**THE JOURNAL OF RURAL HEALTH** | NRHA

## ORIGINAL ARTICLE

# Mental health at the COVID-19 frontline: An assessment of distress, fear, and coping among staff and attendees at screening clinics of rural/regional settings of Victoria, Australia

**Muhammad Aziz Rahman MBBS,MPH,CertGTC,GCHECTL,PhD**[1,2,3] |
**Dale Ford MBBS,FRACGP,FRARRM**[4] | **Grace Sousa BS,MD**[5,6] | **Lorraine Hedley RN,BA Nursing (Post-regisration)MACN**[4] | **Louise Greenstock BSc (Hons),PGCert (SS),PhD**[7] |
**Wendy M. Cross RN,BAppSc,Med,PhD**[1] | **Susan Brumby RN,DipFarm M'ment,GCertHELT,GCertSciCommun,GDipWomensSt,MHM, PhD**[2,4]

[1] School of Health, Federation University Australia, Berwick, Victoria, Australia

[2] National Centre for Farmer Health, Deakin University, Hamilton, Victoria, Australia

[3] Faculty of Public Health, Universitas Airlangga, Surabaya, Indonesia

[4] Western District Health Service (WDHS), Hamilton, Victoria, Australia

[5] South West Healthcare (SWH), Warrnambool, Victoria, Australia

[6] Hawaii Emergency Physicians Associated, Honolulu, Hawaii, USA

[7] Western Alliance, Warrnambool, Victoria, Australia

**Correspondence**
Muhammad Aziz Rahman, School of Health, Federation University Australia, 100 Clyde Road, Berwick, VIC 3804, Australia.
Email: ma.rahman@federation.edu.au
Susan Brumby, National Centre for Farmer Health, Deakin University, Western District Health Service (WDHS), Tyers Street, Hamilton, VIC 3300, Australia.
Email: susan.brumby@wdhs.net

## Abstract

**Purpose:** Research examining psychological well-being associated with COVID-19 in rural/regional Australia is limited. This study aimed to assess the extent of psychological distress, fear of COVID-19, and coping strategies among the attendees in COVID-19 screening clinics at 2 rural Victorian settings.

**Methods:** A cross-sectional study was conducted during July 2020 to February 2021 inclusive. Participants were invited to fill in an online questionnaire. Kessler Psychological Distress Scale (K-10), Fear of COVID-19 Scale, and Brief Resilient Coping Scale were used to assess psychological distress, fear of COVID-19, and coping, respectively.

**Findings:** Among 702 total participants, 69% were females and mean age ($\pm$SD) was 49 ($\pm$15.8) years. One in 5 participants (156, 22%) experienced high to very high psychological distress, 1 in 10 (72, 10%) experienced high fear, and more than half (397, 57%) had medium to high resilient coping. Participants with mental health issues had higher distress (AOR 10.4, 95% CI: 6.25-17.2) and fear (2.56, 1.41-4.66). Higher distress was also associated with having comorbidities, increased smoking (5.71, 1.04-31.4), and alcohol drinking (2.03, 1.21-3.40). Higher fear was associated with negative financial impact, drinking alcohol (2.15, 1.06-4.37), and increased alcohol drinking. Medium to high resilient coping was associated with being $\geq$60 years old (1.84, 1.04-3.24) and completing Bachelor and above levels of education.

**Conclusion:** People who had pre-existing mental health issues, comorbidities, smoked, and consumed alcohol were identified as high-risk groups for poorer psychological well-being in rural/regional Victoria. Specific interventions to support the mental well-being of these vulnerable populations, along with engaging health care providers, should be considered.

**KEYWORDS**
coping, COVID-19, mental health, resilience, rural

# INTRODUCTION

The first case of confirmed COVID-19 was detected in Victoria, Australia, on January 25, 2020,[1] and then subsequently found in other Australian states among returned travelers. The international borders were closed to all noncitizens and nonresidents in March 2020 to reduce the number of infections coming in from overseas.[2] However, as local transmission increased, a number of measures were put in place to reduce opportunities for infection. Those measures included increased access to COVID-19 screening, social distancing, working from home, restriction of visitors to home gatherings, closure of educational facilities (schools, TAFE, and universities), introduction of remote learning, and restrictions to visitors to health services and aged care residences.[3] At that stage, the wearing of face masks was not compulsory. In June 2020, a second wave of infections affected Victoria, spreading rapidly, with a peak of 687 infections/cases being reported in 1 day. Another period of lockdown was commenced and mandatory mask wearing was introduced, along with nightly curfews and the restriction of movement to a 5 km radius, which remained until November 22, 2020. While COVID transmission in regional Victoria occurred at lower levels than in Melbourne and some restrictions were lifted earlier, there were several outbreaks and cases (n = 610) in the Barwon South West region of Victoria. Those outbreaks mostly occurred around workplaces, such as abattoirs and aged care, and were linked to the movement of people from infected metropolitan to regional areas.[4]

Rural or regional areas are resource-stretched with specialists, doctors, nurses, and mental health worker shortages commonplace.[5] Globally, there have been examples where regional villages have managed to reduce COVID-19 spread by proactively undertaking community screenings, enforcing social isolation, communicating actively with their communities, and reducing contagion through restrictions.[6] In response to the COVID-19 outbreak in Victoria, some regional health services focused their services to prepare and manage potential outbreaks and concentrate heavily on prevention, detection, screening, community communication, and clinical management of suspected cases. That involved redeployment of staff to areas, such as drive-through screening clinics and respiratory assessment clinics (RACs), which included the likely contact with active COVID-19 cases. Such modified service delivery from hospital settings, along with the ongoing fear of coronavirus spread in communities, might increase stress levels for patients with health conditions that put them at higher risk for COVID-19.

Australian government pandemic restrictions have resulted in social, economic, and health consequences, affecting both health-seeking behaviors of Australians and the manner of interactions with health care workers.[7,8] A recent report in *The Lancet* highlighted the adverse effects of the pandemic, both on people with diagnosed mental illness and the general population's mental health being exacerbated by fear, self-isolation, and stigma.[9] In response to the growing global pandemic and potential COVID-19 spread across Victoria, COVID-19 screening clinics were established at Hamilton Base Hospital (300 km west of Melbourne) and South West Health Care, 256 km south west of Melbourne, to enable community members with respiratory symptoms or concerns of contact to be swabbed.[10,11] Both Hamilton and South West Health Care catchments extend to the South Australian border with some of the region's working population commuting or transporting goods and livestock into South Australia.

Frontline health care workers were redeployed and rostered to assess attendees clinically and collect swabs if they met the latest and ever-changing testing criteria. Attendees were then instructed to self-isolate at home until the results were returned, usually within 48 hours; however, initially this was up to 168 hours (7 days).[11] Pathology swabs had to be sent to Melbourne (300 km away) for analysis and then returned to the health service, resulting in delays of return of results to attendees.

Frontline health care workers reported stress due to the risk of transmission from confirmed, suspected, or asymptomatic cases, working with new and frequently shifting testing criteria, and the continual wearing of personal protective equipment (PPE).[12,13] Health care workers also reported anxiousness when returning home and possibly exposing their families to the risk of COVID-19. Higher rates of infection were reported among health care workers globally, particularly in staff undertaking testing.[14]

Focusing on the psychological impact of current and future outbreaks was important, as evidence from previous epidemics suggests that not only short-term but also long-term impacts could occur.[15,16] Improving our approach to community screening, whether through drive-through or community clinics, was important for both the current COVID-19 pandemic and for future operation. In this study, we aimed to assess the extent of psychological distress, fear of COVID-19, and coping strategies among attendees at 2 COVID119 screening clinics in regional/rural Victoria, Australia.

# MATERIALS AND METHODS

## Study design and settings

This was a cross-sectional study. Two COVID-19 clinics, one a drive-through and the other an RAC, were selected as study sites. Those sites are approximately 100 km apart by road with one based in a predominantly agricultural setting and the other with a larger population, in manufacturing, agriculture, meatworks, and tourism. Both sites are more than 250 km away from metropolitan Melbourne. The study was conducted during January to February 2021 and included clinic attendees from July 2020 to February 2021 inclusive.

