

Symptoms of anxiety, depression and fear in healthcare workers and non-healthcare workers undergoing outpatient COVID-19 testing in an urban Australian setting

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Abstract. This study assessed symptoms of anxiety, depression and fear of COVID-19 in members of the general community and healthcare workers (HCWs) attending for COVID testing. This cross-sectional study was conducted in a public hospital COVID-19 testing clinic (June–September 2020) using self-administered questionnaires (i.e. the Hospital Anxiety and Depression Scale (HADS) and the Fear of COVID-19 Scale). In all, 430 participants who met the criteria for COVID-19 testing with nasopharyngeal and throat swabs completed the questionnaires. The mean ($\pm$ s.d.) age of participants was 37.6 ± 12.6 years. HCWs made up 35.1% of the sample. Overall, the mean ($\pm$ s.d.) score for anxiety was 6.09 ± 4.41 and ‘case’ prevalence (any severity) was 151/430 (35.1%), higher than normative population scores. Higher anxiety was found in women ($P = 0.001$) and in clients who had previously been tested for coronavirus ($P = 0.03$). HCWs had lower anxiety scores than members of the general community ($P = 0.001$). For depression, the mean ($\pm$ s.d.) score was 4.18 ± 3.60 , with a ‘case’ prevalence (any severity) of 82/430 (19.1%), similar to normative population scores. Women reported a higher level of COVID-19 fear ($P = 0.001$), as did people with a lower education level ($P = 0.001$). A greater psychological impact of COVID-19 was observed in women, people undergoing repeat testing and participants reporting lower levels of educational attainment. HCWs had fewer symptoms of anxiety and depression than non-HCWs attending the same clinic for COVID-19 testing. This information can be used to plan mental health interventions in primary care and testing settings during this and future pandemics.

Keywords: mental health, public health practice.

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Introduction

The psychological effects of the COVID-19 pandemic and the associated lockdown have been severe, with an increase in people reporting mental illness or not receiving ongoing treatment for previously existing mental illness (Pfefferbaum and North 2020; Rajkumar 2020). Generalised anxiety is more prevalent in areas with large COVID-19 caseloads and strict quarantine measures. A Spanish study reporting experiences early in the COVID-19 pandemic showed that 20% of the general community experienced significant symptoms of anxiety (Gonzalez-Sanguino *et al.* 2020), with higher levels ($>30\%$) reported in similar Chinese studies (Wang *et al.* 2020a, 2020b). In Australia, in a sample of 1491 adults recruited through social

media in April 2020, the prevalence of ‘any level’ anxiety, depression and stress was 21.2%, 38.3% and 27.8% respectively (Stanton *et al.* 2020). A similar online study of 5071 participants found rates that were nearly twice as high: anxiety, 49.8%; depression, 61.8%; and stress, 54.5% (Newby *et al.* 2020). In that study, fear of COVID-19 was specifically measured. Asked about the level of concern and worry about the possibility of contracting COVID-19, 66.4% were ‘a little’ or ‘moderately’ concerned and 25.7% were ‘very’ or ‘extremely’ concerned (Newby *et al.* 2020).

There is evidence that the burden of psychological morbidity is particularly high in health professionals, who may be faced with having limited resources to care for patients, a lack of

protective equipment and concerns about infecting their own families with COVID-19 (Ahmed *et al.* 2020; Lai *et al.* 2020).

In the Australian health system, most mental health care is provided in a primary care setting (Royal Australian College of General Practitioners n.d.). Therefore, the task of caring for people with anxiety, depression and fear falls to primary health professionals, who are likely to care for healthcare workers (HCWs) as well as the general public. Understanding the extent and nature of psychological symptoms is therefore important to allow Australian primary care practitioners to prepare and plan for this role as the pandemic continues and to consider suitable interventions.

During the 4-month study period from June to September 2020, the incidence of COVID-19 was low in the state of New South Wales (NSW), Australia (population ~8 million). The highest daily total during this time was 23 cases on 10 August. This compares with the record highest daily total for the state of 213 cases on 27 March. At the time of the study, strict lockdown rules had been reduced and restrictions on gatherings were ongoing. Strict social distancing applied, and the wearing of masks was recommended but not mandated.

Westmead Hospital, in Western Sydney, NSW, is a referral centre for 1.5 million people and is the designated state infectious disease centre. Understanding the level of anxiety, depression and fear in people attending the clinic at Westmead Hospital will help determine the need for supportive care for clients and will provide insights into whether the needs of HCWs differ to those of non-HCWs attending for testing.

