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The challenges facing essential workers: The subjective mental health and wellbeing of New Zealand healthcare and 'other' essential workers during the COVID-19 lockdown

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ABSTRACT

Introduction

Understanding the mental health and wellbeing of those in essential work is important to inform the psychosocial needs of this vital workforce. This online survey, conducted in New Zealand over April and May 2020, aimed to to compare psychological outcomes, experiences and sources of stress over the COVID-19 pandemic lockdown in essential workers (in healthcare and 'other' essential work) with non-essential workers.

Methods

2495 participants are included in this report; 381 healthcare workers, 649 'other' essential workers, and 1465 in non-essential work.

Results

After controlling for confounders, those in healthcare were at 71% greater risk (95% CI 1.29, 2.27), and those in 'other' essential work at 59% greater risk (95% CI 1.25, 2.02) of anxiety (GAD-7 ≥10) than those in non-essential work. Those in healthcare were at 19% greater risk of poor wellbeing (WHO-5 < 13) (95% CI 1.02, 1.39). There was no difference across the work roles in risk for psychological distress (K-10 ≥12) or increased alcohol use. Healthcare and 'other' essential workers reported increased workload (<0.001) and report less uncertainty about finances and employment than those in non-essential work (<0.001). Healthcare workers were at greater risk of stress about the consequences of COVID-19 (p=0.012). Healthcare and non-essential workers reported decreased social contact. 15% of participants had concerns about their own health and 33% about other people's health, with no difference by work category.

Conclusions

During the lockdown, essential workers (both those in healthcare and those providing 'other' essential work) were at increased risk of anxiety compared with those in non-essential work, with those in healthcare also being at increased risk of poor wellbeing. This highlights the need for organisations to recognise the challenges this vital workforce face in pandemics.

Strengths and limitations of this study

- The first study to examine the psychosocial outcomes of the COVID-19 pandemic lockdown, not just in healthcare workers but also those working in 'other' essential roles.
- Although identifying stressors for different work categories, finer grained analyses of impacts for specific roles was not possible.
- The survey used validated outcome measures and adjusted for confounders, however the cross-sectional design did not allow differentiation between longer term factors and newer impacts deriving from the lockdown.

Key words

Mental health, wellbeing, COVID-19, healthcare, essential workers

Protocol

There is no protocol for this observational survey.

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Competing interests
The authors have declared that no competing interests exist.

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INTRODUCTION

There is increasing recognition of the psychological impacts of the COVID-19 pandemic[1]. These impacts involve a complex mix of the fear of infection and the social and economic effects of public health restrictions[2]. A growing number of general population studies report increased symptoms of anxiety and depression over the pandemic[3, 4]. Essential workers, particularly those in healthcare, are consistently identified as being at increased risk of these detrimental psychological outcomes[5].

The emerging literature from studies of healthcare workers conducted over the first two months of the pandemic report high rates of depression[6], anxiety[7, 8], distress[6, 8], sleep disturbance[7, 8] and somatic symptoms[7]. These findings replicate those from previous pandemics, such as the 2002-2004 SARS outbreak, which reported significant psychological impacts on healthcare workers[9]. This may be explained by the multiple stressors those employed in these roles face in direct relation to their work, in addition to those experienced by the wider population. These stressors include higher rates of infection, fears of infecting others, having to work in challenging conditions (with exposure to potentially traumatic events, grief, and ethical dilemmas), overwork leading to exhaustion, and stigmatisation[8, 10, 11].

While most people were asked to stay at home during the COVID-19 lockdown, workers employed in law enforcement, other emergency services, and as providers of essential goods or services (e.g., food supply, fuel, waste removal, internet, financial support, transport), were required to keep working alongside healthcare workers. This former group has been collectively referred to as 'other' essential workers, to distinguish them from healthcare workers, who, of course, were also essential. There has been very limited research examining the mental health and wellbeing of these 'other' essential workers, excepting a few studies that have studied medical volunteers or those in medical, non-patient facing work[12] and a recent study reporting that those employed in roles which involved interacting with the general public were at increased risk of detrimental psychological outcomes[13]. This is a significant gap in the literature, with large numbers of 'other' essential workers providing vital work to keep populations functioning. It is likely that those employed in 'other' essential work, similar to those in healthcare, may also face increased work demands and feel at increased risk of infection because of potential exposure during their work. Indeed, a recent large study from the UK reported an increased risk of COVID-19 infection in workers in social care, education and transport (in addition to healthcare workers), compared to those in non-essential work[14].

This paper reports findings from surveys of the mental health and wellbeing of essential workers (both those in healthcare and importantly those providing 'other' essential work) compared with those in non-essential work. The surveys were conducted in New Zealand over the alert level 4 lockdown and national state of emergency which started on 25 March 2020 and lasted for 33 days. The lockdown was 'hard', with a composite measure rating the public health restrictions in New Zealand as being the highest of any World Bank high-income country[15]. At the time, although infection and mortality rates were relatively low by international standards[16], healthcare professionals were voicing concern about the potential impacts on the health system[17]. We have already reported initial data from this survey from a large, demographically representative sample of New Zealanders[18].

The aim of this study was to compare psychological outcomes, experiences and sources of stress over the pandemic lockdown in essential workers (in healthcare and 'other' essential

work roles) with other workers employed in non-essential roles. Understanding the stressors and the mental health and wellbeing of this vital workforce is important to inform their psychosocial needs. This may be particularly pertinent in the global environment with the implementation of further lockdowns and restrictions, and inform planning in the event of further pandemics.

METHODS

Survey

The survey was fielded using the Qualtrics platform between 15 April and 8 May 2020, during the New Zealand lockdown. It could be completed on a mobile phone, tablet or computer and took approximately 15 minutes[see 18 for more details].

Participants

Participants were eligible to complete the survey if they were aged 18 years or older at the time of the level 4 lockdown. Potential participants were identified and invited to complete the online survey via two national survey panels, the Dynata commercial survey platform[results recently published[18] and the New Zealand government's Health and Justice survey panels (COVID-19 Health and Wellbeing Surveys), both of which used age and sex quotas to match the national population. In order to sample a greater number of essential workers, the survey invitation was also sent to contacts of the Medical Research Institute of New Zealand (MRINZ).

Measures

The survey contained three standardised self-report measures of psychological distress (the Kessler Psychological Distress Scale (K10)[19], anxiety (the Generalised Anxiety Disorder Assessment (GAD-7)[20], and wellbeing (the World Health Organisation Well-Being Index (WHO-5)[21]. The K-10 is a 10-item scale measuring non-specific symptoms of anxiety and depression over the previous 4 weeks. Scores are reported in a 0–40 range to align with reporting in the New Zealand Health Survey[22], with people scoring 12 or higher having moderate to high distress. The GAD-7 measures anxiety symptoms with respondents indicating how much they have been bothered by each of seven symptoms over the last two weeks, on a 4-point scale ranging from 'not at all' to 'nearly every day'. Scores range from 0–21 with cut-off scores of 10 and higher indicating at least moderate anxiety. The WHO-5 is one of the most widely-used scales for assessing subjective psychological well-being[21]. It contains five positively phrased items, with respondents rating each statement for the last two weeks. Scores range from 0–25 with cut-off scores of 12 and under indicating poor wellbeing, and scores greater than 22 indicating excellent wellbeing. We assessed alcohol consumption by asking participants how many standard drinks they consumed on an average 7-day period before the lockdown and how many standard drinks they had consumed over the previous 7 days.

We also asked about demographic and pre-lockdown factors (age, gender, ethnicity, socio-economic status (education and household income), employment, smoking and alcohol usage, lealthe vulnerability and mental health, and prior trauma). Objective and subjective lockdown experiences were assessed by questions on living circumstances, relationships and connections with others, workload, change in alcohol use, COVID-19 exposure and concerns about risk of infection. Respondents were also asked to identify what the main sources of stress during the lockdown were (uncertainty about their health or that of a family member; finances; employment; the wider consequences of COVID-19).

Work role was assessed by asking respondents to identify whether they were an essential worker in one of four categories; healthcare; law enforcement; other emergency services such as fire service; or as a provider of other essential goods or services such as food supply, fuel, waste removal, internet, financial support or transport.

The survey questions are available as a supplementary file (Supplementary file 1) and a detailed description of survey items and construction of the questionnaire has previously been published[18].

Patient and public involvement

No patients were involved. The survey samples members of the general public. We developed and refined the survey using the 'group mind' process, which Sudman and Bradburn describe as asking others to review and rigorously critique a draft of the questionnaire [23]. We consulted with government health advisors, people with lived experience of mental distress, experts in survey design, Māori cultural advisors, and healthcare professionals during the survey development and testing phase. We requested feedback on the survey content, both in terms of the most important outcome measures and on language, clarity and cultural appropriateness. We also requested feedback on the survey format, notably in terms of the layout of the questions on the Qualtrics platform, the survey length and the flow. We made iterative improvements based on the feedback we received. We then pre-tested the revised questionnaire on a small sample of the general public and further modified it to address respondents' feedback. These individuals who provided feedback were not involved in active recruitment or the dissemination plan for the study. Participants were anonymous so results could not be shared with them directly, although will be summarised in university media releases with links to the open access articles.

Ethical approval

The study was approved by the University of Otago Human Ethics Committee (approval code F20/003) and underwent Māori consultation with the Ngāi Tahu Research Committee.

Statistical Analyses

Participants' demographics, socioeconomic characteristics, and health histories were summarised by work category using counts and percentages. The proportion of participants reporting poor outcomes on each of the K10, GAD-7, and WHO-5 psychological measures, or reporting increased alcohol usage, was determined by work category, and associations assessed using chi-square tests. Differences between work categories were quantified as risk ratios with 95% confidence intervals (CI), calculated using a series of unadjusted and confounder adjusted Poisson generalised linear regression models with robust 'sandwich' standard errors[24]. Participants' experiences of lockdown were summarised by work category as counts and percentages, and groupwise differences assessed using chi-square or Fisher's exact tests. Analysis was performed using the R programming language and environment (R version 4.0.3).

RESULTS

A total of 3864 survey responses were completed over a similar time period: n=2010 from the Dynata panel; n=1477 from the New Zealand government's Health and Justice panels; and n=377 from the MRINZ sample. Of the 3864, 1369 (35.4%) were unemployed at the time of the survey (never had job, not in workface, or retired). There were some differences between the three samples in terms of the distribution of essential and non-essential workers, primarily reflecting the recruitment of the MRINZ sample from predominantly medical contacts.