## Study population

Participants, ≥18 years of age, capable of responding to an online questionnaire in English, and residing in rural/regional settings of Western Victoria, were invited to participate. The study participants included patients (attendees), who presented at the study screening sites, irrespective of test results for COVID-19 from July 2020 to February

**TABLE 1** Characteristics of the study population

| Characteristics | Total, n (%) |
| --- | --- |
| Total study participants | 702 |
| **Age (in years)** | 702 |
| Mean (±SD) | 49 (15.8) |
| Range | 18-87 |
| **Age groups** | 702 |
| 18-29 years | 102 (14.5) |
| 30-59 years | 386 (55.0) |
| ≥60 years | 214 (30.5) |
| **Gender** | 702 |
| Male | 215 (30.6) |
| Female | 481 (68.5) |
| Others | 1 (0.1) |
| Prefer not to say | 5 (0.7) |
| **Born in Australia** | 702 |
| Yes | 615 (87.6) |
| No | 87 (12.4) |
| **Living status** | 702 |
| Live alone | 108 (15.4) |
| Live with family members (partner and/or children) | 518 (73.9) |
| Live with others (shared accommodation/others) | 75 (10.7) |
| **Completed level of education** | 700 |
| Grade 1-12 | 144 (20.6) |
| Trade/Certificate/Diploma | 228 (32.6) |
| Bachelor and above | 328 (46.9) |
| **Self-identification as a frontline or essential service worker** | 702 |
| Yes | 302 (43.0) |
| No | 400 (57.0) |
| **COVID-19 impacted financial situation** | 701 |
| No impact | 456 (65.0) |
| Positively | 90 (12.8) |
| Negatively | 155 (22.1) |
| **Number of comorbidities** | 697 |
| No | 376 (53.9) |
| Single comorbidity | 143 (20.5) |
| Multiple comorbidities | 178 (25.4) |
| **Specific comorbidities** | 697 |
| No | 376 (53.9) |
| Psychiatric/mental health issues | 121 (17.4) |
| Other comorbidities[a] | 200 (28.7) |
| **Smoking** | 702 |
| Never smokers | 14 (2.0) |
| Ex-smokers | 462 (65.8) |
| Current smokers (daily/weekly/monthly/occasionally) | 226 (32.2) |

(Continues)

**TABLE 1** (Continued)

| Characteristics | Total, n (%) |
| --- | --- |
| **Increased smoking since July 2020 (among daily smokers)** | 51 |
| Yes | 19 (37.3) |
| No | 32 (62.7) |
| **Current alcohol drinking** | 700 |
| Yes | 486 (69.4) |
| No | 214 (30.6) |
| **Frequency of alcohol drinking** | 486 |
| Everyday | 38 (7.8) |
| More than 5 times a week | 43 (8.8) |
| 2-4 times a week | 154 (31.7) |
| Once a week | 67 (13.8) |
| Only on weekends | 65 (13.4) |
| On special occasions | 119 (24.5) |
| **Stronger alcohol drinking** | 486 |
| Yes | 101 (20.8) |
| No | 385 (79.2) |
| **Increased alcohol drinking since July 2020** | 486 |
| Yes | 97 (20.0) |
| No | 389 (80.0) |
| **Provided care to a family member/patient with known/suspected case of COVID-19** | 702 |
| Yes | 59 (8.4) |
| No | 643 (91.6) |
| **Identification as a patient/health care service use since July 2020** | 702 |
| Yes | 284 (40.5) |
| No | 418 (59.5) |
| **Health care service use to overcome COVID-19-related stress since July 2020** | 702 |
| Yes | 47 (6.7) |
| No | 655 (93.3) |
| **Test sites** | 702 |
| Hamilton Base Hospital, Drive through | 236 (33.6) |
| Hamilton Base Hospital, Accident and Emergency | 14 (2.0) |
| South West Healthcare, Respiratory Clinic | 93 (13.2) |
| South West Healthcare, Drive/Walk through | 359 (51.1) |
| **Number of tests done** | 539 |
| Mean (±SD) | 2 (1.3) |
| Mode | 1 |
| Range | 0-10 |

[a](Stroke/hypertension/hyperlipidemia/diabetes/cancer/chronic respiratory illness).

**TABLE 2** Level of psychological distress among the study participants

| Anxiety and Depression Checklist (K10) (last 4 weeks) | Total, n (%) |
|---|---|
| About how often did you feel tired out for no good reason? | 702 |
| None | 213 (30.3) |
| A little | 184 (26.2) |
| Sometime | 209 (29.8) |
| Most of the time | 72 (10.3) |
| All the time | 24 (3.4) |
| About how often did you feel nervous? | 702 |
| None | 266 (37.9) |
| A little | 208 (29.6) |
| Sometime | 179 (25.5) |
| Most of the time | 43 (6.1) |
| All the time | 6 (0.9) |
| About how often did you feel so nervous that nothing could calm you down? | 702 |
| None | 532 (75.8) |
| A little | 113 (16.1) |
| Sometime | 48 (6.8) |
| Most of the time | 6 (0.9) |
| All the time | 3 (0.4) |
| About how often did you feel hopeless? | 702 |
| None | 472 (67.2) |
| A little | 127 (18.1) |
| Sometime | 74 (10.5) |
| Most of the time | 24 (3.4) |
| All the time | 5 (0.7) |
| About how often did you feel restless or fidgety? | 702 |
| None | 331 (47.2) |
| A little | 200 (28.5) |
| Sometime | 122 (17.4) |
| Most of the time | 38 (5.4) |
| All the time | 11 (1.6) |
| About how often did you feel so restless you could not sit still? | 702 |
| None | 483 (68.8) |
| A little | 149 (21.2) |
| Sometime | 57 (8.1) |
| Most of the time | 9 (1.3) |
| All the time | 4 (0.6) |
| About how often did you feel so depressed? | 702 |

(Continues)

**TABLE 2** (Continued)

| Anxiety and Depression Checklist (K10) (last 4 weeks) | Total, n (%) |
|---|---|
| None | 381 (54.3) |
| A little | 184 (26.2) |
| Sometime | 94 (13.4) |
| Most of the time | 37 (5.3) |
| All the time | 6 (0.9) |
| About how often did you feel that everything was an effort? | 702 |
| None | 275 (39.2) |
| A little | 248 (35.3) |
| Sometime | 100 (14.2) |
| Most of the time | 62 (8.8) |
| All the time | 17 (2.4) |
| About how often did you feel so sad that nothing could cheer you up? | 702 |
| None | 502 (71.5) |
| A little | 126 (17.9) |
| Sometime | 55 (7.8) |
| Most of the time | 17 (2.4) |
| All the time | 2 (0.3) |
| About how often did you feel worthless? | 702 |
| None | 498 (70.9) |
| A little | 113 (16.1) |
| Sometime | 60 (8.5) |
| Most of the time | 24 (3.4) |
| All the time | 7 (1.0) |
| K10 score (total) | 702 |
| Mean (±SD) | 17.1 (7.1) |
| Range | 10-46 |
| Level of psychological distress (K10 categories) | 702 |
| Low (score 10-15) | 366 (52.1) |
| Moderate (score 16-21) | 180 (25.6) |
| High (score 22-29) | 100 (14.2) |
| Very high (score 30-50) | 56 (8.0) |

2021. Participants who partially completed the questionnaire were excluded. In addition, participants who took <1 minute to complete the survey were excluded from the analyses to avoid information bias.