The aims of this study were to: (1) assess the levels of anxiety, depression and fear of COVID-19 in symptomatic people or close contacts ('suspected COVID-19 cases') attending for testing; and (2) identify associations between demographic groups and psychological morbidity; and (3) compare the prevalence of psychological symptoms between HCWs and laypersons attending the same testing clinic. A further aim was to use this information to help primary care practitioners prepare to care for people experiencing symptoms.

Methods

This cross-sectional study assessed psychological outcomes using validated self-administered web-based questionnaires in people attending for COVID-19 testing. The study was approved by the Western Sydney Human Research Ethics Committee (Reference: HREC 2020/ETH01071).

Participants were aged ≥ 18 years, triaged as meeting the criteria for testing at a COVID-19 testing clinic in a large public hospital and able to complete questionnaires in English on a mobile device. Only people with symptoms or close contacts of confirmed cases of COVID-19 ('suspected cases') were offered testing at the clinic at the time of the study. A participant information sheet was provided by nursing or administration staff on arrival. Interested participants scanned a QR code on the information sheet using their mobile phone to gain access to the online consent and study questionnaires.

Anxiety and depression were measured using the Hospital Anxiety and Depression Scale (HADS; Zigmond and Snaith 1983). Fear was measured using the Fear of COVID-19 Scale (Ahorsu *et al.* 2020; Soraci *et al.* 2020). The Fear of COVID-19 Scale has been validated in English and for online use in a

New Zealand population (Winter *et al.* 2020), and has also been validated in an Australian multicultural population that included 42% HCWs (Rahman *et al.* 2020, 2021).

Descriptive statistics (mean $\pm$ s.d. or percentages) were used to describe participant characteristics and Chi-squared tests were used to test for differences between HCWs and non-HCWs. For anxiety and depression questionnaire data, logistic regression with a binomial distribution and log link function was performed to estimate relative risks; for fear of COVID-19, linear regression on the total scale score was performed using generalised linear models.

Further details about the methodology used in this study are provided in Supplementary Methods S1.

Results

Between June and September 2020, 517 participants accessed the study questionnaires. Of these, 87 were excluded because $<50\%$ of items were completed, leaving responses from 430 (83.2%) participants in the final analysis.

Participant characteristics are presented in Table 1. The mean age of participants was 37.6 ± 12.6 years (range 18–83 years; median 35 years); 55.6% of the sample were female, 44.2% were male and 0.2% did not state gender. There were 151 HCWs (35.1% of the sample).

Anxiety

Mean anxiety scores, measured by the HADS, are presented in Table 2 for each group, with Table 3 summarising the results of univariable and multivariable analyses. Data were available for 430 participants. Overall, the mean anxiety score was 6.09 ± 4.41 and 279 of 430 participants (64.9%) had a 'normal' ('non-case' of anxiety) score, but 151 of 430 participants (35.1%) had a score ≥ 8 , indicating a 'case' of anxiety according to the HADS definition, including 74 of 430 (17.2%) identified as having 'borderline cases' of anxiety and 77 of 430 (17.9%) identified as having 'moderate/severe' cases of anxiety. Gender, HCW status and having had a previous COVID-19 test were significant factors in univariable models and remained independently associated with the risk of anxiety in the multivariable model (Table 3). Male gender (relative risk (RR) 0.57; 95% confidence interval (CI) 0.43–0.75; $P < 0.001$) and being an HCW rather than a layperson (RR 0.53; 95% CI 0.39–0.72; $P < 0.001$) were associated with lower risk of anxiety, whereas having undergone a previous COVID-19 test was associated with a higher risk of anxiety (RR 1.30; 95% CI 1.02–1.66; $P = 0.03$). There were no significant two-way interactions.

Depression

Mean depression scores, measured by the HADS, are presented in Table 2 for each group, with Table 3 summarising the results of univariable and multivariable analyses. Data were available for 430 participants. Overall, the mean depression score was 4.18 ± 3.60 . Fewer 'cases' of depression (according to HADS criteria) were identified than 'cases' of anxiety; 348 of 430 participants (80.9%) had a 'non-case' of depression score and 82 (19.1%) had a 'case of depression' score, including 60 (14%) with a 'borderline case' of depression score and 22 (5.1%) with a 'moderate/severe case' of depression score. HCW status and

Table 1. Participant demographics, with comparisons between health care workers (HCWs) and non-HCWs
Unless indicated otherwise, data are given as *n* (%). TAFE, technical and further education (non-degree diploma or certificate)