However, the data were broadly comparable which allowed the samples to be combined. In view of the small numbers identifying as working in law enforcement (n=57) and other emergency services (n=43), these two categories were combined with those identifying as being providers of other essential goods or services. This meant that in the final combined sample there were three work categories for comparison; essential workers in healthcare (n=381), 'other' essential workers (n=649), and workers in non-essential roles (n=1465).

Demographic and Socioeconomic Characteristics

Table 1 shows the demographic profile for survey respondents by these three work categories. Healthcare workers were predominantly female, whereas those from the two other two work groupings showed a more balanced gender distribution. The majority of all workers did not report pre-existing vulnerabilities to COVID-19 (e.g., being immunocompromised or pregnant). A previous history of a mental health disorder was noted in 26% of healthcare workers, 23% of 'other' essential workers and 19% of non-essential workers. A history of exposure to previous trauma was noted in 48% of healthcare workers, 40% of 'other' essential workers and 28% of non-essential workers. The most common trauma was exposure to a natural disaster, which was reported by a total of 17% of the sample.

Table 1: Demographic characteristics of essential and non-essential workers.

Characteristic	Healthcare essential worker	Other essential worker	Non-essential worker
Gender			
Male	17.4% (66)	47.5% (306)	43.5% (635)
Female	82.6% (314)	52.5% (338)	56.5% (824)
Age			
15-24	4.5% (17)	7.4% (48)	9.1% (133)
25-34	18.6% (71)	21.7% (141)	20.5% (301)
35-44	18.1% (69)	20.3% (132)	22.5% (329)
45-54	27.0% (103)	25.7% (167)	22.3% (326)
55-64	25.7% (98)	19.4% (126)	17.3% (254)
65+	6.0% (23)	5.4% (35)	8.3% (122)
Ethnicity (prioritised)			
Māori	12.6% (48)	17.3% (112)	15.7% (230)
Pacific	2.4% (9)	4.0% (26)	4.2% (62)

Table 1 conti.

Characteristic	Healthcare essential worker	Other essential worker	Non-essential worker
Asian	8.4% (32)	8.3% (54)	10.0% (147)
European/Other	76.6% (291)	70.4% (456)	70.0% (1025)
Education			
No formal qualification	5.8% (22)	8.9% (58)	6.4% (94)
High school	10.0% (38)	25.7% (167)	22.3% (326)
Certificate or diploma	21.0% (80)	25.3% (164)	25.1% (368)
Bachelor's degree	22.3% (85)	23.1% (150)	26.5% (388)
Post-graduate	40.9% (156)	16.9% (110)	19.7% (289)
Income			
$30,000 or less	8.9% (34)	10.7% (69)	19% (278)
$30,001 – $70,000	43.6% (166)	41.9% (271)	38.4% (562)
$70,001 – $100,000	22.0% (84)	21.5% (139)	18.5% (270)
$100,001 – $150,000	11.8% (45)	14.2% (92)	10.0% (146)
$150,001 or more	8.7% (33)	4.9% (32)	6.3% (92)
Prefer not to say	5.0% (19)	6.8% (44)	7.9% (115)
Potential vulnerability			
Health vulnerability	6.3% (24)	5.7% (37)	4.0% (58)
Past history of mental health disorder	26.1% (97)	22.9% (146)	18.6% (268)
History of previous exposure to trauma	48.0% (183)	39.9% (259)	28.3% (415)

Psychological distress, anxiety and wellbeing

The unadjusted risk ratios for psychological distress, anxiety and wellbeing are summarised in Table 2. The results show that about a quarter of all workers scored above the cut-off for moderate to severe psychological distress (K-10 >12) and that those in essential work (healthcare and 'other' essential roles) were not at greater risk of reporting moderate-high levels of psychological distress than those in non-essential work roles (p=0.153). Essential

workers (healthcare and 'other' essential roles) were, however, at an estimated 61% greater risk than those in non-essential work of reporting moderate-high levels of anxiety from the GAD-7 (p=<0.001). Healthcare workers, but not 'other' essential workers were at an estimated 15% greater risk than those in non-essential work of reporting poor wellbeing from the WHO-5 (p=0.038). About one-third of all workers increased their use of alcohol but those in essential work (healthcare and 'other' essential roles) were not at greater risk of this than those in non-essential work roles (p=0.212).

Table 2. Unadjusted and adjusted rates of psychological distress anxiety and poor wellbeing.

	% (Number)	Risk Ratio (95% CI)	Adjusted Risk Ratio[1]	Adjusted Risk Ratio[2]
K-10 ≥12				
Non-essential worker	22.3% (326)	1.00	1.00	1.00
Healthcare workers	24.7% (94)	1.11 (0.91, 1.35)	1.23 (1.01, 1.49)	1.14 (0.97, 1.33)
Other essential workers	26.1% (169)	1.17 (0.99, 1.37)	1.17 (1.00, 1.37)	1.12 (0.92, 1.37)
GAD-7 ≥10				
Non-essential worker	9.8% (143)	1.00	1.00	1.00
Healthcare workers	15.7% (60)	1.61 (1.22, 2.13)	1.89 (1.43, 2.50)	1.71 (1.29, 2.27)
Other essential workers	15.7% (102)	1.61 (1.27, 2.04)	1.62 (1.28, 2.05)	1.59 (1.25, 2.02)
WHO-5 <13				
Non-essential worker	44.5% (650)	1.00	1.00	1.00
Healthcare workers	51.2% (195)	1.15 (1.03, 1.29)	1.21 (1.05, 1.41)	1.19 (1.02, 1.39)
Other essential workers	48.2% (312)	1.08 (0.98, 1.20)	1.08 (0.95, 1.23)	1.07 (0.94, 1.22)
Alcohol increase				
Non-essential worker	30.3% (443)	1.00	1.00	1.00
Healthcare workers	33.9% (129)	1.12 (0.95, 1.32)	1.03 (0.87, 1.21)	1.04 (0.88, 1.23)
Other essential workers	33.3% (216)	1.10 (0.96, 1.26)	1.08 (0.95, 1.23	1.06 (0.93, 1.21)

1. Adjusted for age, gender and ethnicity
2. Adjusted for age, gender, ethnicity, income, smoking status, living alone, health vulnerability, prior mental health and prior exposure to a traumatic event

As shown in Table 2, after controlling for confounders (age, gender, ethnicity, socioeconomic status, living alone, health vulnerability, previous history of mental disorder and exposure to previous trauma), those in healthcare roles were at 71% greater risk, and those in 'other' essential work at 59% greater risk of reporting at least moderate levels of anxiety (GAD-7 ≥10) than those in non-essential work roles. Those in healthcare roles were at 19% greater risk of poor wellbeing (WHO-5 < 13). There was no evidence of a difference across the work roles in risk for psychological distress (K-10 ≥12) or increased alcohol use.

Positive outcomes

In addition to detrimental psychological outcomes, we were also interested in those who reported excellent wellbeing (WHO-5 ≥22) during the lockdown experience. Healthcare workers had a lower likelihood of this than non-essential workers (Risk ratio = 0.53 (0.31, 0.89, p=0.007). 3.9% of healthcare workers, 9.0% of 'other essential workers and 7.5% of non-essential workers reported excellent wellbeing.

Living circumstances, connections, workload and COVID-19 testing

There was no evidence of a difference between essential and non-essential workers in terms of satisfaction with their living circumstances or their relationships with the people in their bubble (defined as the people respondents were living with over the lockdown) (see Table 3). There were, however, differences across the work categories in terms of maintaining contact with family and friends outside of their bubble (including contact by videolink, telephone, email, or letter), with 36% of healthcare workers, 34% of non-essential workers and 29% of 'other' essential workers reporting decreased contact compared with pre-lockdown (p=0.008).

Those in healthcare roles reported higher rates of COVID-19 testing compared with the other work roles, with 12% having been tested for COVID-19. Although numbers of confirmed positive tests were low; i.e., a total of nine positive tests in the samples, this included four healthcare workers, which represented 1% of healthcare respondents (Fisher's exact, p=0.015).

Table 3: Living circumstances, social connections, workload, and COVID-19 testing.

Living circumstances, social connections, work demand, and COVID-19 testing	**Healthcare worker**	**Other essential worker**	**Non-essential worker**	**p**
Living circumstances				
Living situation				
Living alone	15.0% (57)	13.9% (90)	12.2% (179)	0.075
With one adult	24.7% (94)	29.3% (190)	28.9% (423)	
With other adults	24.5% (93)	17.3% (112)	20.4% (298)	
With children	35.8% (136)	39.6% (257)	38.5% (564)	

Table 3 conti.

Living circumstances, social connections, work demand, and COVID-19 testing	Healthcare worker	Other essential worker	Non-essential worker	p
Satisfaction with 'bubble'				
Extremely dissatisfied	3.4% (13)	3.9% (25)	3.5% (51)	0.36
Dissatisfied	2.6% (10)	2.9% (19)	1.8% (27)	
Neither satisfied nor dissatisfied	6.6% (25)	8.9% (58)	8.5% (124)	
Satisfied	28.3% (108)	32.8% (213)	31.1% (455)	
Extremely satisfied	59.1% (225)	51.5% (334)	55.2% (808)	
Getting along with members of household				
Very badly	1.2% (4)	0.5% (3)	0.6% (8)	0.68
Badly	2.8% (9)	3.4% (19)	2.1% 27)	
Neither well nor badly	11.1% (36)	12.0% (67)	11.1% (143)	
Well	43.2% (140)	40.3% (225)	41.1% (528)	
Very well	41.7% (135)	43.8% (245)	45.15 (579)	
Change in contact with others outside bubble				
Decreased	36.1% (136)	28.7% (186)	33.7% (491)	0.008
Stayed the same or increased	63.9% (241)	71.2% (461)	66.4% (968)	
Feeling lonely or isolated				
All of the time	2.6% (10)	3.2% (21)	1.8% (26)	0.53
Most of the time	4.7% (18)	4.9% (32)	4.7% (69)	0.53
Some of the time	19.7% (75)	21.9% (142)	21.7% (318)	
A little of the time	32% (122)	27.4% (178)	29.8% (437)	
None of the time	40.9% (156)	42.5% (276)	41.9% (614)	
Work				
Workload increased				
Yes	31.8% (121)	25.8% (167)	17.2% (252)	<0.001
Less paid work				
Less work	20.5% (78)	23.6% (153)	40.5% (594)	<0.001
Covid-19				
Tested for Covid-19				
Tested	11.6% (44)	4.8% (31)	3.1% (45)	<0.001
Not tested	88.4% (336)	95.2% (918)	96.9% (1420)	<0.001

Main sources of stress

About 15% of participants had concerns about their own health and 33% were concerned about other people's health, with no obvious difference by worker category ($p = 0.45$ and $p = 0.19$, respectively). Essential workers were less likely to report uncertainty about finances than those in non-essential work (healthcare 22%, 'other' essential workers 29% and non-essential workers 37%, $p < 0.001$). There was a similar pattern regarding concerns about employment (healthcare 14%, 'other' essential workers 24% and non-essential workers 31%, $p < 0.001$). Healthcare workers were at a greater risk of reporting stress in relation to the wider consequences of COVID-19 (healthcare workers 60%, 'other' essential workers 50% and non-essential workers 53%, $p = 0.012$).