## Sampling

All participants fulfilling the inclusion criteria were invited to participate. Sample size was calculated using OpenEpi. Considering a total

**TABLE 3** Factors associated with psychological distress among the study population (based on K10 score)

| Characteristics | High to very high (score 22+), n (%) | Low to moderate (score 10-21), n (%) | Unadjusted analyses | | | Adjusted analyses | | |
|---|---|---|---|---|---|---|---|---|
| | | | P | OR | 95% CIs | P | AOR | 95% CIs |
| Total study participants | 156 | 546 | | | | | | |
| **Age groups** | 156 | 546 | | | | | | |
| 18-29 years | 41 (26.3) | 61 (11.2) | | 1 | | | 1 | |
| 30-59 years | 81 (51.9) | 305 (55.9) | .000 | 0.40 | 0.25-0.63 | .018 | 0.51 | 0.30-0.89 |
| ≥60 years | 34 (21.8) | 180 (33.0) | .000 | 0.28 | 0.16-0.48 | .001 | 0.33 | 0.17-0.62 |
| **Gender** | 153 | 543 | | | | | | |
| Male | 38 (24.8) | 177 (32.6) | | 1 | | | 1 | |
| Female | 115 (75.2) | 366 (67.4) | .067 | 1.46 | 0.97-2.20 | .445 | 1.18 | 0.77-1.82 |
| **Living status** | 155 | 546 | | | | | | |
| Live alone | 32 (20.6) | 76 (13.9) | .042 | 1.61 | 1.01-2.54 | .794 | 1.10 | 0.54-2.25 |
| Live with family members (partner and/or children) | 95 (61.3) | 423 (77.5) | .000 | 0.46 | 0.31-0.67 | .109 | 0.60 | 0.32-1.12 |
| Live with others (shared accommodation/others) | 28 (18.1) | 47 (8.6) | .001 | 2.34 | 1.41-3.89 | NA | NA | NA |
| **Born in Australia** | 156 | 546 | | | | | | |
| No | 18 (11.5) | 69 (12.6) | | 1 | | | 1 | |
| Yes | 138 (88.5) | 477 (87.4) | .713 | 1.11 | 0.64-1.93 | .621 | 1.16 | 0.65-2.08 |
| **Completed level of education** | 155 | 545 | | | | | | |
| Grade 1-12 | 32 (20.6) | 112 (20.6) | | 1 | | | 1 | |
| Trade/Certificate/Diploma | 50 (32.3) | 178 (32.7) | .947 | 0.98 | 0.59-1.63 | .879 | 1.04 | 0.61-1.77 |
| Bachelor and above | 73 (47.1) | 255 (46.8) | .993 | 1.00 | 0.63-1.61 | .828 | 1.06 | 0.64-1.75 |
| **Self-identification as a frontline or essential service worker** | 156 | 546 | | | | | | |
| No | 87 (55.8) | 313 (57.3) | | 1 | | | 1 | |
| Yes | 69 (44.2) | 233 (42.7) | .729 | 1.07 | 0.74-1.52 | .807 | 0.95 | 0.64-1.41 |
| **COVID-19 impacted financial situation** | 155 | 546 | | | | | | |
| No | 77 (49.7) | 379 (69.4) | | 1 | | | 1 | |
| Positively | 26 (16.8) | 64 (11.7) | .009 | 2.00 | 1.19-3.35 | .015 | 1.96 | 1.14-3.37 |
| Negatively | 52 (33.5) | 103 (18.9) | .000 | 2.48 | 1.64-3.76 | .000 | 2.49 | 1.62-3.84 |
| **Comorbidities** | 154 | 543 | | | | | | |
| No | 50 (32.5) | 326 (60.0) | | 1 | | | 1 | |
| Single comorbidity | 47 (30.5) | 96 (17.7) | .000 | 3.19 | 2.02-5.05 | .000 | 3.70 | 2.25-6.08 |
| Multiple comorbidities | 57 (37.0) | 121 (22.3) | .000 | 3.07 | 2.00-4.74 | .000 | 5.74 | 3.38-9.74 |
| **Comorbidities** | 154 | 543 | | | | | | |
| No | 50 (32.5) | 326 (60.0) | | 1 | | | 1 | |
| Psychiatric/mental health issues | 71 (46.1) | 50 (9.2) | .000 | 9.26 | 5.79-14.8 | .000 | 10.4 | 6.25-17.2 |
| Other comorbidities[a] | 33 (21.4) | 167 (30.8) | .298 | 1.29 | 0.80-2.08 | .025 | 1.84 | 1.08-3.14 |
| **Smoking** | 156 | 546 | | | | | | |
| Never smoker | 3 (1.9) | 11 (2.0) | | 1 | | | 1 | |
| Ever smoker (daily/nondaily/ex) | 153 (98.1) | 535 (98.0) | .942 | 1.05 | 0.29-3.81 | .506 | 1.68 | 0.41-6.03 |

(Continues)

**TABLE 3** (Continued)

| Characteristics | High to very high (score 22+), n (%) | Low to moderate (score 10-21), n (%) | Unadjusted analyses | | | Adjusted analyses | | |
|---|---|---|---|---|---|---|---|---|
| | | | P | OR | 95% CIs | P | AOR | 95% CIs |
| **Increased smoking since July 2020 (among daily smokers)** | 19 | 32 | | | | | | |
| No | 7 (36.8) | 25 (78.1) | | 1 | | | 1 | |
| Yes | 12 (63.2) | 7 (21.9) | .005 | 6.12 | 1.75-21.4 | .045 | 5.71 | 1.04-31.4 |
| Current alcohol drinking | 156 | 544 | | | | | | |
| No | 52 (33.3) | 162 (29.8) | | 1 | | | 1 | |
| Yes | 104 (66.7) | 382 (70.2) | .396 | 0.85 | 0.60-1.24 | .611 | 0.90 | 0.60-1.35 |
| **Stronger alcohol drinking since July 2020** | 104 | 382 | | | | | | |
| No | 72 (69.2) | 313 (81.9) | | 1 | | | 1 | |
| Yes | 32 (30.8) | 69 (18.1) | .005 | 2.02 | 1.23-3.30 | .213 | 1.41 | 0.82-2.41 |
| **Increased occasions of alcohol drinking since July 2020** | 104 | 382 | | | | | | |
| No | 70 (67.3) | 319 (83.5) | | 1 | | | 1 | |
| Yes | 34 (32.7) | 63 (16.5) | .000 | 2.46 | 1.51-4.02 | .008 | 2.03 | 1.21-3.40 |
| **Provided care to a family member/patient with known/suspected case of COVID-19** | 156 | 546 | | | | | | |
| No | 139 (89.1) | 504 (92.3) | | 1 | | | 1 | |
| Yes | 17 (10.9) | 42 (7.7) | .205 | 1.47 | 0.81-2.66 | .404 | 1.31 | 0.69-2.50 |
| **Identification as a patient/health care service use since July 2020** | 156 | 546 | | | | | | |
| No | 75 (48.1) | 343 (62.8) | | 1 | | | 1 | |
| Yes | 81 (51.9) | 203 (37.2) | .001 | 1.82 | 1.27-2.61 | .001 | 1.91 | 1.30-2.79 |
| **Level of fear of COVID-19 (FCV-19S categories)** | 156 | 546 | | | | | | |
| Low (score 7-21) | 125 (80.1) | 505 (92.5) | | 1 | | | 1 | |
| High (score 22-35) | 31 (19.9) | 41 (7.5) | .000 | 3.05 | 1.84-5.07 | .000 | 3.26 | 1.93-5.53 |
| **Level of coping (BRCS categories)** | 156 | 546 | | | | | | |
| Low resilient copers (score 4-13) | 76 (48.7) | 229 (41.9) | | 1 | | | 1 | |
| Medium to high resilient copers (score 14-20) | 80 (51.3) | 317 (58.1) | .133 | 0.76 | 0.53-1.09 | .215 | 0.79 | 0.54-1.45 |
| **Health care service use to overcome COVID-19-related stress since July 2020** | 156 | 546 | | | | | | |
| No | 130 (83.3) | 525 (96.2) | | 1 | | | 1 | |
| Yes | 26 (16.7) | 21 (3.8) | .000 | 5.00 | 2.73-9.17 | .000 | 4.79 | 2.56-8.99 |

*Note*: Adjusted for: age, gender, living status, born in Australia, and education.
[a]Cardiac disases/stroke/hypertension/hyperlipidemia/diabetes/cancer/chronic respiratory illness.

population of 120,718 (covering the study hospital's catchment areas of Warrnambool and the South-West region),[17] assuming 50% prevalence of stress among Australians, 95% confidence intervals (CIs), and 80% power, the estimated minimum sample size was 383 at each site. Therefore, we aimed for a total of 766 participants as our total sample size.