Variable	HCWs (<i>n</i> = 151)	Non-HCWs (<i>n</i> = 279)	Total (<i>n</i> = 430)	Significance	
				<i>P</i> -value	χ^2
Mean ($\pm$ s.d.) age (years)	38.5 $\pm$ 11.7	38.5 $\pm$ 13.2	37.6 $\pm$ 12.6	0.072	
Age group (years)					
<30	56 (39.4)	68 (30.0)	124 (33.6)		
30–44	56 (39.4)	96 (42.3)	152 (41.2)		
45–59	24 (16.9)	50 (22.0)	74 (20.1)		
≥ 60	6 (4.2)	13 (5.7)	19 (5.1)		
Total	142 (100.0)	227 (100.0)	369 (100.0)	0.258	4.04
Gender					
Female	107 (70.9)	132 (47.3)	239 (55.6)		
Male	44 (29.1)	146 (52.3)	190 (44.2)		
Prefer not to say	0 (0.0)	1 (0.4)	1 (0.2)		
Total	151 (100.0)	279 (100.0)	430 (100.0)	<0.001	22.24
Occupation					
Professional	122 (80.8)	71 (25.4)	193 (44.9)		
Technicians and trades	5 (3.3)	48 (17.2)	53 (12.3)		
Student	5 (3.3)	33 (11.8)	38 (8.8)		
Community and personal service	3 (2.0)	28 (10.0)	31 (7.2)		
Clerical and administration	10 (6.6)	21 (7.5)	31 (7.2)		
Manager	1 (0.7)	16 (5.7)	17 (4.0)		
Other	5 (3.3)	62 (22.4)	67 (15.7)		
Total	151 (100.0)	279 (100.0)	430 (100.0)	<0.001	129.81
Previous COVID-19 test					
No	68 (45.0)	184 (65.9)	252 (58.6)		
Yes	83 (55.0)	95 (34.1)	178 (41.4)		
Total	151 (100.0)	279 (100.0)	430 (100.0)	<0.001	17.67
Education					
Did not complete high school	0 (0.0)	8 (2.9)	8 (1.9)		
Completed high school	8 (5.3)	45 (16.1)	53 (12.3)		
TAFE certificate or diploma	14 (9.3)	42 (15.1)	56 (13.0)		
University degree (Bachelor)	49 (32.5)	101 (36.2)	150 (34.9)		
Postgraduate degree	76 (50.3)	56 (20.1)	132 (30.7)		
Other	3 (2.0)	20 (7.2)	23 (5.3)		
Prefer not to say	1 (0.7)	7 (2.5)	8 (1.9)		
Total	151 (100.0)	279 (100.0)	430 (100.0)	<0.0001	52.50

level of education were significant factors in univariable models and remained independently associated with the risk of depression in the multivariable model (Table 3). Being an HCW rather than a layperson (RR 0.60; 95% CI 0.37–0.99; $P = 0.04$) was associated with a lower risk of depression. A lower level of educational attainment was also independently associated with the risk of depression ($P = 0.01$); compared with clients who had a postgraduate degree, there was a significantly higher risk of depression in those who had not completed high school (RR 3.84; 95% CI 2.11–7.03; $P < 0.001$) and those in the ‘Other/prefer not to say’ education category (RR = 2.77; 95% CI 1.35–5.68; $P = 0.005$). There were no significant two-way interactions.

Fear of COVID-19

Fear scores, measured by the Fear of COVID-19 Scale, are presented in Table 4. Data were available for 420 participants. The mean overall score for the cohort was 15.95 (maximum score 35, with higher scores indicating more fear). On analysis of the mean total score for fear of COVID-19, gender, HCW status

and education were all statistically significant in univariable models. In the multivariable model, the mean fear of COVID score was significantly higher for females (17.5) than males (15.6; $P < 0.001$). There was a significant interaction between HCW status and level of education ($P < 0.001$). In HCWs, only the lowest level of education (high school or lower) was associated with a higher fear score (22.1) compared with a postgraduate degree (15.0; $P < 0.001$). In non-HCWs, all education levels below a postgraduate degree were associated with higher fear scores ($P = 0.03$ for undergraduate degree, technical and further education (TAFE) certificate or diploma; $P = 0.02$ for high school education or lower).

Discussion

This study evaluated anxiety, depression and fear in a cohort of participants attending a hospital clinic for ambulatory COVID-19 testing. Participants were symptomatic or were close contacts of a confirmed case of COVID-19. Because the clinic was based in a tertiary hospital, 35% of attendees were HCWs. Although the number of HCWs was small ($n = 151$), the data provide some

Table 2. Hospital Anxiety and Depression Scale (HADS) scores
Unless indicated otherwise, data are given as *n* (%). TAFE, technical and further education (non-degree diploma or certificate)