DISCUSSION

The aim of this study was to compare psychological outcomes, experiences, and sources of stress during the New Zealand COVID-19 lockdown in essential workers with that of other workers employed in non-essential roles. The key findings were that essential workers (both those in healthcare and those providing 'other' essential work) were at increased risk of anxiety compared to non-essential workers. In addition, healthcare workers (but not those in 'other' essential work) were at increased risk of poor wellbeing. Although rates of psychological distress were well above baseline general population measures[25], there were no significant differences across the work groups. There was also no difference in rates of increased use of alcohol across the work categories.

Healthcare workers

We report that anxiety levels were higher in healthcare workers, compared with non-essential workers during the pandemic restrictions in New Zealand, adding to the literature which consistently identifies healthcare workers as being at increased risk of psychological impacts in pandemics[5]. Few studies, however, have examined impacts in comparison with other workers (rather than the general population), and these have also reported mixed findings; one study increased anxiety[26] and another reduced anxiety[27] in healthcare workers compared with those in 'other' essential work. In addition, we report that healthcare workers were at increased risk of poor wellbeing compared with non-essential workers.

The extant literature suggests that healthcare work poses significant challenges in a pandemic including increased risk of infection because of potential exposure, workload demands and social change including stigmatisation, and that some, or all of these factors may be associated with detrimental psychological outcomes[28]. Our study attempted to explore some of these issues. Healthcare workers were at greater risk of having been tested for, and testing positive, for COVID-19. These findings reflect the international literature[29] and the New Zealand context at the time of the survey, where one in 10 cases of COVID-19 were in healthcare workers[30]. Healthcare workers were also at increased risk of reporting stress in relation to the wider consequences of COVID-19. Compared with those in non-essential work, healthcare workers were more likely to report experiencing increased workload. As may have been expected, because of the central place of healthcare work in the pandemic, they were less likely to report concern about finances and employment than those in non-essential work. As with other workers, healthcare workers were more concerned about the health of their family and friends than their own health (with one in three and in seven respectively reporting this). As discussed, social isolation has been consistently identified as a risk factor for negative psychological impacts[31], and although not different from non-essential workers, about one-third of healthcare workers reported decreased contact with

family and friends outside of their bubble. This included not just face-to-face contact (which was reduced for everyone), but contact by videolink, telephone, email, or letter.

Our findings are comparable with those in the literature with rates of at least moderate anxiety (16%) and moderate to high psychological distress (25%) being at the lower range of those reported internationally (26-30% and 34-36% respectively)[5, 32]. It is likely that this reflects the trust in the New Zealand Government's public health approach[33] and the comparatively low rates of infection and mortality in New Zealand at the time of data collection. Generally, lower rates of anxiety and depression in healthcare workers have been reported from countries where death rates were relatively low[27] or where there was an aggressive surveillance programme[34]. Conversely, higher rates of psychological distress have been reported in countries during higher rates of infection in February 2020, such as China[35].

Other essential workers

As far as we are aware, this is the first study to report on psychological outcomes in the important group of 'other' essential workers. Our findings show that, in comparison with non-essential workers, 'other' essential workers, were also at increased risk of reporting at least moderate anxiety. We had hypothesised that, similar to those in healthcare, 'other' essential workers may face increased work demands and feel at increased risk of infection because of potential exposure during their work. Our findings suggest that these workers were at greater risk of experiencing increased workload in comparison with non-essential workers. They were also, like those in healthcare, less likely to report concern about finances and employment. Interestingly, they were at less risk of reducing their social contact compared to those in non-essential work. This may have impacted on wellbeing because it is established that social connectedness promotes wellbeing[36].

Importance of feeling safe

All worker categories reported concern about the safety of themselves, family and friends, highlighting how crucial this concern is for most people. It is important that organisations/employers put in place strategies to address these concerns. It is established that perceived lack of safety increases the risk of anxiety, depression and PTSD[31] and that improving this, through access to personal protective equipment, and specialised training, mitigates detrimental psychological outcomes[37]. This underpins the established evidence for the importance of feeling safe and its association with resilient outcomes after disasters and previous epidemics[36].

Limitations and strengths

Like all survey-based research, our study has some limitations. Outcomes were participants' subjective reports of their experiences and emotions, and while this is not equivalent to a structured diagnostic interview[38] it does allow comment on levels of distress. There may have been some selection bias since respondents needed access to a computer or internet-connected mobile phone to complete the survey. In addition, people for whom the topic of wellbeing had particular salience (perhaps because they were struggling), may have been more inclined to participate. The data was collected cross-sectionally and were limited by the lack of pre-COVID-19 surveys, which means that it cannot be determined if results were indicative of changes resulting from the pandemic (and/or the lockdown response) rather than being more general differences between these groups of workers; although we were able to adjust for some potential confounders that might underlie this (e.g. history of mental distress). We plan for further serial surveys as part of a longitudinal study which may provide

helpful comparison. Other limitations relate to the grouping of essential workers into two broad categories, healthcare workers versus 'other' essential workers, due to the small numbers involved. This meant that finer grained analyses were not possible within healthcare (e.g. unable to disaggregate type of health care role) or within different types of 'other' essential work.
A major strength of the study is that it is the first, of which we are aware, to examine the psychosocial outcomes in those working in non-healthcare essential roles. Other strengths are that prior to finalisation the survey was peer reviewed during development and then pre-tested on a sample of members of the general public[23], and used validated outcome measures wherever possible.

CONCLUSIONS

Our study reports on the mental health and wellbeing of essential workers during the New Zealand lockdown, early in the COVID-19 pandemic. While most essential workers coped well, some did not. Essential workers as a category (both those in healthcare and those providing 'other' essential work) were at increased risk of anxiety compared with those employed in non-essential roles, with those in healthcare also being at increased risk of poor wellbeing. We suggest that employers and organisations need to recognise the challenges this vital workforce face in times of pandemics and implement appropriate support. This needs to span a broad range of domains; ensuring people have adequate protections and procedures around being able to work safely; that they have ready access to accurate information and training; and that their workload is manageable. Communication should promote the importance of social connections, and access to confidential support and appropriate psychological interventions should be facilitated. We recommend that campaigns publicise available supports and how these can be accessed, with targeted messages for particular groups and their needs. We would also suggest that there is a need for ongoing collection of robust mental health data to guide these approaches.

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Conflicts of interest
The Authors declare that there is no conflict of interest

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Lockdown Wellbeing Survey

Start of Block: 1. Introduction

Q1.1 **Kia Ora and Welcome**

Thank you for clicking through to our survey; it should take you around 10 to 15 minutes to complete. The survey is being conducted by researchers from the University of Otago.

To go directly to the survey please click on the 'Next' button at the bottom of the page

If you lose your connection to the Internet or this survey at any point, please click the link provided in the email you received and it will take you back to the point where you left off.

Q115 **To complete this survey, you must be 16 years old or older.**

Are you 16 years old or older?

- ○ Yes (1)
- ○ No (2)

Skip To: End of Survey If Q115 = 2

Page Break

Q1.2

THE EFFECTS OF COVID-19 AND THE LOCKDOWN ON WELLBEING IN NEW ZEALAND

Information for participants

What will participants be asked to do? The COVID-19 pandemic has resulted in major disruptions to our lives. Research from overseas has shown that pandemics and lockdowns have significant effects on people's well-being and mental health, but we do not yet have similar research from Aotearoa New Zealand. We are interested in the experience of New Zealanders and this is what we would like to ask you about. Should you agree to take part in this survey, you will be asked about your experiences over the course of the COVID-19 lockdown, including how it has affected your employment, your mental health and well-being, your behaviours, and any 'silver linings' or positive experiences. The survey should take about 10 to 15 minutes to complete.

Thank you for showing an interest in this study. Please read this information sheet carefully before deciding whether or not to participate. If you decide to participate, we thank you. If you decide not to take part there will be no disadvantage to you and we thank you for considering our request. **What is the aim of the project?** This study explores the experiences of the New Zealand population during the current COVID-19 event, including the subsequent imposed social isolation measures (the Level 4 'lockdown'). **What types of participants are being sought?** We are seeking adult participants from the general population aged 16 years and older. We are applying quotas so we ensure our sample has reasonable numbers of people from different ethnicities, and roughly similar numbers across genders. **What data or information will be collected and what use will be made of it?** All your answers will be completely anonymous to the research team. Results will be shared with The Ministry of Health and Ministry of Justice. The results of the project may also be published and will be available in the University of Otago (New Zealand) library; however there will be no way to trace responses back to individuals therefore the anonymity of participants will be preserved. The results will also be shared with the Ministry of Health to inform the support packages they offer in response to the COVID-19 crisis. The data collected will be securely stored in such a way that only members of the research team will be able to gain access to it. Data obtained as a result of the research will be retained for at least five years in secure storage. Any information held may be destroyed after five years even though the data derived from the research will, in most cases, be kept for much longer or possibly indefinitely. **Can participants change their mind and withdraw from the project?** You may withdraw from participation in the survey at any time and without any disadvantage to yourself. **What supports are available?** Some of the questions are about potentially sensitive topics like suicidal thoughts or family violence. We are asking about these topics because overseas evidence has suggested changes in their frequency related to the COVID-19 crisis. Like all other questions, your response to these questions is anonymous. You do not have to answer any question you do not wish to. If you feel negatively affected thinking about any of these topics, please use the contact details for the support services

provided or free call or text 1737 any time, 24 hours a day to talk to a trained counsellor. This service is completely free. **What if participants have any questions?** If you have any questions about our project, either now or in the future, please feel free to contact: Dr Matthew Jenkins

Department of Psychological Medicine, University of Otago, Wellington Email Address: matthew.jenkins@otago.ac.nz This study has been approved by the University of Otago Human Ethics Committee (reference F20/003). However, if you have any concerns about the ethical conduct of the research you may contact the University of Otago Human Ethics Committee (Gary Witte: gary.witte@otago.ac.nz or Jo Farron de Diaz: jo.farrondediaz@otago.ac.nz). Any issues you raise will be treated in confidence and investigated and you will be informed of the outcome.