## Data collection

The 2 selected COVID-19 screening clinics operated independently of each other by the respective health services. Nevertheless, the services operated in a similar manner. Attendees who presented at the clinics for screening were treated as "patients" and their

**TABLE 4** Level of fear of COVID-19 among the study participants

| Fear of COVID-19 Scale (FCV-19S) individual items | Total, n (%) |
|---|---|
| **I am most afraid of COVID-19** | 702 |
| Strongly disagree | 82 (11.7) |
| Somewhat disagree | 165 (23.5) |
| Neither agree nor disagree | 229 (32.6) |
| Somewhat agree | 197 (28.1) |
| Strongly agree | 29 (4.1) |
| **It makes me uncomfortable to think about COVID-19** | 702 |
| Strongly disagree | 110 (15.7) |
| Somewhat disagree | 221 (31.5) |
| Neither agree nor disagree | 224 (31.9) |
| Somewhat agree | 135 (19.2) |
| Strongly agree | 12 (1.7) |
| **My hands become clammy when I think about COVID-19** | 702 |
| Strongly disagree | 384 (54.7) |
| Somewhat disagree | 239 (34.0) |
| Neither agree nor disagree | 71 (10.1) |
| Somewhat agree | 6 (0.9) |
| Strongly agree | 2 (0.3) |
| **I am afraid of losing my life because of COVID-19** | 702 |
| Strongly disagree | 227 (32.3) |
| Somewhat disagree | 218 (31.1) |
| Neither agree nor disagree | 136 (19.4) |
| Somewhat agree | 113 (16.1) |
| Strongly agree | 8 (1.1) |
| **When watching news and stories about COVID-19 on social media, I become nervous or anxious** | 702 |
| Strongly disagree | 152 (21.7) |
| Somewhat disagree | 175 (24.9) |
| Neither agree nor disagree | 189 (26.9) |
| Somewhat agree | 167 (23.8) |
| Strongly agree | 19 (2.7) |
| **I cannot sleep because I'm worrying about getting COVID-19** | 702 |
| Strongly disagree | 389 (55.4) |
| Somewhat disagree | 235 (33.5) |
| Neither agree nor disagree | 69 (9.8) |
| Somewhat agree | 8 (1.1) |
| Strongly agree | 1 (1.1) |
| **My heart races or palpitates when I think about getting COVID-19** | 702 |
| Strongly disagree | 363 (51.7) |

(Continues)

**TABLE 4** (Continued)

| Fear of COVID-19 Scale (FCV-19S) individual items | Total, n (%) |
|---|---|
| Somewhat disagree | 235 (33.5) |
| Neither agree nor disagree | 79 (11.3) |
| Somewhat agree | 24 (3.4) |
| Strongly agree | 1 (0.1) |
| **FCV-19S score (total)** | 702 |
| Mean (±SD) | 15.2 (4.8) |
| Range | 7-29 |
| **Level of fear of COVID-19 (FCV-19S categories)** | 702 |
| Low (score 7-21) | 630 (89.7) |
| High (score 22-35) | 72 (10.3) |

personal contact details were recorded by a health care worker during the screening process. Attendee details, including phone numbers, were saved and stored in the TrakCare® Electronic Medical Record System (InterSystems Corp, Cambridge, MA) at the relevant health service. Health information teams at both study sites extracted the mobile phone numbers securely from TrakCare®, which generated a list of deidentified mobile numbers (no names or other information) that was passed on securely to the research team.

An SMS was sent to all extracted mobile phone numbers with a short message inviting them to participate in the study. Invitations to complete the survey were generic, not specifically addressed to any individual, and were sent from Western District Health Service. The SMS included a QR code and the link to the online survey. Since the screening clinics were operating during the data collection period, eligible attendees at both clinics were also invited to participate with the study information included on the screening clinics handout. If anyone was interested in participating in the study, they were advised to hold their mobile phone over the QR code, which directed them to the survey on their phones immediately. The online survey was also advertised on flyers posted at the screening clinics.

The web-based survey was developed using the Qualtrics (Provo, UT) surveying platform by Federation University Australia. The first screen contained a Plain Language Information Statement (PLIS) and Consent Form. Only the participants who provided consent and agreed to participate in the study could move to the next screen containing the self-administered survey.

## Study tool

A structured survey based on previously published studies by the first author (MAR) was used and adapted for this cohort.[18,19] Following the initial screening questions to confirm eligibility, the survey included questions on sociodemographics, self-reported comorbidities, behavioral risk factors, exposure and contact history of COVID-19,

**TABLE 5** Factors associated with levels of fear of COVID-19 among the study population (based on FCV-19S score)

| Characteristics | High (score 22-35), n (%) | Low (score 7-21), n (%) | Unadjusted analyses | | | Adjusted analyses | | |
|---|---|---|---|---|---|---|---|---|
| | | | P | OR | 95% CIs | P | AOR | 95% CIs |
| Total study participants | 72 | 630 | | | | | | |
| **Age groups** | 72 | 630 | | | | | | |
| 18-29 years | 11 (15.3) | 91 (14.4) | | 1 | | | 1 | |
| 30-59 years | 39 (54.2) | 347 (55.1) | .840 | 0.93 | 0.46-1.89 | .888 | 1.06 | 0.46-2.44 |
| ≥60 years | 22 (30.6) | 192 (30.5) | .891 | 0.95 | 0.44-2.04 | .960 | 1.02 | 0.42-2.50 |
| **Gender** | 72 | 624 | | | | | | |
| Male | 17 (23.6) | 198 (31.7) | | 1 | | | 1 | |
| Female | 55 (76.4) | 426 (68.3) | .160 | 1.50 | 0.85-2.66 | .121 | 1.59 | 0.88-2.87 |
| **Living status** | 72 | 630 | | | | | | |
| Live alone | 14 (19.5) | 94 (14.9) | .318 | 1.37 | 0.74-2.56 | .576 | 1.35 | 0.48-3.81 |
| Live with family members (partner and/or children) | 50 (69.4) | 468 (74.4) | .365 | 0.78 | 0.46-1.33 | .963 | 0.98 | 0.38-2.49 |
| Live with others (shared accommodation/others) | 8 (11.1) | 67 (10.7) | .905 | 1.05 | 0.48-2.28 | NA | NA | NA |
| **Born in Australia** | 72 | 630 | | | | | | |
| No | 10 (13.9) | 77 (12.2) | | 1 | | | 1 | |
| Yes | 62 (86.1) | 553 (87.8) | .685 | 0.86 | 0.42-1.75 | .307 | 0.68 | 0.32-1.43 |
| **Completed level of education** | 72 | 628 | | | | | | |
| Grade 1-12 | 18 (25.0) | 126 (20.1) | | 1 | | | 1 | |
| Trade/Certificate/Diploma | 29 (40.3) | 199 (31.7) | .951 | 1.02 | 0.54-1.91 | .934 | 1.03 | 0.54-1.96 |
| Bachelor and above | 25 (34.7) | 303 (48.2) | .093 | 0.58 | 0.30-1.10 | .059 | 0.52 | 0.27-1.02 |
| **Self-identification as a frontline or essential service worker** | 72 | 630 | | | | | | |
| No | 41 (56.9) | 359 (57.0) | | 1 | | | 1 | |
| Yes | 31 (43.1) | 271 (43.0) | .995 | 1.00 | 0.61-1.64 | .821 | 1.06 | 0.63-1.80 |
| **COVID-19 impacted financial situation** | 72 | 629 | | | | | | |
| No | 32 (44.4) | 424 (67.4) | | 1 | | | 1 | |
| Positively | 13 (18.1) | 77 (12.2) | *.022* | *2.24* | *1.12-4.45* | .026 | 2.23 | 1.10-4.52 |
| Negatively | 27 (37.5) | 128 (20.3) | *.000* | *2.79* | *1.61-4.84* | *.000* | *2.83* | *1.62-4.97* |
| **Comorbidities** | 72 | 625 | | | | | | |
| No | 31 (43.1) | 345 (55.2) | | 1 | | | 1 | |
| Single comorbidity | 17 (23.6) | 126 (20.2) | .203 | 1.50 | 0.80-2.81 | .206 | 1.51 | 0.80-2.85 |
| Multiple comorbidities | 24 (33.3) | 154 (24.6) | .056 | 1.73 | 0.99-3.05 | .060 | 1.80 | 0.98-3.34 |
| **Comorbidities** | 72 | 625 | | | | | | |
| No | 31 (43.1) | 345 (55.2) | | 1 | | | 1 | |
| Psychiatric/mental health issues | 23 (31.9) | 98 (15.7) | *.001* | *2.61* | *1.46-4.68* | *.002* | *2.56* | *1.41-4.66* |
| Other comorbidities[a] | 18 (25.0) | 182 (29.1) | .757 | 1.10 | 0.60-2.02 | .838 | 1.07 | 0.56-2.04 |
| **Smoking** | 72 | 630 | | | | | | |
| Never smoker | 0 (0) | 14 (2.2) | | 1 | | | 1 | |
| Ever smoker (daily/nondaily/ex) | 72 (100) | 616 (97.8) | NA | NA | NA | NA | NA | NA |
| **Increased smoking since July 2020 (among daily smokers)** | 10 | 41 | | | | | | |
| No | 6 (60.0) | 26 (63.4) | | 1 | | | 1 | |
| Yes | 4 (40.0) | 15 (36.6) | .841 | 1.16 | 0.28-4.76 | .483 | 1.78 | 0.35-8.97 |