Variable	Mean (±s.d.) total anxiety score	HADS anxiety category		Mean (±s.d.) total depression score	HADS depression category		Total		
		Non-case	Borderline case		Moderate or severe case	Non-case		Borderline case	Moderate or severe case
Age group (years)									
≤30	6.31 ± 4.32	80 (64.5)	23 (18.5)	21 (16.9)	3.99 ± 3.10	109 (87.9)	10 (8.1)	5 (4.0)	124 (100)
30–45	5.85 ± 4.32	100 (65.8)	25 (16.4)	27 (17.8)	4.01 ± 3.49	119 (78.3)	27 (17.8)	6 (3.9)	152 (100)
46–60	5.69 ± 4.36	51 (68.9)	14 (18.9)	9 (12.2)	4.31 ± 4.28	58 (78.4)	10 (13.5)	6 (8.1)	74 (100)
>60	5.21 ± 4.38	14 (73.7)	2 (10.5)	3 (15.8)	3.89 ± 3.74	17 (89.5)	1 (5.3)	1 (5.3)	19 (100)
Total	5.94 ± 4.32	245 (66.4)	64 (17.3)	60 (16.3)	4.06 ± 3.54	303 (82.1)	48 (13.0)	18 (4.9)	369 (100)
Gender									
Female	6.78 ± 4.67	138 (57.7)	46 (19.2)	55 (23)	4.26 ± 3.65	193 (80.8)	34 (14.2)	12 (5.0)	239 (100)
Male	4.09 ± 3.54	141 (74.2)	27 (14.2)	22 (11.6)	5.21 ± 3.89	154 (81.1)	26 (13.7)	10 (5.3)	190 (100)
Prefer not to say	10	0 (0.0)	1 (100)	0 (0)	3	1 (100.0)	0 (0.0)	0 (0.0)	1 (100)
Total	6.09 ± 4.41	279 (64.9)	74 (17.2)	77 (17.9)	4.18 ± 3.60	348 (80.9)	60 (14)	22 (5.1)	430 (100)
Health worker									
No	6.65 ± 4.50	166 (59.5)	50 (17.9)	63 (22.6)	4.68 ± 3.74	216 (77.4)	44 (15.8)	19 (6.8)	279 (100)
Yes	5.07 ± 4.05	113 (74.8)	24 (15.9)	14 (9.3)	3.26 ± 3.13	132 (87.4)	16 (10.6)	3 (2.0)	151 (100)
Total	6.09 ± 4.41	279 (64.9)	74 (17.2)	77 (17.9)	4.18 ± 3.60	348 (80.9)	60 (14)	22 (5.1)	430 (100)
Previous COVID-19 test									
No	5.91 ± 4.53	172 (68.3)	33 (13.1)	47 (18.7)	4.08 ± 3.48	206 (81.7)	36 (14.3)	10 (4.0)	252 (100)
Yes	6.35 ± 4.22	107 (60.1)	41 (23)	30 (16.9)	4.33 ± 3.76	142 (79.8)	24 (13.5)	12 (6.7)	178 (100)
Total	6.09 ± 4.41	279 (64.9)	74 (17.2)	77 (17.9)	4.18 ± 3.60	348 (80.9)	60 (14)	22 (5.1)	430 (100)
Education									
Did not complete high school	10.13 ± 6.08	3 (37.5)	1 (12.5)	4 (50)	9.25 ± 4.17	46 (86.8)	5 (9.4)	2 (3.8)	8 (100)
Completed high school	5.79 ± 4.22	33 (62.3)	13 (24.5)	7 (13.2)	4.02 ± 3.31	2 (25)	3 (37.5)	3 (37.5)	53 (100)
TAFE certificate or diploma	6.79 ± 4.83	34 (60.7)	6 (10.7)	16 (28.6)	4.52 ± 4.41	15 (65.2)	7 (30.4)	1 (4.3)	56 (100)
University degree (Bachelor)	6.15 ± 4.27	99 (66.0)	24 (16)	27 (18)	4.22 ± 3.18	112 (84.8)	13 (9.8)	7 (5.3)	150 (100)
Postgraduate degree	2.38 ± 2.62	90 (68.2)	26 (19.7)	16 (12.1)	1.75 ± 2.19	8 (100)	0 (0)	0 (0)	132 (100)
Other	7.17 ± 5.68	12 (52.2)	4 (17.4)	7 (30.4)	5.13 ± 4.18	44 (78.6)	6 (10.7)	6 (10.7)	23 (100)
Prefer not to say	5.64 ± 3.97	8 (100.0)	0 (0)	0 (0)	3.73 ± 3.45	121 (80.7)	26 (17.3)	3 (2.0)	8 (100)
Total	6.09 ± 4.41	279 (64.9)	74 (17.2)	77 (17.9)	4.18 ± 3.60	348 (80.9)	60 (14)	22 (5.1)	430 (100)