Page Break

Q1.3 As part of the University of Otago's ethics approval process we need to ask you to answer the following question before starting our survey.

I have read the Information Sheet for this project and agree to take part in the study.

- ○ Yes (1)
- ○ No (2)

Skip To: End of Survey If Q1.3 = 2

End of Block: 1. Introduction

Start of Block: 2. Ethnicity

Q2.3 **Which of these ethnic groups do you identify with?**

Please select ALL the ethnic groups that you identify with.

- ☐ New Zealand European (1)
- ☐ Māori (2)
- ☐ Samoan (8)
- ☐ Cook Island Māori (9)
- ☐ Tongan (4)
- ☐ Niuean (10)
- ☐ Chinese (6)
- ☐ Indian (5)
- ☐ Other (e.g. Dutch, Japanese, Tokelauan). Please state: (7) _____

Page Break

Display This Question:

If Q2.3 = 2

Q2.4 **Do you belong to any local iwi close to where you live?**

- ○ Yes (1)
- ○ No (2)
- ○ Don't know (3)

Display This Question:

If Q2.3 = 2

Q2.5 **Thinking about your connection to Māori culture, in the last 12 months, but prior to lockdown, did you do any of these things?**

Please tick all that apply

- ☐ Went to a marae (3)
- ☐ Went to a Māori festival (e.g., Pā Wars. Matariki, or Waitangi Day) (2)
- ☐ Sang a Māori song, performed a haka, given a mihi or speech, or taken part in Māori performing arts or crafts (4)
- ☐ Took part in traditional Māori healing or massage. (5)
- ☐ ⊗ None of these (6)

Display This Question:

If Q2.3 = 2

Q2.6 **In the last 12 months, other than those listed in the previous question, are there any other important ways that you have connected to or expressed your Māori identity or heritage.**

- ○ Yes (please specify) (1) _____
- ○ No (2)
- ○ Don't know (3)

End of Block: 2. Ethnicity

Start of Block: 3. Living circumstances

Q3.1 **Your living circumstances**

These questions are about your living circumstances during the COVID-19 lockdown, which started on Thursday 26 March.

We define your 'bubble' as the household that you are in during the lockdown period, including anybody you are living with. Please note - this does not include people in other households, if you are living alone during lockdown.

Page Break

Q3.2 **During the lockdown, who has been living with you in your 'bubble'?**

- ○ No one, I live by myself and have no pets (1)
- ○ No one, I live by myself but I have one or more pets (2)
- ○ Flatmates or tenants (3)
- ○ Adult family/whānau member(s) only (4)
- ○ Family/whānau members, including a child/children (8)
- ○ Friends (5)
- ○ A mixture of flatmates, family/whānau members or friends (6)

Display This Question:

If Q3.2 != 1

And Q3.2 != 2

Q3.3 **Including yourself, how many people live with you in your bubble?**

_____

Q3.4

Not everybody has ended up in their bubble of choice.
How satisfied are you with the bubble you are in?

- ○ Extremely dissatisfied (27)
- ○ Dissatisfied (28)
- ○ Neither satisfied nor dissatisfied (29)
- ○ Satisfied (30)
- ○ Extremely satisfied (31)

Q3.5 **In your lockdown residence, which of the following are available to you?**

Please tick all that apply.

- ☐ Personal or quiet space (1)
- ☐ Internet (2)
- ☐ Computer (3)
- ☐ Easy access to a garden/green space (4)
- ☒ None of these (5)

Q3.6 **During the lockdown, how** easy has it been to stay connected with your family/whānau and friends outside your 'bubble'?

- ○ Extremely hard (1)
- ○ Somewhat hard (2)
- ○ Neither easy nor hard (3)
- ○ Somewhat easy (4)
- ○ Extremely easy (5)
- ○ I haven't tried to stay connected (6)

Display This Question:

If Q3.6 != 6

Q3.7 During the lockdown, **how often have you connected each week with your family/whānau and friends outside your bubble?**

	Not at all (1)	**Once a week** (2)	**2-3 times a week** (3)	**4-6 times a week** (4)	**Every day** (5)
Talked in person (1)	○	○	○	○	○
Talked by video (eg, Skype, WhatsApp) (2)	○	○	○	○	○
Talked over the telephone (3)	○	○	○	○	○
Connected by writing (text, email, snail mail) (4)	○	○	○	○	○

Q3.8 **Since the lockdown began, how has your level of contact changed with family/whānau and friends outside your bubble?**

- ○ It has increased (1)
- ○ It has decreased (2)
- ○ It has stayed the same (3)

Q3.9 **Overall, thinking about how well your family/whānau has been doing since the lockdown, would you say that things are currently getting better, getting worse, or staying about the same?**

- ○ Getting better (1)
- ○ Getting worse (2)
- ○ Staying the same (3)

Display This Question:
If Q3.2 != 1
And Q3.2 != 2

Q3.10 During the lockdown, **how are you and the people you are living with getting along with each other?**

- ○ Very badly (1)
- ○ Badly (2)
- ○ Neither well nor badly (3)
- ○ Well (4)
- ○ Very well (5)

Q3.11 **During the lockdown, how often have you felt lonely or isolated?**

- ○ All of the time (1)
- ○ Most of the time (2)
- ○ Some of the time (3)
- ○ A little of the time (4)
- ○ None of the time (5)

Q3.12 **During the lockdown how much time have you been spending looking at information related to COVID-19?**

- ○ Less than an hour a day (1)
- ○ 1-2 hours per day (2)
- ○ 2-4 hours per day (3)
- ○ 4-8 hours per day (4)
- ○ More than 8 hours a day (5)

Page Break

End of Block: 3. Living circumstances

Start of Block: 5. New Employment

Q4.1

The following questions are about jobs and businesses during the COVID-19 lockdown.

Do you have a job now?

- ○ Yes, I have a job (1)
- ○ No, I don't have a job (2)
- ○ I am self-employed (7)
- ○ I am a business owner (9)
- ○ I am retired (3)
- ○ I have never had a job (10)

Skip To: End of Block If Q4.1 = 3
Skip To: End of Block If Q4.1 = 10

Page Break

Display This Question:

If Q4.1 = 1

Or Q4.1 = 7

Or Q4.1 = 9

Q4.2 **Have your hours of paid work been drastically reduced as a result of the lockdown?**

- Yes (3)
- No (5)
- Doesn't apply to me (4)

Display This Question:

If Q4.1 = 1

Or Q4.1 = 7

Or Q4.1 = 9

Q4.3 Has your paid workload drastically increased as a result of the lockdown?

- Yes (1)
- No (2)
- Doesn't apply to me (3)

Display This Question:

If Q4.1 = 2

Q4.4 **Have you lost your job (or jobs) as a result of the lockdown?**

- Yes (1)
- No (2)
- I didn't have a job before the lockdown (3)

Display This Question:

If Q4.1 = 1

Or Q4.1 = 7

Or Q4.1 = 9

Q4.5 **Are you an 'essential worker' (e.g., healthcare, law enforcement, emergency services, provider of essential goods)?**

- Yes (1)
- No (2)

Q4.6 **Is someone in your bubble an essential worker (e.g., healthcare, law enforcement, emergency services, provider of essential goods)?**

- Yes (1)
- No (2)
- Not applicable (4)

Display This Question:

If Q4.5 = 1

Q4.7 **What type of essential work do you do?**

- Healthcare (1)
- Law enforcement (2)
- Other emergency services (e.g., fire service) (3)
- Provider of other essential goods or services (e.g., food supply, fuel, waste removal, internet, financial support, transport) (4)

Display This Question:

If Q4.5 = 1

Q4.8 **Through your job, have you had known direct contact with COVID-19 patients?**

- I have had direct contact with people who I knew at the time were **suspected of having** COVID-19 (2)
- I have had direct contact with people who I knew at the time had **been diagnosed with** COVID-19 (1)
- I found out later that people I had contact with were probable or confirmed COVID-19 cases but I did not know at the time (3)
- I may have had contact with probable or confirmed COVID-19 cases (4)
- To the best of my knowledge, I have not yet had contact with probable or confirmed COVID-19 cases (5)

Page Break

Display This Question:
If Q4.1 = 7
Or Q4.1 = 9

Q4.9 **Do you personally own or run a business whose reduction in turnover due to COVID-19 threatens the survival of your business?**

- ○ Yes (1)
- ○ No (2)

Display This Question:
If Q4.9 = 1

Q4.10 **Have you personally had to make people in your organisation redundant or lose their jobs?**

- ○ Yes (3)
- ○ No (5)

Q4.11 **If there has been a reduction in your hours, have you applied (or has your employer applied on your behalf) for any of the following?**
Please select all that apply.

- ☐ COVID-19 wage subsidy (1)
- ☐ COVID-19 leave payment (2)
- ☐ Financial support for your business (6)
- ☐ Other government financial support (3)
- ☐ ⊗ None of the above (4)
- ☐ ⊗ Not applicable to me (5)
- ☐ ⊗ I don't know (7)

Page Break

Display This Question:

If Q4.9 = 1

Or Q4.2 = 3

Or Q4.4 = 1

Q4.12 **How much has any reduction in your hours, losing your job, or loss of turnover in your business made it more difficult for you to meet basic living costs such as rent, mortgage payments, or food bills?**

- ○ A great deal (1)
- ○ A lot (2)
- ○ A moderate amount (3)
- ○ A little (4)
- ○ None at all (5)
- ○ Not applicable to me (6)

End of Block: 5. New Employment

Start of Block: 6. General Health

Q5.1 **Your general health**

The next few questions are about your general (physical) health.