(Continues)

**TABLE 5** (Continued)

| Characteristics | High (score 22-35), n (%) | Low (score 7-21), n (%) | Unadjusted analyses | | | Adjusted analyses | | |
|---|---|---|---|---|---|---|---|---|
| | | | P | OR | 95% CIs | P | AOR | 95% CIs |
| **Current alcohol drinking** | 72 | 628 | | | | | | |
| No | 25 (34.7) | 189 (30.1) | | 1 | | | 1 | |
| Yes | 47 (65.3) | 439 (69.9) | .420 | 0.81 | 0.48-1.35 | .665 | 0.89 | 0.53-1.51 |
| **Stronger alcohol drinking** | 47 | 439 | | | | | | |
| No | 31 (66.0) | 354 (80.6) | | 1 | | | 1 | |
| Yes | 16 (34.0) | 85 (19.4) | *.021* | *2.15* | *1.12-4.11* | *.034* | *2.15* | *1.06-4.37* |
| **Increased alcohol drinking since July 2020** | 47 | 439 | | | | | | |
| No | 29 (61.7) | 360 (82.0) | | 1 | | | 1 | |
| Yes | 18 (38.3) | 79 (18.0) | *.001* | *2.83* | *1.50-5.35* | *.003* | *2.75* | *1.40-5.37* |
| **Provided care to a family member/patient with known/suspected case of COVID-19** | 72 | 630 | | | | | | |
| No | 65 (90.3) | 578 (91.7) | | 1 | | | 1 | |
| Yes | 7 (9.7) | 52 (8.3) | .671 | 1.20 | 0.52-2.74 | .281 | 1.62 | 0.67-3.90 |
| **Identification as a patient/health care service use since July 2020** | 72 | 630 | | | | | | |
| No | 43 (59.7) | 375 (59.5) | | 1 | | | 1 | |
| Yes | 29 (40.3) | 255 (40.5) | .974 | 0.99 | 0.60-1.63 | .954 | 1.02 | 0.61-1.69 |
| **Level of psychological distress (K10 categories)** | 72 | 630 | | | | | | |
| Low to moderate (score 10-21) | 41 (56.9) | 505 (80.2) | | 1 | | | 1 | |
| High to very high (score 22+) | 31 (43.1) | 125 (19.8) | *.000* | *3.05* | *1.84-5.07* | *.000* | *3.24* | *1.91-5.51* |
| Level of coping (BRCS categories) | 72 | 630 | | | | | | |
| Low resilient copers (score 4-13) | 33 (45.8) | 272 (43.2) | | 1 | | | 1 | |
| Medium to high resilient copers (score 14-20) | 39 (54.2) | 358 (56.8) | .666 | 0.90 | 0.55-1.47 | .839 | 0.95 | 0.57-1.57 |
| **Health care service use to overcome COVID-19-related stress since July 2020** | 72 | 630 | | | | | | |
| No | 61 (84.7) | 594 (94.3) | | 1 | | | 1 | |
| Yes | 11 (15.3) | 36 (5.7) | *.003* | *2.98* | *1.44-6.14* | *.005* | *2.94* | *1.39-6.22* |

*Note*: Adjusted for: age, gender, living status, born in Australia, and education.
[a]Cardiac disases/stroke/hypertension/hyperlipidemia/diabetes/cancer/chronic respiratory illness.
The bold itlaic values indicate 'statistical significance'.

psychological distress (Kessler K-10),[20] fear of COVID-19 (FCV-19S),[21] and coping strategies (Brief Resilient Coping Scale – BRCS).[22] Access to mental health resources and specific support pertaining to COVID-19 from the Victorian Department of Health and Human Services was also provided. Psychometric properties of the English version of those 3 tools were examined recently during the COVID-19 pandemic period, which demonstrated significant reliability for use among migrants and nonmigrants in Australia.[23]

## Data analyses

Data were analyzed using SPSS v.25 (IBM Corp., Armonk, NY) and STATA v.12 (StataCorp LLC, College Station, TX). At first, study variables were analyzed for descriptive information. In addition to calculating proportions for categorical variables, mean and standard deviations were calculated for continuous variables. Based on the scoring from the K-10 scale, we categorized participants into low to

**TABLE 6** Coping during COVID-19 pandemic among the study participants

| Brief Resilient Coping Scale (BRCS) individual items | Total, n (%) |
| --- | --- |
| **I look for creative ways to alter difficult situations** | 702 |
| Does not describe me at all | 50 (7.1) |
| Does not describe me | 90 (12.8) |
| Neutral | 252 (35.9) |
| Describes me | 243 (34.6) |
| Describes me very well | 67 (9.5) |
| **Regardless of what happens to me, I believe I can control my reaction to it** | 702 |
| Does not describe me at all | 18 (2.6) |
| Does not describe me | 73 (10.4) |
| Neutral | 237 (33.8) |
| Describes me | 294 (41.9) |
| Describes me very well | 80 (11.4) |
| **I believe I can grow in positive ways by dealing with difficult situations** | 702 |
| Does not describe me at all | 8 (1.1) |
| Does not describe me | 30 (4.3) |
| Neutral | 188 (26.8) |
| Describes me | 379 (54.0) |
| Describes me very well | 97 (13.8) |
| **I actively look for ways to replace the losses I encounter in life** | 702 |
| Does not describe me at all | 19 (2.7) |
| Does not describe me | 73 (10.4) |
| Neutral | 293 (41.7) |
| Describes me | 262 (37.3) |
| Describes me very well | 55 (7.8) |
| BRCS score (total) | 702 |
| Mean (±SD) | 13.9 (2.7) |
| Range | 4-20 |
| Level of coping (BRCS categories) | 702 |
| Low resilient copers (score 4-13) | 305 (43.4) |
| Medium resilient copers (score 14-16) | 299 (42.6) |
| High resilient copers (score 17-20) | 98 (14.0) |

The bold italic values indicate 'statistical significance'.

moderate (score 10-21) and high to very high (score 22-50) psychological distress. BRCS scores were categorized into low (score 4-13) and medium to high (score 14-20) for resilient coping. Chi-square tests were used to compare responses according to age groups, gender, exposure history, comorbidities, and so on, for each study outcome (psychological distress, fear of COVID-19, and coping). We determined association through the P value of < .05 and strength of association was determined by binary logistic regression, which provided odds ratio (OR) and 95% CI. We considered sociodemographic variables (age, gender, living status, born in Australia, education, and employment) as potential confounders, which were adjusted during multivariate analyses, and we reported adjusted OR (AOR) with 95% CI.

## Ethics

We obtained approval from the Human Research Ethics Committee at both Federation University Australia and South West Healthcare. All the responses were anonymous; therefore, no information which could identify any individual was collected. The PLIS included contact information for BeyondBlue, Lifeline, and Victorian government mental health resources on COVID-19.

## RESULTS

A total of 10,599 people, who went through screening at both sites during the study period and had their mobile numbers listed, received the invitations to participate in this study. Among them, a total of 702 people (7%) participated. About two-thirds of the participants (452, 64%) had their tests undertaken at South West Healthcare at Warrnambool and the remainder (250, 36%) at Western District Health Service in Hamilton.

