021; Sotomayor-Castillo *et al.* 2021).

Similar to the study of Sotomayor-Castillo *et al.* (2021), we found a significant proportion of GPs did not receive training on PPE usage or the care of COVID-19 patients. Failure to adequately train GPs is highly concerning, given that GPs are often the first point-of-contact for people with suspected COVID-19, and caring for people with mild COVID-19 infection (Australian Government Department of Health 2020a, 2020b; Kidd 2020a), Respiratory Protection Programs – providing governance, education and protection for workers at risk of respiratory hazards – are established in other industries and gradually adopted in hospitals during the pandemic (Ryan 2001; Victorian Respiratory Protection Program guidelines 2020; Australian NSW Government

2021; Williams *et al.* 2021). Yet, the majority of Australian GPs have not been offered respiratory fit-testing (The Royal Australian College of General Practitioners 2021). A similar program for primary care clinicians is urgently needed. This would protect not only physical health, but also mental health, as many studies have shown that inadequate PPE training contributes to increased stress levels in primary healthcare workers (Lee *et al.* 2020; Crowley *et al.* 2021; Sotomayor-Castillo *et al.* 2021).

A significant stressor associated with mental health symptoms for GPs in our study was concern regarding finances during the pandemic, with 60% experiencing a decrease in income. In contrast to HMS, who are generally salaried, Australian GPs are paid fee-for-service, often as part of small businesses, of which they may be part owners. Financial pressures arose from fewer patients attending GP clinics due to lockdowns or fears of contracting COVID-19, and restructuring of the GP practice system to telehealth (Kidd 2020a; Wright *et al.* 2020). GPs could only charge the minimum rebate for telehealth consultations initially, despite having to cover for the implementation costs, along





**Fig. 2.** Personal and professional predictors of coping strategy utilisation and help-seeking behaviour among GPs.

with day-to-day expenditures. Thus, the shift to telehealth and its operating expenses exacerbated the financial challenges they experienced.

The significant concerns from GPs about spreading COVID-19 to their family members, and being blamed by colleagues, were important findings. Perceived stigma associated with being a frontline worker (Juan *et al.* 2020; Kirk *et al.* 2021; Tasnim *et al.* 2021), as well as the worry about inadequate infection protection (Tasnim *et al.* 2021; Torrente *et al.* 2021), have been identified as risk factors for anxiety and depression among healthcare workers internationally. From a practical point of view, if a GP becomes infected with COVID-19, the impacts include generating additional work burden for colleagues, and potentially causing colleagues to be furloughed or even temporary closure of their clinic. Furthermore, during this pandemic, shaming of infected healthcare workers by the press may lead to patients seeking alternative GPs (ABC News 2020).

In our study, significantly more GPs compared with HMS reported having burnout symptoms and experienced moderate-to-high levels of emotional exhaustion. Internationally, studies

have demonstrated high levels of stress and burnout symptoms amongst GPs during the COVID-19 pandemic (Dutour *et al.* 2021; Lum *et al.* 2021; Stafie *et al.* 2021; Lange *et al.* 2022). Burnout can be detrimental, at both personal and professional levels, including increased risk of substance abuse and suicide, and impaired quality of patient care (Lebares *et al.* 2018; Hert 2020; Iacobucci 2021). Moreover, one study showed that burnout had a direct effect on GPs' turnover intention (Zhang *et al.* 2021). Similar to the UK, the Australian PHC workforce has been under a significant amount of pressure for some time, with the ever-expanding workload due to GP shortage, (The Guardian 2021) and the growing aging population (Dingwall *et al.* 2020). Crisis events, such as the pandemic, further exacerbate the problem; for example, the UK is currently facing a potential exodus of GPs due to a 'burnout workforce' (The Guardian 2021).

Despite the fact that a considerable proportion of GPs exhibited moderate-to-severe mental health symptoms, <25% sought professional mental health care. Studies showed that GPs preferred self-treatment when dealing with sensitive

psychological conditions, because of embarrassment, concerns of confidentiality breaches and also the culture of medicine, which tended to discourage admission of vulnerabilities (Thompson *et al.* 2001; Davidson and Schattner 2003). Therefore, more acceptable psychological interventions are urgently needed and should be readily available to all healthcare workers (The British Psychological Society 2020).