Page Break

Q5.2 **How would you describe your general (physical) health?**

- Poor (1)
- Fair (2)
- Good (3)
- Very good (4)
- Excellent (5)

Q5.3 **Over the past 5 years, have you had a medical condition that may make you more vulnerable to COVID-19 such as heart disease, COPD (difficulty breathing), weakened immunity, or cancer?**

- Yes (1)
- No (2)
- Prefer not to say (3)

Q5.4 Do you have a family member who has a medical condition that may make them more vulnerable to COVID-19 such as heart disease, COPD (difficulty breathing), weakened immunity, or cancer?

- Yes (1)
- No (2)
- Prefer not to say (3)

Q5.5 **Do you live with somebody, apart from a family member, who has a medical condition that may make them more vulnerable to COVID-19 such as heart disease, COPD (difficulty breathing), weakened immunity, or cancer?**

- Yes (1)
- No (2)
- Prefer not to say (3)

Q5.6 **Do you think you have had COVID-19?**

- Yes (1)
- No (2)
- Not sure (3)

Q5.7 **Have you been tested for COVID-19?**

- Yes (1)
- No (2)

Display This Question:
If Q5.7 = 1

Q5.8 **What were the results of this test?**

- Positive (1)
- Negative (2)
- Awaiting results (3)

Display This Question:

If Q5.8 = 1

Q5.9 **Have you fully recovered from COVID-19?**

- Yes (1)
- No (2)

Q5.10 **Do you have any physical condition or disability that affects your ability to function (e.g., leave the house for essential goods or for physical activity) during the lockdown?**

- Yes (1)
- No (2)

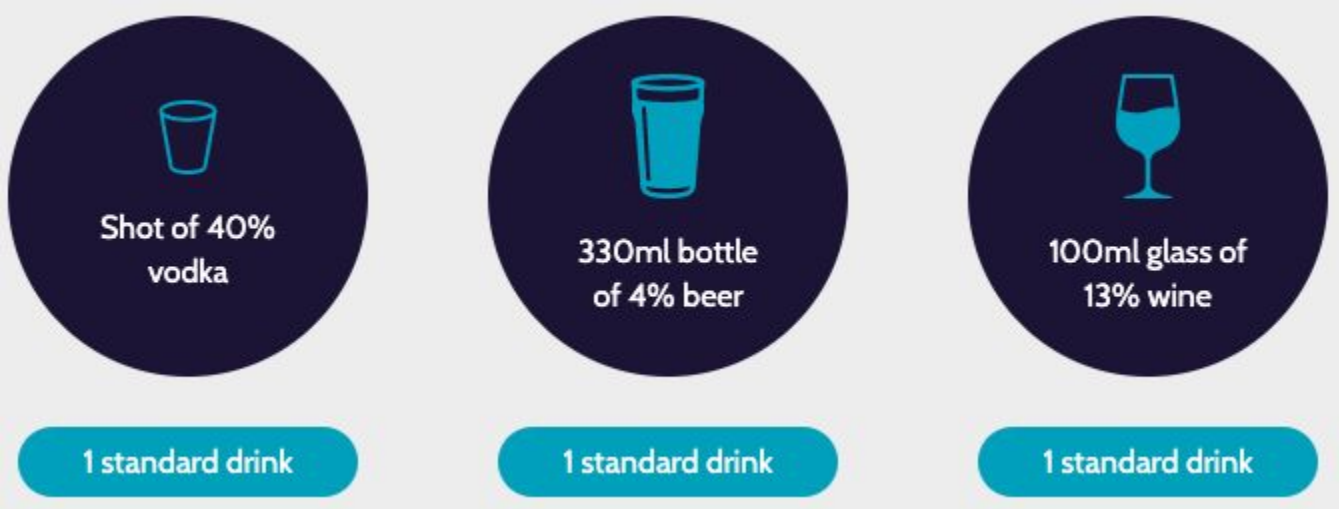
End of Block: 6. General Health

Start of Block: 7. Alcohol use

Q6.1 **Alcohol and Smoking**

The following questions are about your alcohol intake and smoking since the start of the COVID-19 lockdown.

Q6.2



Q6.3

Q6.4 Using the above graphic as a guide, BEFORE **the lockdown**, **how many standard drinks would you have consumed in a typical 7 days?**

Please answer using a number

_____

Q6.5 **How many standard drinks have you consumed in the last 7 days?**

Please answer using a number

_____

End of Block: 7. Alcohol use

Start of Block: 8. Smoking

Q7.1 **How often do you CURRENTLY smoke tobacco cigarettes (either tailor-made or roll-your-own)?**

- ○ I smoke cigarettes every day (1)
- ○ I smoke cigarettes at least once a week, but not daily (2)
- ○ I smoke cigarettes less than once a week (3)
- ○ I am an ex-smoker (5)
- ○ I have never been a smoker (6)

Display This Question:

If Q7.1 = 1

Q7.2 **BEFORE the lockdown, about how many cigarettes did you smoke each day?**

Please answer using a number

_____

Display This Question:

If Q7.1 = 1

Q7.3 **DURING the lockdown, about how many cigarettes do you smoke each day?**

Please answer using a number

_____

Display This Question:
If Q7.1 = 2

Q7.4 **BEFORE** **the lockdown, about how many cigarettes did you smoke each week?**

Please answer using a number

_____

Display This Question:
If Q7.1 = 2

Q7.5 **DURING** **the lockdown, about how many cigarettes do you smoke each week?**

Please answer using a number

_____

End of Block: 8. Smoking

Start of Block: 9. Mental health

Q8.1 **How are you feeling?**

The next questions are about your mental health and wellbeing. We are interested in whether people's mental health or wellbeing may have been affected by recent COVID-19 events.

Some of these questions may seem a bit repetitive but they come from surveys that are used all over the world. Please bear with us and answer them all.

Like all of the questions in the survey, your answers are completely confidential and anonymous, and will be used for research purposes only.

Q8.2 **DURING the lockdown**:

	At no time (1)	**Some of the time** (2)	**Less than half of the time** (3)	**More than half of the time** (4)	**Most of the time** (5)	**All of the time** (6)
I have felt cheerful and in good spirits (1)	○	○	○	○	○	○
I have felt calm and relaxed (2)	○	○	○	○	○	○
I have felt active and vigorous (3)	○	○	○	○	○	○
I woke up feeling fresh and rested (4)	○	○	○	○	○	○
My daily life has filled me with things that interest me (5)	○	○	○	○	○	○

Page Break

Q8.3 **The following question refers to your overall sleep quality for most nights both before and since the lockdown.**

Please think about the quality of your sleep overall, such as how many hours of sleep you got, how easily you fell asleep, how often you woke up during the night (except to go to the bathroom), how often you woke up earlier than you had to in the morning, and how refreshing your sleep was.

<u>BEFORE the lockdown</u>, how would you rate your sleep quality overall?

- ○ 1 (Terrible) (1)
- ○ 2 (2)
- ○ 3 (3)
- ○ 4 (4)
- ○ 5 (5)
- ○ 6 (6)
- ○ 7 (7)
- ○ 8 (8)
- ○ 9 (9)
- ○ 10 (Excellent) (10)

Q8.4 **DURING the lockdown, how would you rate your sleep quality overall?**

- 1 (Terrible) (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)
- 8 (8)
- 9 (9)
- 10 (Excellent) (10)

Page Break

Q8.5 **DURING the lockdown, how often have you been bothered by the following?**

	Not at all (1)	**Some days** (2)	**Most days** (3)	**Nearly every day** (4)
Feeling nervous, anxious, or on edge (1)	○	○	○	○
Not being able to stop or control worrying (2)	○	○	○	○
Worrying too much about different things (3)	○	○	○	○
Having trouble relaxing (4)	○	○	○	○
Being so restless that it's hard to sit still (5)	○	○	○	○
Becoming easily annoyed or irritable (6)	○	○	○	○
Feeling afraid as if something awful might happen (7)	○	○	○	○

Page Break

Q8.6 DURING the lockdown, **about how often have you felt tired out for no good reason?**

- None of the time (1)
- A little of the time (2)
- Some of the time (3)
- Most of the time (4)
- All of the time (5)
- Don't know (6)

Q8.7 DURING the lockdown, **about how often** have you felt **nervous?**

- None of the time (1)
- A little of the time (2)
- Some of the time (3)
- Most of the time (4)
- All of the time (5)
- Don't know (6)

Q8.8 DURING the lockdown **about how often** have you felt **so nervous that nothing could calm you down?**

- None of the time (1)
- A little of the time (2)
- Some of the time (3)
- Most of the time (4)
- All of the time (5)
- Don't know (6)

Q8.9 DURING the lockdown**, about how often** have you felt **hopeless?**

- None of the time (1)
- A little of the time (2)
- Some of the time (3)
- Most of the time (4)
- All of the time (5)
- Don't know (6)

Q8.10 DURING the lockdown, **about how often** have you felt **restless or fidgety?**

- None of the time (1)
- A little of the time (2)
- Some of the time (3)
- Most of the time (4)
- All of the time (5)
- Don't know (6)

Page Break

Q8.11 DURING the lockdown, **about how often** have you felt **so restless you could not sit still?**

- None of the time (1)
- A little of the time (2)
- Some of the time (3)
- Most of the time (4)
- All of the time (5)
- Don't know (6)

Q8.12 DURING the lockdown, **about how often** have you felt **depressed?**

- None of the time (1)
- A little of the time (2)
- Some of the time (3)
- Most of the time (4)
- All of the time (5)
- Don't know (6)

Q8.13 DURING the lockdown, **about how often** have you felt **that everything was an effort?**

- None of the time (1)
- A little of the time (2)
- Some of the time (3)
- Most of the time (4)
- All of the time (5)
- Don't know (6)

Q8.14 DURING the lockdown, **about how often** have you felt **so sad that nothing could cheer you up?**

- None of the time (1)
- A little of the time (2)
- Some of the time (3)
- Most of the time (4)
- All of the time (5)
- Don't know (6)