Mean age (±SD) of the participants was 49 (±15.8) years and the majority (386, 55%) were aged between 30 and 59 years. More than two-thirds were female (481, 69%), the majority (615, 88%) were born in Australia, and 302 participants (43%) identified themselves as frontline or essential service workers (such as health care workers, police, supermarket workers, ambulance, farmer, veterinarian, child protection, meat factory workers, taxi driver, petrol station attendants, teacher, and kerbside collection worker). About two-thirds (456, 65%) reported that COVID-19 did not have any impact on their financial situation and 16 participants (2%) reported losing their job due to the COVID-19 pandemic. A quarter of attendees (178, 25%) reported having multiple comorbidities and 121 (17%) reported having psychiatric/mental health issues. A quarter of the participants (175, 25%) reported smoking occasionally and 51 (7%) smoked at least monthly. Since July 2020, 46% (n = 19) of those who reported smoking daily (n = 41) increased smoking. More than two-thirds (486, 69%) reported current alcohol drinking, 21% (n = 101) reported consuming stronger alcohol, and 20% (n = 97) reported increased alcohol drinking since July 2020. Study participants had an average of 2 tests, 289 (41%) participants reported more than 1 test, and only 7 participants (1%) reported positive test results for COVID-19 (Table 1).

## Psychological distress

The mean score (±SD) for psychological distress on the K10 tool was 17 (±7), with 1 in 5 participants (156, 22%) experiencing high to very high levels of psychological distress (score 22-50) in the previous 4 weeks

**TABLE 7** Factors associated with levels of coping among the study population (based on BRCS score)

| Characteristics | Medium to high resilient copers (score 14-20), n (%) | Low resilient copers (score 4-13), n (%) | Unadjusted analyses | | | Adjusted analyses | | |
|---|---|---|---|---|---|---|---|---|
| | | | *P* | OR | 95% CIs | *P* | AOR | 95% CIs |
| Total study participants | 397 | 305 | | | | | | |
| **Age groups** | 397 | 305 | | | | | | |
| 18-29 years | 54 (13.6) | 48 (15.7) | | 1 | | | 1 | |
| 30-59 years | 208 (52.4) | 178 (58.4) | .865 | 1.04 | 0.67-1.61 | .936 | 1.02 | 0.61-1.72 |
| ≥60 years | 135 (34.0) | 79 (25.9) | .086 | 1.52 | 0.94-2.45 | *.035* | *1.84* | *1.04-3.24* |
| **Gender** | 393 | 303 | | | | | | |
| Male | 111 (28.2) | 104 (34.3) | | 1 | | | 1 | |
| Female | 282 (71.8) | 199 (65.7) | .086 | 1.33 | 0.96-1.83 | .049 | 1.41 | 1.00-1.99 |
| **Living status** | 397 | 305 | | | | | | |
| Live alone | 60 (15.1) | 48 (15.8) | .806 | 0.95 | 0.63-1.43 | .632 | 0.85 | 0.43-1.67 |
| Live with family members (partner and/or children) | 297 (74.8) | 221 (72.7) | .528 | 1.12 | 0.79-1.57 | .943 | 1.02 | 0.57-1.84 |
| Live with others (shared accommodation/others) | 40 (10.1) | 35 (11.5) | .542 | 0.86 | 0.073 | NA | NA | NA |
| **Born in Australia** | 397 | 305 | | | | | | |
| No | 57 (14.4) | 30 (9.8) | | 1 | | | 1 | |
| Yes | 340 (85.6) | 275 (90.2) | .073 | 0.65 | 0.41-1.04 | .191 | 0.72 | 0.44-1.18 |
| **Completed level of education** | 397 | 303 | | | | | | |
| Grade 1-12 | 66 (16.6) | 78 (25.7) | | 1 | | | 1 | |
| Trade/Certificate/Diploma | 122 (30.7) | 106 (35.0) | .150 | 1.36 | 0.90-2.07 | .115 | 1.42 | 0.92-2.18 |
| Bachelor and above | 209 (52.6) | 119 (39.3) | *.000* | *2.08* | *1.39-3.09* | *.000* | *2.20* | *1.45-3.34* |
| **Self-identification as a frontline or essential service worker** | 397 | 305 | | | | | | |
| No | 222 (55.9) | 178 (58.4) | | 1 | | | 1 | |
| Yes | 175 (44.1) | 127 (41.6) | .517 | 1.1 | 0.82-1.49 | .324 | 1.18 | 0.85-1.64 |
| **COVID-19 impacted financial situation** | 397 | 304 | | | | | | |
| No | 262 (66.0) | 194 (63.8) | | 1 | | | 1 | |
| Positively | 52 (13.1) | 38 (12.5) | .955 | 1.01 | 0.64-1.60 | .801 | 1.06 | 0.66-1.72 |
| Negatively | 83 (20.9) | 72 (23.7) | .397 | 0.85 | 0.59-1.23 | .555 | 0.89 | 0.61-1.30 |
| **Comorbidities** | 393 | 304 | | | | | | |
| No | 222 (56.5) | 154 (50.7) | | 1 | | | 1 | |
| Single comorbidity | 80 (20.4) | 63 (20.7) | .523 | 0.88 | 0.60-1.30 | .593 | 0.90 | 0.60-1.34 |
| Multiple comorbidities | 91 (23.2) | 87 (28.6) | .080 | 0.73 | 0.51-1.04 | *.017* | *0.61* | *0.41-0.92* |
| **Comorbidities** | 393 | 304 | | | | | | |
| No | 222 (56.5) | 154 (50.7) | | 1 | | | 1 | |
| Psychiatric/mental health issues | 56 (14.2) | 65 (21.4) | *.014* | *0.60* | *0.40-0.90* | *.012* | *0.57* | *0.37-0.88* |
| Other comorbidities[a] | 115 (29.3) | 85 (28.0) | .721 | 0.94 | 0.66-1.33 | .548 | 0.89 | 0.61-1.30 |
| **Smoking** | 397 | 305 | | | | | | |
| Never smoker | 7 (1.8) | 7 (2.3) | | 1 | | | 1 | |
| Ever smoker (daily/nondaily/ex) | 390 (98.2) | 298 (97.7) | .618 | 1.31 | 0.45-3.77 | .919 | 1.06 | 0.35-3.18 |

(Continues)

**TABLE 7** (Continued)

| Characteristics | Medium to high resilient copers (score 14-20), n (%) | Low resilient copers (score 4-13), n (%) | Unadjusted analyses | | | Adjusted analyses | | |
|---|---|---|---|---|---|---|---|---|
| | | | P | OR | 95% CIs | P | AOR | 95% CIs |
| **Increased smoking since July 2020 (among daily smokers)** | 17 | 34 | | | | | | |
| No | 10 (58.8) | 22 (64.7) | | 1 | | | 1 | |
| Yes | 7 (41.2) | 12 (35.3) | .682 | 1.28 | 0.39-4.24 | .658 | 1.38 | 0.33-5.80 |
| **Current alcohol drinking** | 396 | 304 | | | | | | |
| No | 131 (33.1) | 83 (27.3) | | 1 | | | 1 | |
| Yes | 265 (66.9) | 221 (72.7) | .100 | 0.76 | 0.55-1.05 | .089 | 0.74 | 0.53-1.05 |
| **Stronger alcohol drinking** | 265 | 221 | | | | | | |
| No | 219 (82.6) | 166 (75.1) | | 1 | | | 1 | |
| Yes | 46 (17.4) | 55 (24.9) | *.043* | *0.63* | *0.41-0.98* | .090 | 0.66 | 0.41-1.07 |
| **Increased alcohol drinking since July 2020** | 265 | 221 | | | | | | |
| No | 212 (80.0) | 177 (80.1) | | 1 | | | 1 | |
| Yes | 53 (20.0) | 44 (19.9) | .980 | 1.01 | 0.64-1.57 | .651 | 1.12 | 0.69-1.79 |
| **Provided care to a family member/patient with known/suspected case of COVID-19** | 397 | 305 | | | | | | |
| No | 370 (93.2) | 273 (89.5) | | 1 | | | 1 | |
| Yes | 27 (6.8) | 32 (10.5) | .083 | 0.62 | 0.36-1.06 | *.043* | *0.56* | *0.30-0.98* |
| **Identification as a patient/health care service use since July 2020** | 397 | 305 | | | | | | |
| No | 237 (59.7) | 181 (59.3) | | 1 | | | 1 | |
| Yes | 160 (40.3) | 124 (40.7) | .925 | 0.99 | 0.73-1.34 | .381 | 0.87 | 0.63-1.19 |
| **Level of psychological distress (K10 categories)** | 397 | 305 | | | | | | |
| Low to moderate (score 10-21) | 317 (79.8) | 229 (75.1) | | 1 | | | 1 | |
| High to very high (score 22+) | 80 (20.2) | 76 (24.9) | .133 | 0.76 | 0.53-1.09 | .212 | 0.79 | 0.54-1.15 |
| **Level of fear of COVID-19 (FCV-19S categories)** | 397 | 305 | | | | | | |
| Low (score 7-21) | 358 (90.2) | 272 (89.2) | | 1 | | | 1 | |
| High (score 22-35) | 39 (9.8) | 33 (10.8) | .666 | 0.90 | 0.55-1.47 | .816 | 0.94 | 0.57-1.56 |
| **Health care service use to overcome COVID-19-related stress since July 2020** | 397 | 305 | | | | | | |
| No | 376 (94.7) | 279 (91.5) | | 1 | | | 1 | |
| Yes | 21 (5.3) | 26 (8.5) | .092 | 0.60 | 0.33-1.09 | *.047* | *0.53* | *0.29-0.99* |