## Implications for research and/or practice

The unique workplace challenges and stressors faced by GPs during the COVID-19 pandemic, and their associations with poorer mental health symptoms, are undeniable. Workplace challenges related to policy development, communication, training, PPE and financial burden can be overcome with effective organisational and government leadership. New, long-term approaches to provide acceptable psychological support for GPs, who suffer from significant emotional exhaustion, are urgently required. It is essential to protect our GPs' wellbeing and workforce, which is fundamental to the functioning of the national health system.

## References

- ABC News (2020) Coronavirus-infected GP Chris Higgins hits back after criticism from Victorian Health Minister. (ABC News). Available at <https://www.abc.net.au/news/2020-03-08/coronavirus-gp-chris-higgins-hits-back-at-health-minister/12036910>
- Ashraf F, Ahmad H, Shakeel M, Aftab S, Masood A (2019) Mental health problems and psychological burnout in medical health practitioners: a study of associations and triadic comorbidity. *Pakistan Journal of Medical Sciences* 35, 1558–1564. doi:10.12669/pjms.35.6.444
- Australian Government Department of Health (2020a) Coronavirus (COVID-19) GP respiratory clinics. Available at <https://www.health.gov.au/initiatives-and-programs/coronavirus-covid-19-gp-respiratory-clinics>
- Australian Government Department of Health (2020b) Opening of 100th COVID-19 GP-led respiratory clinic. Available at <https://www.health.gov.au/ministers/the-hon-greg-hunt-mp/media/opening-of-100th-covid-19-gp-led-respiratory-clinic>
- Australian NSW Government (2021) Clinical Excellence Commission. Respiratory Protection Program. Available at <https://www.cec.health.nsw.gov.au/keep-patients-safe/COVID-19/respiratory-protection-program>
- Bauchner H, Redberg RF (2020) Notice of Retraction: Panagioti et al. Association between physician burnout and patient safety, professionalism, and patient satisfaction: a systematic review and meta-analysis. *JAMA Intern Med.* 2018;178(10):1317–1331. *JAMA Internal Medicine* 180, 931. doi:10.1001/jamainternmed.2020.1755
- Beyondblue (2019) National mental health survey of doctors and medical students. Available at <https://medicine.uq.edu.au/files/42088/Beyondblue%20Doctors%20Mental%20health.pdf>
- Cabarkapa S, Nadjidai SE, Murgier J, Ng CH (2020) The psychological impact of COVID-19 and other viral epidemics on frontline healthcare workers and ways to address it: a rapid systematic review. *Brain, Behavior, & Immunity – Health* 8, 100144. doi:10.1016/j.bbih.2020.100144
- Cénat JM, Blais-Rochette C, Kokou-Kpolou CK, Noorishad P-G, Mukunzi JN, McIntee S-E, Dalexis RD, Goulet M-A, Labelle P (2021) Prevalence of symptoms of depression, anxiety, insomnia, posttraumatic stress disorder, and psychological distress among populations affected by the COVID-19 pandemic: a systematic review and meta-analysis. *Psychiatry Research* 295, 113599. doi:10.1016/j.psychres.2020.113599
- Crowley T, Kitshoff D, De Lange-Cloete F, Baron J, De Lange S, Young C, Esterhuizen T, Couper I (2021) Primary care nurses' preparedness for COVID-19 in the Western Cape province, South Africa. *African Journal of Primary Health Care & Family Medicine* 13, e1–e8. doi:10.4102/phcfm.v13i1.2879
- Davidson SK, Schattner PL (2003) Doctors' health-seeking behaviour: a questionnaire survey. *Medical Journal of Australia* 179, 302–305. doi:10.5694/j.1326-5377.2003.tb05552.x
- Digby R, Winton-Brown T, Finlayson F, Dobson H, Bucknall T (2021) Hospital staff well-being during the first wave of COVID-19: Staff perspectives. *International Journal of Mental Health Nursing* 30, 440–450. doi:10.1111/inm.12804