Q8.15 DURING the lockdown **about how often** have you felt **worthless?**

- ○ None of the time (1)
- ○ A little of the time (2)
- ○ Some of the time (3)
- ○ Most of the time (4)
- ○ All of the time (5)
- ○ Don't know (6)

Q8.16 DURING the lockdown w**hat have you found to be the main sources of stress or anxiety for you?**

Please tick all that apply

- ☐ Uncertainty regarding my health (1)
- ☐ Uncertainty regarding the health of my family or friends (2)
- ☐ Uncertainty regarding my finances (3)
- ☐ Uncertainty regarding my employment security (6)
- ☐ The wider consequences of COVID-19 (4)
- ☒ Not applicable (8)
- ☐ Something else (7) _____

Page Break

Q8.17 **Have you previously been diagnosed with a mental illness by a doctor or psychologist?**

- ○ Yes (1)
- ○ No (2)
- ○ Prefer not to say (3)

Display This Question:

If Q8.17 = 1

Q8.18 **What diagnosis or diagnoses did they make?**

Please tick all that apply

- ☐ Depression (1)
- ☐ Bipolar disorder (2)
- ☐ Anxiety disorder (3)
- ☐ Personality disorder (4)
- ☐ Psychotic disorder (5)
- ☐ Alcohol or drug disorder (6)
- ☐ Other (7)
- ☐ ⊗ Don't know (8)
- ☐ ⊗ Prefer not to say (9)

Display This Question:

If Q8.17 = 1

Q8.19 **DURING the lockdown, how is your mental health compared to usual?**

- ○ Much worse than usual (1)
- ○ Worse than usual (2)
- ○ The same as usual (3)
- ○ Better than usual (4)
- ○ Much better than usual (5)
- ○ Prefer not to say (6)

Page Break

Q8.20 **Important**

If any of these questions have caused you to feel distressed, or if you are struggling with your mental health, please free call or text 1737 or visit https://1737.org.nz to speak to a trained counseller. This also applies if you have any concerns for your friends, family or whānau.

Alternatively, you can call Depression.org.nz on 0800 111 757 or text 4202.

End of Block: 9. Mental health

Start of Block: 10. Previous trauma

Q226 **Have you ever been exposed to any of the following (aside from the current COVID-related events)?**

Please tick all that apply

- ☐ Childhood adversity (neglect, physical or sexual abuse) (1)
- ☐ Physical or sexual abuse after the age of 16 (2)
- ☐ Exposure to a traumatic event involving physical or sexual abuse to others (9)
- ☐ Natural disaster (e.g., fire, flood, earthquake) (3)
- ☐ Serious physical injury (e.g. car accident) (5)
- ☐ Serious illness (6)
- ☐ Other (please state) (7) _____
- ☒ None of the above (8)

Page Break

End of Block: 10. Previous trauma

Start of Block: 11. Suicide

Q9.1 **Please note: The following questions ask about potentially sensitive topics.**

Like all of the questions in this survey, your answers are completely confidential and anonymous, and will be used for research purposes only.

But, if there are some questions you would prefer not to answer, just skip them.

Page Break

Q9.2 **BEFORE the lockdown, but during the previous 12 months, had you:**

	Yes (1)	No (2)	Prefer not to say (3)
Seriously thought about ending your own life? (1)	○	○	○
Made plans to end your own life? (2)	○	○	○
Made an attempt to end your own life? (3)	○	○	○

Q9.3 DURING the lockdown, have you:

	Yes (1)	No (2)	Prefer not to say (3)
Seriously thought about ending your own life? (1)	○	○	○
Made plans to end your own life? (2)	○	○	○
Made an attempt to end your own life? (3)	○	○	○

Q9.4 **If you feel distressed or feel like you want to talk about anything related to these issues, please call Lifeline on 0800 543 354 or text 4357.**

Alternatively, visit the Lifeline website at https://www.lifeline.org.nz/**.**

Page Break

End of Block: 11. Suicide

Start of Block: 12. Domestic violence

Q10.1 **Family violence**

The next two questions are about any incidents of family violence that have occurred in your household.

Remember, you are not obliged to answer these questions, but all responses are completely confidential and anonymous, and your responses will be used for research purposes only.

If family violence is curently an issue for your family/whānau **or friends, please contact one of the following organisations for assistance:**

Women's Refuge crisis line on 0800 733 843 - (24 hours)
Family violence information line on 0800 456 450
Emergency services on 111.

Page Break

Q10.2 **DURING the lockdown, have you experienced any of the following as a result of an action from a family/whānau member?**

Please tick all that apply, and in*clude threats made to you directly (face-to-face, phone, email, text), or via someone else*.

- ☐ Been frightened (8)
- ☐ Been insulted or abused (9)
- ☐ Been threatened with harm to you, your children or your pets (10)
- ☐ Been threatened with being hit, slapped or punched (5)
- ☐ Been threatened with a weapon or other object (6)
- ☐ Been slapped, punched or kicked (2)
- ☐ Been hit with a weapon or other object (3)
- ☐ Been touched sexually in a way you didn't like (4)
- ☐ Been forced to have sex when you didn't want to (1)
- ☐ ⊗ None of these (7)
- ☐ ⊗ Prefer not to say (11)

Q10.3 **DURING the lockdown, have you been a witness to any of the above in your 'bubble' ?**

- ○ Yes (1)
- ○ No (2)
- ○ Prefer not to say (3)

Q10.4 **Useful contacts for family violence-related incidents**

If family violence is currently an issue for your family/whānau or friends please contact one of the following organisations for assistance:

Women's Refuge
Call the crisis line on 0800 733 843 (24 hours)

'It's Not OK' family violence prevention
Call the information line on 0800 456 450

Rape Crisis
Call 0800 88 33 00 or visit http://www.rapecrisisnz.org.nz/

If you are presently in danger call the emergency services on 111.

End of Block: 12. Domestic violence

Start of Block: 13. Silver lining

Q11.1 **Positive aspects of COVID-19**

Have you experienced any 'silver linings' or positive aspects during the COVID-19 lockdown?

Please tick all that apply

- ☐ Yes, for me personally (11)
- ☐ Yes, for wider society (13)
- ☐ No (14)

Display This Question:
If Q11.1 = 11
Or Q11.1 = 13

Q11.2 **What are these silver linings, for you personally or for wider society?**

_____

_____

_____

_____

_____

End of Block: 13. Silver lining

Start of Block: 14. Demographics

Q12.1 **Finally, a few questions about yourself**

Which of the following best describes your highest formal qualification?

- ○ No formal qualification (1)
- ○ High school qualifications (school certificate, NCEA, UE, Bursary) (2)
- ○ Certificate or diploma below Bachelor's level (3)
- ○ Bachelor's degree (4)
- ○ Post-graduate or higher qualification (5)

Q12.2 **What is your exact age (in years)?**

_____

Q2.1
Which of these do you <u>most</u> identify with?

- ○ Male (1)
- ○ Female (2)
- ○ Gender diverse (3)

Display This Question:
If Q2.1 = 3

Q12.3 **Are you?**

- ○ Transgender female to male (1)
- ○ Transgender male to female (2)
- ○ Intersexed (3)
- ○ Gender non-conforming (5)
- ○ Genderqueer (6)
- ○ Two-spirit (7)
- ○ Third gender (8)
- ○ Other (4) _____

Display This Question:
If Q2.1 = 2

Q12.4
Are you pregnant?

- ○ Yes (1)
- ○ No (2)
- ○ Don't know (3)

Q12.5 **What is the total income that you yourself received from all sources, before tax or any other deductions, over the last 12 months?**

- ○ Less than $10,000 (1)
- ○ $10,001 – $20,000 (2)
- ○ $20,001 – $30,000 (3)
- ○ $30,001 – $40,000 (4)
- ○ $40,001 – $50,000 (5)
- ○ $50,001 – $60,000 (6)
- ○ $60,001 – $70,000 (7)
- ○ $70,001 – $100,000 (8)
- ○ $100,001 – $150,000 (9)
- ○ $150,001 or more (10)
- ○ Prefer not to say (11)

Q12.6 **What is your postcode?**

_____

End of Block: 14. Demographics

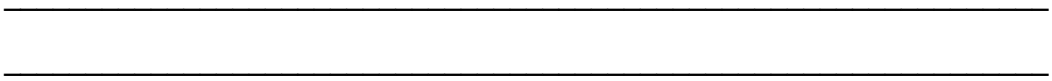
Start of Block: 15. Signposting

Q13.1 **Are there any comments you'd like to make about COVID-19, the lockdown or this survey? If so, please write them in the box below.**

_____

_____

_____



Page Break

Q13.2

Remember

If you are feeling distressed by any of the content in this survey, think that these issues may be affecting family/whānau members or friends, or if you simply want more information, please note the following helplines and services.

Family violence

Women's Refuge
Call the crisis line on 0800 733 843 (24 hours)

'It's Not OK' family violence prevention
Call the information line on 0800 456 450

Rape Crisis
Call 0800 88 33 00 or visit http://www.rapecrisisnz.org.nz/

If you are in danger, call the emergency services on 111.

Depression or suicide

Lifeline
Call 0800 543 354 or text 4357 or on the web at https://www.lifeline.org.nz/.

NZ free and confidential counselling
Call or text 1737 or visit https://1737.org.nz/

Depression.org.nz
Call 0800 111 757, text 4202, or visit depression.org.nz.

COVID-19 information
Call the Ministry of Health Healthline on 0800 611 116 for advice, or visit https://covid19.govt.nz/ for up-to-date and accurate information on COVID-19.

Page Break

Q13.4 **Thank you for taking part in our survey.**

Please click 'Next' to submit your answers.

End of Block: 15. Signposting

BMJ Open

The challenges facing essential workers: A cross-sectional survey of the subjective mental health and wellbeing of New Zealand healthcare and 'other' essential workers during the COVID-19 lockdown

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The challenges facing essential workers: A cross-sectional survey of the subjective mental health and wellbeing of New Zealand healthcare and 'other' essential workers during the COVID-19 lockdown

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ABSTRACT

Objectives

To compare psychological outcomes, experiences and sources of stress over the COVID-19 lockdown in New Zealand in essential workers (healthcare and 'other' essential workers) with that of workers in non-essential work roles.

Design

Online cross-sectional survey.