*Note*: Adjusted for: age, gender, living status, born in Australia, and education.

[a]Cardiac disases/stroke/hypertension/hyperlipidemia/diabetes/cancer/chronic respiratory illness.

The bold itlaic values indicate 'statistical significance'.

(Table 2). High to very high psychological distress was associated with those who had a single comorbidity (AOR 3.70, 95% CI: 2.25-6.08) or multiple comorbidities (AOR 5.74, 95% CI: 3.38-9.74), who had psychiatric/mental health issues (AOR 10.4, 95% CI: 6.25-17.2) or other comorbidities (AOR 1.84, 95% CI: 1.08-3.14), daily smokers who had increased their smoking (AOR 5.71, 95% CI: 1.04-31.4), and those who increased alcohol drinking (AOR 2.03, 95% CI: 1.21-3.40) since July 2020, who identified themselves as patients/visited health care services since July 2020 (AOR 1.91, 95% CI: 1.30-2.79), who had higher levels of fear of COVID-19 (AOR 3.26, 95% CI: 1.93-5.53), and who used health care service to overcome COVID-19-related stress since July 2020 (AOR 4.79, 95% CI: 2.56-8.99). On the other hand, low to moderate psychological distress was associated with being >30 years old (Table 3).

## Levels of fear

The mean score (±SD) on the FCV-19S tool was 15 (±5) and 1 in 10 participants (72, 10%) had high levels of fear of COVID-19 (score 22-35) (Table 4). Higher levels of fear were associated with those whose financial situation was impacted negatively (AOR 2.83, 95% CI: 1.62-4.97), who had psychiatric/mental health issues (AOR 2.56, 95% CI: 1.41-4.66), who drank stronger alcoholic beverages (AOR 2.15, 95% CI: 1.06-4.37), who increased alcohol drinking since July 2020 (AOR 2.75, 95% CI: 1.40-5.37), who had high to very high psychological distress (AOR 3.24, 95% CI: 1.91-5.51), and who used a health care service to overcome COVID-19-related stress since July 2020 (AOR 2.94, 95% CI: 1.39-6.22) (Table 5).

## Coping strategies

The mean score (±SD) on the BRCS tool was 14 (±3) and more than half of the participants (397, 57%) were medium to high resilient copers (score 14-20) (Table 6). Medium to high resilient coping was associated with being ≥60 years old (AOR 1.84, 95% CI: 1.04-3.24) and those who completed Bachelor or above level of education (AOR 2.20, 95% CI: 1.45-3.34). Conversely, low resilient coping was associated with having multiple comorbidities, having psychiatric/mental health issues, providing care to a family member/patient with a known/suspected case of COVID-19, and using health care services to overcome COVID-19-related stress since July 2020 (Table 7).

## DISCUSSION

Those attendees with pre-existing mental health issues showed low resilience, high psychological distress and fear of COVID, and had multiple comorbidities, psychiatric/mental health problems, and had used health care services to overcome COVID-19-related stress. A number of factors could negatively affect people with existing mental health conditions, including poorer physical health, social isolation, reduced service utilization, and poorer adherence to prescribed medications. Additionally, during the COVID pandemic, changed health-seeking behaviors for those with chronic conditions have been reported, including a reticence to attend or follow-up.[24,25] According to Neelam et al, people with pre-existing mental illness had significantly more psychiatric symptoms, anxiety, and depressive symptoms compared to others during a pandemic.[26] Surprisingly, Neelam et al also found that there was a reduction in both the utilization of mental health services and mental health-related hospitalizations during pandemics. That could be due to the barriers in seeking direct consultations with mental health care providers, as many of those providers had a preference for telehealth consultations during the pandemic, which might not meet patients' preference for face-to-face contacts.[25] Those who did attend their health care providers (for any reason) to manage COVID-19-related stress also reported higher distress and fear.

While Australia had been largely shielded from the high numbers of mortalities experienced globally, there was ample evidence published to show that mortality and complications were high among people with physical comorbidities when coupled with COVID-19. The risk of severe disease, hospitalization, and death was strongly age-related, but it also included pregnant women, leading to greater anxiety and stress for these groups.[27] Using a model-based analysis, Holt et al found that hospitalization estimates for COVID-19 increased with age: 1.04% for people aged 20–29 years, increasing to 18.40% for those aged over 80 years.[28]

Behavioral risk factors, such as smoking and alcohol consumption, also increased in this study. The finding was consistent with evidence showing that as anxiety increased, some people self-medicated using tobacco or alcohol to ameliorate the discomfort they experience due to stress or uncertainty, or to use as a coping mechanism.[29] Recent studies also reported association between coping during the COVID-19 pandemic and smoking rates, pointing to a need to develop programs that support coping for those most at risk of increased smoking behavior.[30] The World Health Organization (WHO) also argued that the pandemic made it harder, but more important than ever to quit smoking.[31] Recommended strategies from WHO included proven effective strategies, such as free cessation services, support from primary health care, and nicotine replacement therapy.

Attendees affected financially (positively and negatively) experienced increased psychological distress and fear of COVID-19. Increased demand for essential workers (given the relatively high self-reported number of essential workers in this survey of 43%) might involve working extra shifts and longer hours, resulting in less leisure and self-care time. For health care workers and other essential frontline workers, the requirement to work with PPE, coupled with concerns regarding the adequacy, efficacy, and availability of masks and shields, resulted in adverse health effects, such as respiratory issues, dermatitis, and anxiety.[32]

Unlike numerous other studies that found females to be more fearful and anxious about COVID-19, that was not found to be a factor in our study. Living alone was also not associated with more stress, fear, or less coping ability. While this survey did not ask about social media use, some research suggests that engaging with social media

may have adverse effects on well-being, and other research reports social media producing positive outcomes.[33] In a recent paper, Pandey et al noted that digital interactions during the COVID-19 pandemic assisted in mitigating boredom, loneliness, and irritability caused by lockdowns or quarantining at home.[34] As this study focused on a rural and regional area, self-reliance for social connection and physical geographical distance was the nature of those environments and possibly those attributes might assist in higher coping and resilience during a pandemic.

## Limitations

Our study had some limitations. As the study was conducted online and in English, selection bias was not unlikely as such methodology allowed only participants who were literate and had internet access to use online platforms in English. The cross-sectional nature of the study design limited our ability to draw a causal relationship between different study variables. However, invitations to participate in this study were sent to all attendees of both study hospitals who had mobile phones, and we had a very good sample size from both sites. Therefore, findings could be generalizable to attendees at such screening clinics in regional Victoria.