- Dingwall S, Henderson J, Britt H, Harrison C (2020) Adequacy of Australia's GP workforce: estimating supply and demand, 2005–06 to 2015–16. *Australian Health Review* 44, 328–333. doi:10.1071/AH18252
- Doutour M, Kirchhoff A, Janssen C, Meleze S, Chevalier H, Levy-Amon S, Detrez M-A, Piet E, Delory T (2021) Family medicine practitioners' stress during the COVID-19 pandemic: a cross-sectional survey. *BMC Family Practice* 22, 36. doi:10.1186/s12875-021-01382-3
- Galbraith N, Boyda D, McFeeters D, Hassan T (2021) The mental health of doctors during the COVID-19 pandemic. *BJPsych Bulletin* 45, 93–97. doi:10.1192/bjb.2020.44
- Gray R, Sanders C (2020) A reflection on the impact of COVID-19 on primary care in the United Kingdom. *Journal of Interprofessional Care* 34, 672–678. doi:10.1080/13561820.2020.1823948
- Hammond NE, Crowe L, Abbenbroek B, Elliott R, Tian DH, Donaldson LH, Fitzgerald E, Flower O, Grattan S, Harris R, Sayers L, Delaney A (2021) Impact of the coronavirus disease 2019 pandemic on critical care healthcare workers' depression, anxiety, and stress levels. *Australian Critical Care* 34, 146–154. doi:10.1016/j.aucc.2020.12.004
- Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG (2009) Research electronic data capture (REDCap)—a metadata-driven methodology and workflow process for providing translational research informatics support. *Journal of Biomedical Informatics* 42, 377–381. doi:10.1016/j.jbi.2008.08.010
- Hert SD (2020) Burnout in healthcare workers: prevalence, impact and preventative strategies. *Local and Regional Anesthesia* 13, 171–183. doi:10.2147/LRA.S240564
- Holton S, Wynter K, Trueman M, Bruce S, Sweeney S, Crowe S, Dabscheck A, Eleftheriou P, Booth S, Hitch D, Said CM, Haines KJ, Rasmussen B (2021) Psychological well-being of Australian hospital clinical staff during the COVID-19 pandemic. *Australian Health Review* 45, 297–305. doi:10.1071/AH20203
- Iacobucci G (2021) Burnout is harming GPs' health and patient care, doctors warn. *BMJ* 374, n1823. doi:10.1136/bmj.n1823
- Juan Y, Yuanyuan C, Qiuxiang Y, Cong L, Xiaofeng L, Yundong Z, Jing C, Peifeng Q, Yan L, Xiaojiao X, Yujie L (2020) Psychological distress surveillance and related impact analysis of hospital staff during the COVID-19 epidemic in Chongqing, China. *Comprehensive Psychiatry* 103, 152198. doi:10.1016/j.comppsy.2020.152198
- Kidd M (2020a) Australia's primary care COVID-19 response. *Australian Journal of General Practice* 49(Suppl 2). doi:10.31128/AJGP-COVID-02
- Kidd MR (2020b) Five principles for pandemic preparedness: lessons from the Australian COVID-19 primary care response. *British Journal of General Practice* 70, 316–317. doi:10.3399/bjgp20X710765
- Kirk AHP, Chong SL, Kam KQ, Huang W, Ang LSL, Lee JH, Sultana R, Hon KL, Wong JJM (2021) Psychosocial impact of the COVID-19 pandemic on paediatric healthcare workers. *Annals of the Academy of Medicine, Singapore* 50, 203–211. doi:10.47102/annals-acadmedsg.2020527
- Krishnamoorthy Y, Nagarajan R, Saya GK, Menon V (2020) Prevalence of psychological morbidities among general population, healthcare workers and COVID-19 patients amidst the COVID-19 pandemic: a systematic review and meta-analysis. *Psychiatry Research* 293, 113882. doi:10.1016/j.psychres.2020.113882
- Kroenke K, Spitzer RL, Williams JB (2001) The PHQ-9: validity of a brief depression severity measure. *Journal of General Internal Medicine* 16, 606–613. doi:10.1046/j.1525-1497.2001.016009606.x
- Lange M, Joo S, Couette P-A, Bas FL, Humbert X (2022) Impact on mental health of the COVID-19 outbreak among general practitioners during the sanitary lockdown period. *Irish Journal of Medical Science* 191(1), 93–96. doi:10.1007/s11845-021-02513-6