Setting

Conducted in New Zealand over level 4 lockdown in April/May 2020.

Participants

Findings from employed participants (2495) are included in this report; 381 healthcare workers, 649 'other' essential workers, and 1465 non-essential workers.

Primary and secondary outcome measures

Measures included psychological distress (K-10), anxiety (GAD-7), wellbeing (WHO-5), alcohol use, subjective experiences and sources of stress. Differences between work categories were quantified as risk ratios or chi-square tests.

Results

After controlling for confounders that differed between groups of essential and non-essential workers, those in healthcare and those in 'other' essential work were at 71% (95% CI 1.29, 2.27) and 59% (95% CI 1.25, 2.02) respectively of moderate levels of anxiety (GAD-7 ≥10), than those in non-essential work. Those in healthcare were at 19% (95% CI 1.02, 1.39) greater risk of poor wellbeing (WHO-5 < 13). There was no evidence of differences across work roles in risk for psychological distress (K-10 ≥12) or increased alcohol use. Healthcare and 'other' essential workers reported increased workload ($p<0.001$) and less uncertainty about finances and employment than those in non-essential work ($p<0.001$). Healthcare and non-essential workers reported decreased social contact. No difference by work category about health concerns was reported; 15% had concerns about participants' own health and 33% about other people's health.

Conclusions

During the pandemic lockdown, essential workers (those in healthcare and those providing 'other' essential work) were at increased risk of anxiety compared with those in non-essential work, with those in healthcare also being at increased risk of poor wellbeing. This highlights the need of recognising the challenges this vital workforce face in pandemics.

Strengths and limitations of this study

- One of the few studies to examine the psychosocial outcomes of the COVID-19 pandemic lockdown, not just in healthcare workers but also those working in 'other' essential roles.
- The study was conducted in New Zealand which had low rates of COVID-19 infection, which meant that it examined of the impact of strict lockdown restrictions in the absence of widespread direct effects of the virus
- The survey used validated outcome measures and adjusted for confounders, however the cross-sectional design did not allow differentiation between longer term factors and newer impacts deriving from the lockdown.
- Although identifying stressors for different work categories, finer grained analyses of impacts for specific roles was not possible.

Key words

Mental health, wellbeing, COVID-19, healthcare, essential workers

INTRODUCTION

There is increasing recognition of the psychological impacts of the COVID-19 pandemic and its associated public health restrictions (1-4). People employed in essential work, particularly those in healthcare, are consistently identified as being at increased risk of detrimental psychological outcomes (5). This paper examines the mental health and wellbeing of essential workers (those in healthcare and those providing other essential services) during a national lockdown in New Zealand at the start of the pandemic.

Previous studies of healthcare workers conducted over early COVID-19 lockdowns report high rates of depression (6), anxiety (7), distress (6, 8), sleep disturbance(7, 8) and somatic symptoms (7). These findings replicate those from previous pandemics, such as the 2002–2004 SARS outbreak, which reported significant psychological impacts on healthcare workers (9). They may be explained by the multiple stressors those employed in healthcare face in relation to their work, in addition to those experienced by the wider population. These include higher rates of infection, fears of infecting others, working in challenging conditions (with exposure to potentially traumatic events, grief, and ethical dilemmas), overwork and stigmatisation(10) (8, 11, 12).

While most people are told to stay at home during a COVID-19 lockdown, workers employed in law enforcement, other emergency services, and as providers of essential goods or services (e.g., food supply, fuel, waste removal, internet, financial support, transport), are (like healthcare workers) required to keep working. This group has been collectively referred to as 'other' essential workers, to distinguish them from healthcare workers, who, of course, are also essential. In contrast to healthcare workers, there has been only limited research examining the mental health and wellbeing of these 'other' essential workers. A recent study reported that those employed in roles which involved interacting with the general public were at increased risk of detrimental psychological outcomes (13). A study of front-line non-medical workers providing services for patients (such as security guards, transport staff) also reported high rates of depression (14), although another study which compared 'other' essential workers with those in healthcare reported that those in public safety roles (e.g. police and emergency personnel) had lower perceived stress than healthcare workers (12). It is likely that people employed in 'other' essential work, similar to those in healthcare, may also face increased work demands and feel at increased risk of infection because of potential exposure during their work. Indeed, a recent large study from the UK reported an increased risk of COVID-19 infection in workers in social care, education and transport (in addition to healthcare workers), compared to those in non-essential work (15).

The first confirmed case of COVID-19 in NZ was on 28 February 2020. On the 21 March a country-wide alert system was announced, with 1 being the lowest and 4 the highest level. The government also released a list of 'essential services' which gave clear guidance to employers and employees for work roles that required people to leave home for work (16). On 25 March 2020 New Zealand moved rapidly to a level 4 lockdown that lasted for 33 days. During this time, all schools and non-essential businesses were shut and non-essential workers required to remain at home. The level 4 lockdown was stringent, with a composite measure rating the public health restrictions in NZ as being the highest of any World Bank high-income country (17). The restrictions were successful with daily case numbers in single figures and falling to zero in the following weeks (18). However, at the time the lockdown was implemented, it was not at all certain that the elimination goal would be achieved, and healthcare professionals voiced concern about the potential impacts on the health system (19).

We have already reported initial data from a survey of a large, demographically representative sample of New Zealanders (20, 21). The aim of the exploratory study reported here was to utilise this same survey to compare psychological outcomes, experiences and sources of stress over the COVID-19 lockdown in NZ in essential workers (healthcare workers and 'other' essential workers) with that of other workers employed in non-essential work roles. Understanding the stressors and the mental health and wellbeing of this vital workforce is important to inform their psychosocial needs. This understanding is particularly pertinent in the global environment with the implementation of further lockdowns and restrictions.

METHODS

Study Design and Survey

This was a cross-sectional survey that could be completed on a mobile phone, tablet or computer and took approximately 15 minutes [see (20) for details]. All participants provided consent before they could proceed with the survey.

The survey was fielded using the Qualtrics platform between 15 April and 8 May 2020, during the New Zealand lockdown. Between the start of the pandemic and the launch of the surveys there were 1366 cases of COVID-19 in New Zealand and nine deaths. During the survey period, the cases rose by 56 with a further two deaths.

Participants and Recruitment

Potential participants were identified and invited to complete the online survey using three methods of distribution of the same survey. Two methods used national survey panels, the Dynata survey platform [methodology described in (20)] and the NZ government's Health and Justice survey panels [methodology described in (22, 23)]. Purposive sampling [utilising 711 Facebook contacts of the Medical Research Institute of NZ (MRINZ) who identified as being an essential worker and had consented to receiving invitations to participate in 'COVID-19-related' research] was used to increase the number of essential workers surveyed because they were likely to be under-represented in the panels described above (because they were at work away from their homes).

People were eligible for the survey if they were living in NZ during the study period, were aged 18 years or over at the time of the level 4 lockdown, had an email address and internet connection, and provided informed consent to participate. For the purpose of this paper, we selected all those who said they were employed at the time of the survey and excluded from the analyses those who were not.

Measures

The survey contained three standardised self-report measures of psychological distress (the Kessler Psychological Distress Scale [K-10](24), anxiety (the Generalised Anxiety Disorder Assessment [GAD-7](25), and wellbeing (the World Health Organisation Well-Being Index [WHO-5](26). The K-10 is a 10-item scale measuring non-specific symptoms of anxiety and depression over the previous 4 weeks. Scores are reported in a 0–40 range to align with reporting in the NZ Health Survey (22), with people scoring 12 or higher having moderate to high distress. The GAD-7 measures anxiety symptoms with respondents indicating how much they have been bothered by each of seven symptoms over the last two weeks, on a 4-point scale ranging from 'not at all' to 'nearly every day'. Scores range from 0–21 with cut-off scores of 10 and higher indicating at least moderate anxiety. The WHO-5 is one of the most widely-used scales for assessing subjective psychological well-being (26). It

contains five positively phrased items, with respondents rating each statement for the last two weeks. Scores range from 0–25 with cut-off scores of 12 and under indicating poor wellbeing, and scores greater than 22 indicating excellent wellbeing. We assessed alcohol consumption by asking participants how many standard drinks they consumed on an average 7-day period before the lockdown and how many standard drinks they had consumed over the previous 7 days.

Respondents were asked to identify whether they were employed, and if employed whether they were an essential worker. If they were in an essential work role, they were asked to identify the type of essential work from one of four categories: healthcare; law enforcement; other emergency services such as fire service; or as a provider of other essential goods or services such as food supply, fuel, waste removal, internet, financial support or transport.

Demographic and pre-lockdown factors included age, gender, ethnicity, socio-economic status [education and household income], smoking and alcohol usage, health vulnerability and mental health, and prior trauma. Objective and subjective lockdown experiences were assessed by questions on living circumstances, relationships and connections with others, workload, change in alcohol use, COVID-19 exposure and concerns about risk of infection. Respondents were also asked to identify their main sources of stress were during the lockdown (uncertainty about their health or that of a family member; finances; employment; the wider consequences of COVID-19).

The survey questions are available as a supplementary file (Supplementary file 1). A detailed description of survey items and construction of the questionnaire has previously been published (20).

Patient and public involvement

No patients were involved. The survey sampled members of the general public. We developed and refined the survey using a peer review process (27). We consulted with government health advisors, people with lived experience of mental distress, experts in survey design, and healthcare professionals during the survey development and testing phase. The authors received advice from Māori cultural advisors to ensure culturally-appropriate question wording and context for questions specifically concerning Māori. We requested feedback on the survey content, both in terms of the most important outcome measures and on language, clarity, format, length, and the flow. We made iterative improvements based on the feedback. We then pre-tested the revised questionnaire on a small sample of the general public and further modified it to address feedback.

Ethical approval

The study was approved by the University of Otago Human Ethics Committee (approval code F20/003) and underwent Māori consultation with the Ngāi Tahu Research Committee.