Table 3. HADS anxiety and HADS depression analysis by demographic variables: univariable and multivariable analysis

HADS anxiety and depression scores were divided into two groups: non-cases versus borderline case/moderate-severe cases of depression or anxiety. Only variables with $P \leq 0.10$ on univariable analysis were included in the multivariable model. CI, confidence interval; RR, relative risk; TAFE, technical and further education (non-degree diploma or certificate)

Variable	HADS Anxiety				HADS Depression				
	Univariable model		Multivariable model		Univariable model		Multivariable model		
	RR	95% CI	P-value	RR	95% CI	P-value	RR	95% CI	P-value
Age group (years)									
<30		Reference	0.82	Not included					0.11
30–44	0.96	0.70–1.33	0.83				1.79	Reference	0.04
45–59	0.88	0.58–1.33	0.53				1.79	1.02–3.15	0.08
≥60	0.74	0.37–1.63	0.46				0.97	0.94–3.40	0.85
Gender			<0.001			<0.001		0.22–3.51	0.94
Female		Reference		Reference					
Male	0.61	0.46–0.81	0.001	0.57	0.43–0.75	<0.001	0.98	Reference	0.01
HCW								0.67–1.46	
No		Reference		Reference					
Yes	0.62	0.46–0.85		0.53	0.39–0.72		0.53	Reference	0.04
Previous COVID-19 test								0.35–0.89	
No		Reference	0.08	Reference		0.03			0.61
Yes	1.26	0.97–1.62		1.3	1.02–1.66		1.11	Reference	
Education								0.75–1.64	
Postgraduate degree		Reference	0.58	Not included					0.009
Bachelor degree/TAFE	1.11	0.82–1.52	0.50				1.31	Reference	
Completed high school	1.19	0.77–1.82	0.43				0.87	0.81–2.14	0.27
Did not complete high school	1.96	1.09–3.55	0.03				4.95	0.39–1.94	0.74
Other/prefer not to say	1.76	0.86–3.61	0.12				2.91	2.80–8.74	<0.001
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Table 4. Fear of COVID-19 (total score) analysis by demographic variables: univariable and multivariable analysis

Only variables with $P \leq 0.10$ on univariable analysis were included in the multivariable model. CI, confidence interval; TAFE, technical and further education (non-degree diploma or certificate)

Variable	Univariable model				Multivariable model			
	Mean	Difference	95% CI	P-value	Mean	Difference	95% CI	P-value
Age group				0.76				
<30 years	16.2	Reference			Not included			
30–44 years	15.9	0.2	–1.1, 1.5	0.99				
45–59 years	15.4	0.8	–0.8, 2.4	0.74				
≥60 years	15.4	0.7	–1.9, 3.4	0.95				
Gender				0.001				<0.001
Female	16.7	Reference			17.5			
Male	15	–1.7	–2.8, –0.7		15.6	–1.9	–3.0, –0.9	
HCW				0.06				0.84
No	16.3	Reference			16.4	Reference		
Yes	15.3	–1.1	–2.2, 0.03		16.6	0.2	–1.7, 2.0	
Previous COVID-19 test				0.8				
No	15.9	Reference			Not included			
Yes	16	0.1	–0.9, 1.2					
Education				0.005				<0.001
Postgraduate degree	15.1	Reference			14.9	Reference		
Undergraduate degree/TAFE	15.8	0.7	–0.9, 2.3	0.65	15.1	0.2	–1.0, 1.4	0.71
High school or lower	17.8	2.8	0.6, 4.9	0.007	19.6	4.7	2.6, 6.9	<0.001
Other/prefer not to say	17.4	2.4	–0.5, 5.3	0.14	16.6	1.7	–1.2, 4.7	0.25
Education								
HCW								<0.001
Postgraduate degree	–	–	–	–	15	Reference		–
Undergraduate degree/TAFE	–	–	–	–	13.6	–1.4	–3.2, 0.4	0.13
High school or lower	–	–	–	–	22.1	7.1	3.3, 11.0	<0.001
Other/prefer not to say	–	–	–	–	15.8	0.8	–4.5, 6.1	0.78
Non-HCW								
Postgraduate degree	–	–	–	–	14.7	Reference		–
Undergraduate degree/TAFE	–	–	–	–	16.6	1.8	0.2, 3.5	0.03
High school or lower	–	–	–	–	17.1	2.4	0.3, 4.4	0.02
Other/prefer not to say	–	–	–	–	17.4	2.7	0.2, 5.2	0.04

insight into the mental health of HCWs, as well as that of the general community. During the study period, the number of new cases of COVID-19 in the community remained low. Despite low levels of COVID-19 in the community, the prevalence of symptoms of anxiety and fear of COVID-19 was high.