- Lebares CC, Braun HJ, Guvva EV, Epel ES, Hecht FM (2018) Burnout and gender in surgical training: a call to re-evaluate coping and dysfunction. *The American Journal of Surgery* **216**, 800–804. doi:10.1016/j.amjsurg.2018.07.058
- Lee ES, Tan SY, Lee PSS, Koh HL, Soon SWW, Sim K, Tang WE, Chong PN (2022) Perceived stress and associated factors among healthcare workers in a primary healthcare setting: the psychological readiness and occupational training enhancement during COVID-19 time (PROTECT) study. *Singapore Medical Journal* **63**(1), 20–27. doi:10.11622/smedj.2020163
- Lum A, Goh Y-L, Wong KS, Seah J, Teo G, Ng JQ, Abidin E, Hendricks MM, Tham J, Nan W, Fung D (2021) Impact of Covid-19 on the mental health of singaporean GPs: a cross-sectional study. *BJGP Open* **5**, BJGP0.2021.0072. doi:10.3399/BJGP0.2021.0072
- Mata DA, Ramos MA, Bansal N, Khan R, Guille C, Angelantonio ED, Sen S (2015) Prevalence of depression and depressive symptoms among resident physicians: a systematic review and meta-analysis. *JAMA* **314**, 2373–2383. doi:10.1001/jama.2015.15845
- Prescott K, Baxter E, Lynch C, Jassal S, Bashir A, Gray J (2020) COVID-19: how prepared are front line healthcare workers in England? *Journal of Hospital Infection* **105**, 142–145. doi:10.1016/j.jhin.2020.04.031
- PricewaterhouseCoopers Consulting Australia (2020) Economic benefits of the RACGP's Vision for general practice and a sustainable healthcare system. Commissioned and supported by The Royal Australian College of General Practitioners. Available at <https://www.racgp.org.au/FSDEDEV/media/documents/RACGP/Advocacy/Economic-evaluation-of-the-RACGP-vision.pdf> [Accessed 29th March 2022]
- Riley GJ (2004) Understanding the stresses and strains of being a doctor. *Medical Journal of Australia* **181**, 350–353. doi:10.5694/j.1326-5377.2004.tb06322.x
- Riley MR, Mohr DC, Waddimba AC (2018) The reliability and validity of three-item screening measures for burnout: evidence from group-employed health care practitioners in upstate New York. *Stress and Health* **34**, 187–193. doi:10.1002/smi.2762
- Rotenstein LS, Ramos MA, Torre M, Segal JB, Peluso MJ, Guille C, Sen S, Mata DA (2016) Prevalence of depression, depressive symptoms, and suicidal ideation among medical students: a systematic review and meta-analysis. *JAMA* **316**, 2214–2236. doi:10.1001/jama.2016.17324
- Ryan MG (2001) Developing a respiratory protection program. Understanding the written elements. *Workplace Health & Safety* **49**, 293–309.
- Sanghera J, Pattani N, Hashmi Y, Varley KF, Cheruvu MS, Bradley A, Burke JR (2020) The impact of SARS-CoV-2 on the mental health of healthcare workers in a hospital setting—a systematic review. *Journal of Occupational Health* **62**, e12175. doi:10.1002/1348-9585.12175
- Scott A (2020) How are Australia's doctors faring during COVID-19? Available at <https://pursuit.unimelb.edu.au/articles/how-are-australia-s-doctors-faring-during-covid-19>
- Seyed ASA, Karimi A, Shobeiri P, Nowroozi A, Mehraeen E, Afsahi AM, Barzegary A (2020) Psychological symptoms of COVID-19 epidemic: a systematic review of current evidence. *Psihologija* **54**, 35–35. doi:10.2298/PSI200703035S
- Siddiqui I, Aurelio M, Gupta A, Blythe J, Khanji MY (2021) COVID-19: causes of anxiety and wellbeing support needs of healthcare professionals in the UK: a cross-sectional survey. *Clinical Medicine* **21**, 66–72. doi:10.7861/clinmed.2020-0502
- Smallwood N, Karimi L, Bismark M, Putland M, Johnson D, Dharmage SC, Barson E, Atkin N, Long C, Ng I, Holland A, Munro JE, Thevarajan I, Moore C, McGillion A, Sandford D, Willis K (2021a) High levels of psychosocial distress among Australian frontline healthcare workers during the COVID-19 pandemic: a cross-sectional survey. *General Psychiatry* **34**, e100577. doi:10.1136/gpsych-2021-100577
- Smallwood N, Karimi L, Pascoe A, Bismark M, Putland M, Johnson D, Dharmage SC, Barson E, Atkin N, Long C, Ng I, Holland A, Munro J, Thevarajan I, Moore C, McGillion A, Willis K (2021b) Coping strategies adopted by Australian frontline health workers to address psychological distress during the COVID-19 pandemic. *General Hospital Psychiatry* **72**, 124–130. doi:10.1016/j.genhosppsych.2021.08.008
- Smallwood N, Pascoe A, Karimi L, Bismark M, Willis K (2021c) Occupational disruptions during the COVID-19 pandemic and their association with healthcare workers' mental health. *International Journal of Environmental Research and Public Health* **18**, 9263. doi:10.3390/ijerph18179263