## CONCLUSIONS

Our study showed that people with pre-existing mental health issues, comorbidities, smokers, and alcohol consumers were high-risk groups in regional Victoria during the COVID-19 pandemic. Additionally, it highlighted the complexity of who was negatively affected psychologically, including those with negative financial impacts. The changed nature of health-seeking behavior, access to services, and modes of health service delivery affected many people throughout the pandemic and highlighted further disparities for vulnerable populations. The study also uncovered some unexpected findings that being female, aged over 60 years, and living alone were not associated with increased stress, fear, or lower resilience, the reasons for which would be interesting to explore in future studies. Policy makers and health service providers in regional settings of Australia could consider utilizing the findings from this study to plan health promotion activities and make support services available for the high-risk groups in regional settings. Specific interventions to support the mental well-being of these vulnerable populations along with engaging health care providers should be considered.

## REFERENCES

1. Ministers Department of Health Affairs. First Confirmed Case of Novel Coronavirus in Australia. 2020. Available from: https://www.health.gov.au/ministers/the-hon-greg-hunt-mp/media/first-confirmed-case-of-novel-coronavirus-in-australia. [Accessed January 25, 2020].
2. Prime Minister of Australia. Border Restrictions. 2020. Available from: https://www.pm.gov.au/media/border-restrictions. [Acessed March 19, 2020].
3. Mclean H, Huf B. Emergency Powers, Public Health and COVID-19. Department of Parliamentary Services, Parliament of Victoria; 2020. Contract No.: No. 2.
4. McNamara B, O'Brien D, Povey J, et al. The Epidemiology of COVID-19 in the Barwon South West Region: Summary Report of Wave 1 and Wave 2. Barwon Health; 2020. Contract No.: 55.
5. Davis J. Coronavirus Will Test Regional Australia's Already Stretched Healthcare System, Experts Say. ABC News; 2020. Available from: https://www.abc.net.au/news/2020-03-14/coronavirus-to-test-regionalmedical-preparedness-health-system/12046572. [Accessed March 14, 2020].
6. Day M. Covid-19: identifying and isolating asymptomatic people helped eliminate virus in Italian village. *BMJ*. 2020;368:m1165.
7. Cuningham M. Critically Ill Patients Risk Their Lives to Avoid Hospital Visits. The Sydney Morning Herald; 2020. Available from: https://www.smh.com.au/national/critically-ill-patients-risk-their-lives-to-avoid-hospital-visits-20200413-p54jb3.html. [Accessed April 13, 2020].
8. Douglas M, Katikireddi SV, Taulbut M, McKee M, McCartney G. Mitigating the wider health effects of covid-19 pandemic response. *BMJ*. 2020;369:m1557.
9. Gunnell D, Appleby L, Arensman E, et al. Suicide risk and prevention during the COVID-19 pandemic. *Lancet Psychiatry*. 2020;7(6):468-471.
10. South West Healthcare. COVID-19 Screening. Available from: https://southwesthealthcare.com.au/covid-19-screening/. [Accessed April 13, 2020].
11. Western District Health Service. Hamilton Base Hospital Drive-thru COVID-19 Testing. Available from: https://wdhs.net/v2/covid-19/covid-19-drive-thru-testing-service/. [Accessed April 13, 2020].
12. The Lancet Psychiatry. Mental health and COVID-19: change the conversation. *Lancet Psychiatry*. 2020;7(6):463.
13. Walton M, Murray E, Christian MD. Mental health care for medical staff and affiliated healthcare workers during the COVID-19 pandemic. *Eur Heart J Acute Cardiovasc Care*. 2020;9(3):241-247.
14. The Lancet. COVID-19: protecting health-care workers. *Lancet*. 2020;395(10228):922.
15. Maunder RG, Lancee WJ, Balderson KE, et al. Long-term psychological and occupational effects of providing hospital healthcare during SARS outbreak. *Emerg Infect Dis*. 2006;12(12):1924-1932.
16. Shah K, Kamrai D, Mekala H, Mann B, Desai K, Patel RS. Focus on mental health during the coronavirus (covid-19) pandemic: applying learnings from the past outbreaks. *Cureus*. 2020;12(3):e7405.
17. Australian Bureau of Statistics. Warrnambool and South West Region Census. 2015. Available from: https://itt.abs.gov.au/itt/r.jsp?RegionSummary&region=217&dataset=ABS_REGIONAL_ASGS&geoconcept=REGION&measure=MEASURE&datasetASGS=ABS_REGIONAL_ASGS&datasetLGA=ABS_REGIONAL_LGA&regionLGA=REGION&regionASGS=REGION. [Accessed April 13, 2020].
18. Rahman MA, Hoque N, Alif SM, et al. Factors associated with psychological distress, fear and coping strategies during the COVID-19 pandemic in Australia. *Global Health*. 2020;16(1):95.

19. Rahman MA, Rahman S, Wazib A, et al. COVID-19 related psychological distress, fear and coping: identification of high-risk groups in Bangladesh. *Front Psychiatry*. 2021;12:718654.

20. Furukawa TA, Kessler RC, Slade T, Andrews G. The performance of the K6 and K10 screening scales for psychological distress in the Australian National Survey of Mental Health and Well-Being. *Psychol Med*. 2003;33(2):357-362.

21. Ahorsu DK, Lin CY, Imani V, Saffari M, Griffiths MD, Pakpour AH. The Fear of COVID-19 Scale: development and initial validation. *Int J Ment Health Addict*. 2020:1-9. https://doi.org/10.1007/s11469-020-00270-8

22. Sinclair VG, Wallston KA. The development and psychometric evaluation of the Brief Resilient Coping Scale. *Assessment*. 2004;11(1):94-101.

23. Rahman MA, Salehin M, Islam SMS, et al. Reliability of the tools used to examine psychological distress, fear of COVID-19 and coping amongst migrants and non-migrants in Australia. *Int J Ment Health Nurs*. 2021;30(3):747-758.

24. Flaherty GT, Hession P, Liew CH, et al. COVID-19 in adult patients with pre-existing chronic cardiac, respiratory and metabolic disease: a critical literature review with clinical recommendations. *Trop Dis Travel Med Vaccines*. 2020;6:16.

25. Levene LS, Seidu S, Greenhalgh T, Khunti K. Pandemic threatens primary care for long term conditions. *BMJ*. 2020;371:m3793.

26. Neelam K, Duddu V, Anyim N, Neelam J, Lewis S. Pandemics and pre-existing mental illness: a systematic review and meta-analysis. *Brain Behav Immun Health*. 2021;10:100177.

27. Boushra MN, Koyfman A, Long B. COVID-19 in pregnancy and the puerperium: a review for emergency physicians. *Am J Emerg Med*. 2021;40:193-198.

28. Holt NR, Neumann JT, McNeil JJ, Cheng AC. Implications of COVID-19 for an ageing population. *Med J Aust*. 2020;213(8):342-344.e1.

29. Rahman MA. Smoking and Alcohol Consumption Increases Amid COVID-Related Distress. Federation University Newsroom; 2020. Available from: https://federation.edu.au/news/articles/smoking-and-alcohol-consumption-increases-amid-covid-related-distress. [Accessed August 14, 2021].

30. Ahluwalia IB, Myers M, Cohen JE. COVID-19 pandemic: an opportunity for tobacco use cessation. *Lancet Public Health*. 2020;5(11):E577.

31. World Health Organization. WHO: COVID-19 Must Not Derail Tobacco Cessation Efforts. 2020. Available from: https://www.who.int/japan/news/feature-stories/detail/who-covid-19-must-not-derail-tobacco-cessation-efforts. [Accessed November 18, 2021].

32. Galanis P, Vraka I, Fragkou D, Bilali A, Kaitelidou D. Nurses' burnout and associated risk factors during the COVID-19 pandemic: a systematic review and meta-analysis. *J Adv Nurs*. 2021;77(8):3286-3302.

33. Boursier V, Gioia F, Musetti A, Schimmenti A. Facing loneliness and anxiety during the COVID-19 isolation: the role of excessive social media use in a sample of Italian adults. *Front Psychiatry*. 2020;11:586222.

34. Pandey V, Misra N, Greeshma R, et al. Techno trend awareness and its attitude towards social connectedness and mitigating factors of COVID-19. *Front Psychol*. 2021;12:637395.