In this study, HCWs had fewer anxiety symptoms than non-HCWs. HCWs had similar mean scores for fear of COVID-19 to non-HCWs (adjusted mean ‘cases’ of 16.6 vs 16.4 respectively; not significant on multivariable analysis). Previous research demonstrated high levels of fear and anxiety in HCWs during the COVID-19 pandemic in China, regardless of whether they were deployed to frontline positions (Liu *et al.* 2020; Wu *et al.* 2020). It is likely that HCWs in the present study were less concerned because the number of cases of COVID-19 was low and the health system was not overwhelmed, as it was at the time of previous research in China. It is also possible that the higher level of health literacy and greater familiarity with the clinical setting of HCWs relative to non-HCWs may lead to less anxiety among HCWs attending the clinic, although the HADS questionnaire asks participants to report symptoms over the preceding week, rather than just present symptoms. Although HCWs had similar levels of fear about COVID-19 as non-HCWs

overall, their level of anxiety was low (and was lower than non-HCWs and the population normative levels.) This provides some evidence that HCWs appeared to be maintaining aspects of their mental health relatively well at this more ‘chronic’ stage of the pandemic. It is also possible that HCWs are well supported with current interventions or that the experience of HCWs is different in the Australian health setting than in other parts of the world.

The assessment of anxiety in this study demonstrated more anxiety symptoms in women than men (mean scores 6.8 vs 4.1 respectively; $P < 0.001$), and this is consistent with previous studies. The mean HADS score in a baseline cohort study in the UK was 6 for women and 5 for men (Breeman *et al.* 2015). In addition, the prevalence of anxiety symptoms measured by the HADS was higher than expected in women, with the present study showing 23% of women had moderate/severe anxiety symptoms measured by HADS, compared with 19% in the baseline cohort study of Breeman *et al.* (2015). For men, there was a lower than expected prevalence of anxiety symptoms measured by HADS the present study, with 11.6% of men showing moderate/severe anxiety symptoms compared with 12.5% in the normative study (Breeman *et al.* 2015). Research

in the general population early in the pandemic found a prevalence of anxiety symptoms of 21% in women in Spain (Gonzalez-Sanguino *et al.* 2020), measured by the Generalized Anxiety Disorder 2-item questionnaire (GAD-2). Prevalence in China was reported to be between 6.3% (Wang *et al.* 2021) and 36.4% (Wang *et al.* 2020a) in general populations during the first wave of the pandemic. It must also be acknowledged that all participants in the present study had symptoms that could represent COVID-19 or were close contacts of a confirmed case, and this, along with their presence in the testing clinic, could have contributed to the measured anxiety symptoms.

This study found a relatively low prevalence of moderate/severe symptoms of depression measured by HADS. Although the mean depression score of 4.2 was higher than the reported normative score of 3 (Breeman *et al.* 2015), the prevalence of moderate/severe symptoms of depression of 5.3% in men and 5% in women (non-significant difference) was lower than the normative prevalence of 6.9% for both genders (Breeman *et al.* 2015).

Because it is a new measure, few studies have previously used the Fear of COVID-19 Scale. In the present study, the mean fear of COVID-19 score was 17.5 in women and 15.6 in men ($P < 0.001$). This is similar to the score of 16.9 in a predominantly female Italian population at the height of the first phase of the pandemic (Soraci *et al.* 2020). This indicates that the population in the present study has a high level of fear (equivalent to the early days of the pandemic in Europe), despite the low number of COVID-19 cases during the study period. Similar mean scores for the individual items and similarly higher levels of fear in women were found in an Israeli study (Tzur Bitan *et al.* 2020). In a New Zealand population, mean fear of COVID-19 scores of 18.3 and 15.6 were found in two mixed male–female groups (Winter *et al.* 2020). The higher score was found during the strictest lockdown phase and the lower as restrictions began to ease (Winter *et al.* 2020). In an Australian population, a higher level of COVID-19-related fear was noted in women and younger people, similar to the findings in the present study (Rahman *et al.* 2020).

Level of educational attainment was strongly associated with anxiety symptoms and fear of COVID-19. This demonstrates the importance of specific and targeted strategies to support this vulnerable group that may have associated low health literacy.