- Smallwood N, Pascoe A, Karimi L, Willis K (2021d) Moral distress and perceived community views are associated with mental health symptoms in frontline health workers during the COVID-19 pandemic. *International Journal of Environmental Research and Public Health* **18**, 8723. doi:10.3390/ijerph18168723
- Sotomayor-Castillo C, Nahidi S, Li C, Hespe C, Burns PL, Shaban RZ (2021) General practitioners' knowledge, preparedness, and experiences of managing COVID-19 in Australia. *Infection, Disease & Health* **26**, 166–172. doi:10.1016/j.idh.2021.01.004
- Spitzer RL, Kroenke K, Williams JBW, Löwe B (2006) A brief measure for assessing generalized anxiety disorder: the GAD-7. *Archives of Internal Medicine* **166**, 1092–1097. doi:10.1001/archinte.166.10.1092
- Stafie CS, Profire L, Apostol MM, Costache II (2021) The professional and psycho-emotional impact of the COVID-19 pandemic on medical care—a romanian GPs' perspective. *International Journal of Environmental Research and Public Health* **18**, 2031. doi:10.3390/ijerph18042031
- Tasnim R, Sujat MSH, Islam MS, Ritu AH, Siddique MAB, Toma TY, Nowshin R, Hasan A, Hossain S, Nahar S, Islam S, Islam MS, Potenza MN, van Os J (2021) Prevalence and correlates of anxiety and depression in frontline healthcare workers treating people with COVID-19 in Bangladesh. *BMC Psychiatry* **21**, 271. doi:10.1186/s12888-021-03243-w
- Thakur B, Pathak M (2021) Burden of predominant psychological reactions among the healthcare workers and general during COVID-19 pandemic phase: a systematic review and meta-analysis. *Indian Journal of Community Medicine* **46**(4), 600–605. doi:10.4103/ijcm.IJCM\_1007\_20
- The British Psychological Society (2020) Guidance. The psychological needs of healthcare staff as a result of the Coronavirus pandemic. Available at <https://www.bps.org.uk/sites/www.bps.org.uk/files/News/News%20-%20Files/Psychological%20needs%20of%20healthcare%20staff.pdf>
- The Guardian (2021) GPs warn face-to-face appointments plan could lead to exodus of doctors. Available at [https://www.theguardian.com/society/2021/oct/14/gps-warn-face-to-face-appointments-plan-could-lead-to-exodus-of-doctors?CMP=Share\\_iOSApp\\_Other](https://www.theguardian.com/society/2021/oct/14/gps-warn-face-to-face-appointments-plan-could-lead-to-exodus-of-doctors?CMP=Share_iOSApp_Other)
- The Royal Australian College of General Practitioners (2020) General Practice Health of the Nation Report 2020. 5.1 Business and income challenges.
- The Royal Australian College of General Practitioners (2021) newsGP. Poll suggests 93% of GPs have not been offered respiratory fit-testing. Available at <https://www1.racgp.org.au/newsGP/clinical/poll-suggests-93-of-gps-have-not-been-offered-resp>
- The Royal Australian College of General Practitioners (2022) COVID-19 telehealth MBS items. Available at <https://www.racgp.org.au/FSDEDEV/media/documents/Running%20a%20practice/Practice%20resources/Changes-to-telehealth-FAQ.pdf>
- Thompson WT, Cupples ME, Sibbett CH, Skan DI, Bradley T (2001) Challenge of culture, conscience, and contract to general practitioners' care of challenge of culture, conscience, and contract to general practitioners' care of their own health: qualitative study. *BMJ* **323**, 728. doi:10.1136/bmj.323.7315.728
- Thoresen S, Tambs K, Hussain A, Heir T, Johansen VA, Bisson JI (2010) Brief measure of posttraumatic stress reactions: impact of event scale-6. *Social Psychiatry and Psychiatric Epidemiology* **45**, 405–412. doi:10.1007/s00127-009-0073-x
- Tse DM-S, Li Z, Lu Y, Li Y, Liu Y, Wong WCW (2020) Fighting against COVID-19: preparedness and implications on clinical practice in primary care in Shenzhen, China. *BMC Family Practice* **21**, 271. doi:10.1186/s12875-020-01343-2
- Torrente M, Sousa PA, Sánchez-Ramos A, Pimentao J, Royuela A, Franco F, Collazo-Lorduy A, Menasalvas E, Provencio M (2021) To burn-out or not to burn-out: a cross-sectional study in healthcare professionals in Spain during COVID-19 pandemic. *BMJ Open* **11**, e044945. doi:10.1136/bmjopen-2020-044945
- Victorian Respiratory Protection Program guidelines (2020) September 2020 (Version 1.1). Available at <https://www.dhhs.vic.gov.au/victorian-respiratory-protection-program-COVID-19-pdf> [Accessed October 2020]