The strengths of the study are the relatively large sample size and the use of standardised and validated measurement tools. The main limitation of this study is that it was conducted in a COVID-19 testing clinic with symptomatic participants or close contacts of COVID-19 cases, so it is unclear whether the results can be applied to the general population. However, it provides insight into the mental health of symptomatic people in the setting of COVID-19, and it provides some information about the well-being of people working in the healthcare setting. Because the number of HCWs in the study was relatively small, the generalisability of these results cannot be assumed. Also, detailed analysis of the HCW by role was not undertaken due to the small numbers in the subgroups. Information about comorbid or an underlying diagnosis of mental illness was not collected, so the relative contribution of the pandemic to the measured symptoms of anxiety and depression is unclear. The study response rate was challenging to reliably quantify due to infection control measures necessitating the use of a web-based

platform linked from QR codes in the clinic. Although the incompleteness rate of forms (16.8%) was quite low, this may have led to a selection bias in the reported results. It may be anticipated that the level of anxiety would be high in people with ‘suspected’ COVID-19. In addition, the incidence of positive COVID-19 cases fluctuated during the study period and was low overall, so the results may not be applicable to high-caseload areas.

NSW (especially Western Sydney, the study setting) is experiencing a further wave of COVID-19 cases during the second half of 2021 in the setting of low vaccination rates. Daily case numbers have exceeded those during the first wave and lockdown restrictions have returned. Further research is needed to explore how fear of COVID-19 is affecting people during this quite different phase of the pandemic. The data presented in this study provide a point of comparison for current and future research.

Implications for primary health care

The pandemic has caused a significant psychological impact worldwide. This study provides an indication that many Australians were also significantly affected, even in a community where infection rates were low. This stresses the importance of ongoing interventions to support psychological well-being in both HCWs and the wider community. In Australia, most of this burden is carried by primary care practitioners; however, due to the prevalence of symptoms, additional support with large-scale public health interventions may also be required. Strategies to address anxiety could be targeted to women and people who had had lower levels of formal education, as well as to the community in general. The point of testing provides a contact opportunity and may be feasible for interventions now that the testing process has become streamlined. HCWs were found to have relatively lower levels of anxiety and fear than the general community attending the same clinic. Further research is needed to understand whether this is related to the relatively low COVID-19 burden in Australia during the study period, whether the current supports for HCWs are effective or whether HCWs are responding differently in the Australian healthcare system compared with other parts of the world.

Conclusions

This study has demonstrated high levels of anxiety and fear of COVID-19 in laypersons attending ambulatory COVID-19 testing, despite a very low likelihood of a subsequent positive result. There is a strong correlation between fear and anxiety with female gender, people with a lower level of education and individuals attending for repeat testing. The overall level of fear in various subgroups was similar to the alarmingly high results found in Europe in the early stage of the COVID-19 pandemic. HCWs had a lower level of anxiety and fear than members of the general community, and depression scores were comparable with the wider population across both groups. This provides some reassurance that, in an Australian setting with low rates of COVID-19, health professionals are experiencing relatively low levels of anxiety and depression symptoms. Further research could focus on interventions to address the issues identified in the general community, which may include innovative ways to

introduce support for mental health at the time clients attend for testing and support for management in primary care.

Data availability

The data supporting this study are available in the Mendeley Data Repository (doi:10.17632/5psjcfssc7.1)

Conflicts of interest

The authors declare no conflicts of interest.

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References

- Ahmed MA, Jouhar R, Ahmed N, Adnan S, Aftab M, Zafar MS, Khurshid Z (2020) Fear and practice modifications among dentists to combat novel Coronavirus disease (COVID-19) outbreak. *International Journal of Environmental Research and Public Health* **17**, 2821. doi:10.3390/ijerph17082821
- Ahorsu DK, Lin CY, Imani V, Saffari M, Griffiths MD, Pakpour AH (2020) The Fear of COVID-19 Scale: development and initial validation. *International Journal of Mental Health and Addiction*. doi:10.1007/s11469-020-00270-8
- Breeman S, Cotton S, Fielding S, Jones GT (2015) Normative data for the Hospital Anxiety and Depression Scale. *Quality of Life Research: An International Journal of Quality of Life Aspects of Treatment, Care and Rehabilitation* **24**, 391–398. doi:10.1007/s11136-014-0763-z
- Gonzalez-Sanguino C, Ausin B, Castellanos MA, Saiz J, Lopez-Gomez A, Ugidos C, Munoz M (2020) Mental health consequences during the initial stage of the 2020 Coronavirus pandemic (COVID-19) in Spain. *Brain, Behavior, and Immunity* **87**, 172–176. doi:10.1016/j.bbi.2020.05.040
- Lai J, Ma S, Wang Y, Cai Z, Hu J, Wei N, Wu J, Du H, Chen T, Li R, Tan H, Kang L, Yao L, Huang M, Wang H, Wang G, Liu Z, Hu S (2020) Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. *JAMA Network Open* **3**, e203976.
- Liu CY, Yang YZ, Zhang XM, Xu X, Dou QL, Zhang WW, Cheng ASK (2020) The prevalence and influencing factors in anxiety in medical workers fighting COVID-19 in China: a cross-sectional survey. *Epidemiology and Infection* **148**, e98. doi:10.1017/S0950268820001107
- Newby JM, O'Moore K, Tang S, Christensen H, Faasse K (2020) Acute mental health responses during the COVID-19 pandemic in Australia. *PLoS One* **15**, e0236562. doi:10.1371/journal.pone.0236562
- Pfefferbaum B, North CS (2020) Mental health and the Covid-19 pandemic. *The New England Journal of Medicine* **383**, 510–512. doi:10.1056/NEJMp2008017
- Rahman MA, Hoque N, Alif SM, Salehin M, Islam SMS, Banik B, Sharif A, Nazim NB, Sultana F, Cross W (2020) Factors associated with psychological distress, fear and coping strategies during the COVID-19 pandemic in Australia. *Globalization and Health* **16**, 95. doi:10.1186/s12992-020-00624-w
- Rahman MA, Salehin M, Islam SMS, Alif SM, Sultana F, Sharif A, Hoque N, Nazim NB, Cross WM (2021) Reliability of the tools used to examine psychological distress, fear of COVID-19 and coping amongst migrants and non-migrants in Australia. *International Journal of Mental Health Nursing* **30**, 747–758. doi:10.1111/inm.12845
- Rajkumar RP (2020) COVID-19 and mental health: a review of the existing literature. *Asian Journal of Psychiatry* **52**, 102066. doi:10.1016/j.ajp.2020.102066
- Royal Australian College of General Practitioners (RACGP) (n.d.) 'Position Statement: Mental health care in general practice.' Available at <https://www.racgp.org.au/advocacy/position-statements/view-all-position-statements/clinical-and-practice-management/mental-health-care-in-general-practice> [Verified June 2021]
- Soraci P, Ferrari A, Abbiati FA, Del Fante E, De Pace R, Urso A, Griffiths MD (2020) Validation and psychometric evaluation of the Italian version of the Fear of COVID-19 Scale. *International Journal of Mental Health and Addiction*. doi:10.1007/s11469-020-00277-1
- Stanton R, To QG, Khalesi S, Williams SL, Alley SJ, Thwaite TL, Fenning AS, Vandelanotte C (2020) Depression, Anxiety and Stress during COVID-19: associations with changes in physical activity, sleep, tobacco and alcohol use in Australian adults. *International Journal of Environmental Research and Public Health* **17**, 4065.
- Tzur Bitan D, Grossman-Giron A, Bloch Y, Mayer Y, Shiffman N, Mendlovic S (2020) Fear of COVID-19 scale: Psychometric characteristics, reliability and validity in the Israeli population. *Psychiatry Research* **289**, 113100. doi:10.1016/j.psychres.2020.113100
- Wang C, Pan R, Wan X, Tan Y, Xu L, Ho CS, Ho RC (2020a) Immediate psychological responses and associated factors during the initial stage of the 2019 Coronavirus disease (COVID-19) epidemic among the general population in China. *International Journal of Environmental Research and Public Health* **17**, 1729. doi:10.3390/ijerph17051729
- Wang C, Pan R, Wan X, Tan Y, Xu L, McIntyre RS, Choo FN, Tran B, Ho R, Sharma VK, Ho C (2020b) A longitudinal study on the mental health of general population during the COVID-19 epidemic in China. *Brain, Behavior, and Immunity* **87**, 40–48. doi:10.1016/j.bbi.2020.04.028
- Wang Y, Di Y, Ye J, Wei W (2021) Study on the public psychological states and its related factors during the outbreak of coronavirus disease 2019 (COVID-19) in some regions of China. *Psychology, Health and Medicine* **26**, 13–22. doi:10.1080/13548506.2020.1746817
- Winter T, Riordan BC, Pakpour AH, Griffiths MD, Mason A, Poulgrain JW, Scarf D (2020) Evaluation of the English version of the Fear of COVID-19 Scale and its relationship with behavior change and political beliefs. *International Journal of Mental Health and Addiction*. doi:10.1007/s11469-020-00342-9
- Wu Y, Wang J, Luo C, Hu S, Lin X, Anderson AE, Bruera E, Yang X, Wei S, Qian Y (2020) A comparison of burnout frequency among oncology physicians and nurses working on the frontline and usual wards during the COVID-19 epidemic in Wuhan, China. *Journal of Pain and Symptom Management* **60**, e60–e65. doi:10.1016/j.jpainsymman.2020.04.008
- Zigmond AS, Snaith RP (1983) The hospital anxiety and depression scale. *Acta Psychiatrica Scandinavica* **67**, 361–370. doi:10.1111/j.1600-0447.1983.tb09716.x