- Williams D, Kave B, Begg F, Marshall C, Segal R, Ng I (2021) Impacts on staff after implementation of a respiratory protection program in a Victorian public hospital. *Infection, Disease & Health* **26**, 265–272. doi:10.1016/j.idh.2021.06.001
- Withiel T, Barson E, Ng I, Segal R, Williams DLG, Krieser RB, Lee K, Mezzavia PM, Sindoni T, Chen Y, Fisher CA (2021) “It’s like the stages of grief”: a qualitative study of the psychological experience of frontline perioperative healthcare staff in responding to COVID-19. *JMIR Perioperative Medicine* **4**(2), e27166. doi:10.2196/27166
- Wright M, Versteeg R, Hall J (2020) General practice’s early response to the COVID-19 pandemic. *Australian Health Review* **44**, 733. doi:10.1071/AH20157
- World Health Organization (2021) Primary health care. Available at <https://www.who.int/news-room/fact-sheets/detail/primary-health-care>
- Zhang T, Feng J, Jiang H, Shen X, Pu B, Gan Y (2021) Association of professional identity, job satisfaction and burnout with turnover intention among general practitioners in China: evidence from a national survey. *BMC Health Services Research* **21**, 382. doi:10.1186/s12913-021-06322-6

**Data availability.** Data available upon reasonable request from the corresponding author.

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