Statistical Analyses

This was an exploratory study (hypothesis generating) designed and implemented at the start of the pandemic. As we were not trying to confirm any hypothesis, no sample size calculations were performed, however we were cognisant of sample size when building statistical models to minimise the risk of over-fitting. Responses from all three methods of survey distribution were combined, and analyses performed on unweighted data. Participants' demographics, socioeconomic characteristics, and health histories were summarised by work category using counts and percentages. The proportion of participants reporting poor

outcomes on each of the K-10, GAD-7, and WHO-5 psychological measures, or reporting increased alcohol usage, was determined by work category, and associations assessed using chi-square tests. Differences between work categories were quantified as risk ratios with 95% confidence intervals [CI], calculated using a series of unadjusted and confounder adjusted Poisson generalised linear regression models with robust 'sandwich' standard errors (28). Models were first adjusted by age, gender, and ethnicity, and secondly by other potential confounders considered to have been fixed prior to lockdown (income, smoking status, living alone, health vulnerability, prior mental health, and prior exposure to a traumatic event). Participants' experiences of lockdown were summarised by work category as counts and percentages, and groupwise differences assessed using chi-square or Fisher's exact tests. Missing data was excluded via listwise deletion. Analysis was performed using the R programming language and environment [R version 4.0.3].

RESULTS

In total, there were 4393 survey responses. The non-completion rate, defined as those who opened and started but did not complete the survey before the cut-off time, was 12.0% (n=529), producing a cleaned sample of 3864 survey responses. The surveys were completed over a similar time period: n=2010 from the Dynata panel; n=1477 from the government's Health and Justice panels; and n=377 from the MRINZ sample. Of these, 1369 (35.4%) were not employed at the time of the survey (and were excluded from this analysis), giving a total of 2495 participants who were in employment and were included in our analyses.

There were some differences between the three samples in terms of the distribution of essential and non-essential workers, primarily reflecting the recruitment of the MRINZ sample from predominantly medical contacts. However, the data were broadly comparable which allowed the samples to be combined. In view of the small numbers identifying as working in law enforcement (n=57) and other emergency services (n=43), these two categories were combined with those providing other essential goods or services. This meant that in the final combined sample there were three work categories for comparison; essential workers in healthcare (n=381), 'other' essential workers ('other' essential workers n=649), and workers in non-essential work (non-essential workers, n=1465).

Demographic and Socioeconomic Characteristics

Table 1 shows the demographic profile of survey respondents by the three work categories. healthcare workers were predominantly female, whereas those from the two categories showed a more balanced gender distribution. A previous history of a mental health disorder was noted in 26% of healthcare workers, 23% of 'other' essential workers and 19% of non-essential workers. A history of exposure to previous trauma was noted in 48% of healthcare workers, 40% of 'other' essential workers and 28% of non-essential workers. The most common trauma was exposure to a natural disaster, which was reported by a total of 17% of the sample.

Table 1: Demographic characteristics of essential and non-essential workers.

Characteristic	Healthcare essential worker	Other essential worker	Non-essential worker
Gender			
Male	17.4% (66)	47.5% (306)	43.5% (635)
Female	82.6% (314)	52.5% (338)	56.5% (824)
Age			
15-24	4.5% (17)	7.4% (48)	9.1% (133)
25–34	18.6% (71)	21.7% (141)	20.5% (301)
35–44	18.1% (69)	20.3% (132)	22.5% (329)
45–54	27.0% (103)	25.7% (167)	22.3% (326)
55–64	25.7% (98)	19.4% (126)	17.3% (254)
65+	6.0% (23)	5.4% (35)	8.3% (122)
Ethnicity (prioritised)			
Māori	12.6% (48)	17.3% (112)	15.7% (230)
Pacific	2.4% (9)	4.0% (26)	4.2% (62)
Asian	8.4% (32)	8.3% (54)	10.0% (147)
European/Other	76.6% (291)	70.4% (456)	70.0% (1025)
Education			
No formal qualification	5.8% (22)	8.9% (58)	6.4% (94)
High school	10.0% (38)	25.7% (167)	22.3% (326)
Certificate or diploma	21.0% (80)	25.3% (164)	25.1% (368)
Bachelor's degree	22.3% (85)	23.1% (150)	26.5% (388)
Post-graduate	40.9% (156)	16.9% (110)	19.7% (289)
Income			
$30,000 or less	8.9% (34)	10.7% (69)	19% (278)
$30,001 – $70,000	43.6% (166)	41.9% (271)	38.4% (562)

Table 1 cont.

Characteristic	Healthcare essential worker	Other essential worker	Non-essential worker
$70,001 – $100,000	22.0% (84)	21.5% (139)	18.5% (270)
$100,001 – $150,000	11.8% (45)	14.2% (92)	10.0% (146)
$150,001 or more	8.7% (33)	4.9% (32)	6.3% (92)
Prefer not to say	5.0% (19)	6.8% (44)	7.9% (115)
Potential vulnerability			
Health vulnerability	6.3% (24)	5.7% (37)	4.0% (58)
History of previous exposure to trauma	48.0% (183)	39.9% (259)	28.3% (415)

Data was missing for the following variables (n): gender (12), ethnicity (3), income (4), history of previous exposure to trauma (7).

Psychological distress, anxiety and wellbeing

The unadjusted risk ratios for psychological distress, anxiety and wellbeing are summarised in Table 2. The results show that about a quarter of all workers scored above the cut-off for moderate to severe psychological distress (K-10 >12) and that those in essential work (healthcare and 'other' essential work) were not at greater risk of reporting moderate-high levels of psychological distress than those in non-essential work (p=0.153). Essential workers (healthcare and 'other' essential workers) were, however, at an estimated 61% greater risk than non-essential workers of reporting moderate-high levels of anxiety from the GAD-7 (p=<0.001). Healthcare workers, but not 'other' essential workers were at an estimated 15% greater risk than non-essential workers of reporting poor wellbeing from the WHO-5 (p=0.038). About one-third of all workers increased their use of alcohol but those in essential work (healthcare and 'other' essential work) were not at greater risk of this than non-essential workers (p=0.212).

Potential confounders included age, gender, ethnicity, socioeconomic status, living alone, health vulnerability, previous history of mental disorder, and exposure to previous trauma. As shown in Table 2, after controlling for potential confounders, those in healthcare were at 71% greater risk, and those in 'other' essential work at 59% greater risk of reporting at least moderate levels of anxiety (GAD-7 ≥10) than non-essential workers. Healthcare workers were at 19% greater risk of poor wellbeing (WHO-5 < 13). There was no evidence of a difference across the work roles in risk for psychological distress (K-10 ≥12) or increased alcohol use.

Table 2. Unadjusted and adjusted rates of psychological distress anxiety and poor wellbeing.

	% (Number)	Risk Ratio (95% CI)	Adjusted Risk Ratio[1]	Adjusted Risk Ratio[2]
K-10 ≥12				
Non-essential worker	22.3% (326)	1.00	1.00	1.00
Healthcare workers	24.7% (94)	1.11 (0.91, 1.35)	1.23 (1.01, 1.49)	1.14 (0.97, 1.33)
Other essential workers	26.1% (169)	1.17 (0.99, 1.37)	1.17 (1.00, 1.37)	1.12 (0.92, 1.37)
GAD-7 ≥10				
Non-essential worker	9.8% (143)	1.00	1.00	1.00
Healthcare workers	15.7% (60)	1.61 (1.22, 2.13)	1.89 (1.43, 2.50)	1.71 (1.29, 2.27)
Other essential workers	15.7% (102)	1.61 (1.27, 2.04)	1.62 (1.28, 2.05)	1.59 (1.25, 2.02)
WHO-5 <13				
Non-essential worker	44.5% (650)	1.00	1.00	1.00
Healthcare workers	51.2% (195)	1.15 (1.03, 1.29)	1.21 (1.05, 1.41)	1.19 (1.02, 1.39)
Other essential workers	48.2% (312)	1.08 (0.98, 1.20)	1.08 (0.95, 1.23)	1.07 (0.94, 1.22)
Alcohol increase				
Non-essential worker	30.3% (443)	1.00	1.00	1.00
Healthcare workers	33.9% (129)	1.12 (0.95, 1.32)	1.03 (0.87, 1.21)	1.04 (0.88, 1.23)
Other essential workers	33.3% (216)	1.10 (0.96, 1.26)	1.08 (0.95, 1.23	1.06 (0.93, 1.21)

Data was missing for the following variables (n): K10 (6), GAD-7 (2), WHO-5 (6), alcohol (4).

1. Adjusted for age, gender, and ethnicity
2. Adjusted for age, gender, ethnicity, income, smoking status, living alone, health vulnerability, prior mental health, and prior exposure to a traumatic event

Positive outcomes

In addition to detrimental psychological outcomes, we were also interested in those who reported excellent wellbeing (WHO-5 ≥22) during the lockdown. Healthcare workers had a lower likelihood of this than non-essential workers (Risk ratio = 0.53 (0.31, 0.89, p=0.007); 3.9% of healthcare workers, 9.0% of 'other' essential workers and 7.5% of non-essential workers reported excellent wellbeing.

Living circumstances, connections, workload and COVID-19 testing

As shown in table 3, there were differences across the work categories in terms of maintaining contact with family and friends outside of their bubble - the people respondents were living with over the lockdown - (which included contact by video link, telephone, email, or letter), with 36% of healthcare workers, 34% of non-essential workers, and 29% of 'other' essential workers reporting decreased contact compared with pre-lockdown (p=0.008). Those in essential work reported greater rates of increased workload than non-essential workers

(p<0.001). Those in healthcare reported higher rates of COVID-19 testing compared with the other work roles, with 12% having been tested for COVID-19. Although numbers of confirmed positive tests were low; i.e., a total of nine positive tests in the samples, this included four healthcare workers, which represented 1% of healthcare respondents (Fisher's exact, p=0.015).

Table 3: Living circumstances, social connections, workload, and COVID-19 testing.

Living circumstances, social connections, work demand, and COVID-19 testing	**Healthcare worker**	**Other essential worker**	**Non-essential worker**	**p**
Living circumstances				
Living situation				
Living alone	15.0% (57)	13.9% (90)	12.2% (179)	0.075
With one adult	24.7% (94)	29.3% (190)	28.9% (423)	
With other adults	24.5% (93)	17.3% (112)	20.4% (298)	
With children	35.8% (136)	39.6% (257)	38.5% (564)	
Satisfaction with 'bubble'(defined as the people respondents were living with over the lockdown)				
Extremely dissatisfied	3.4% (13)	3.9% (25)	3.5% (51)	0.36
Dissatisfied	2.6% (10)	2.9% (19)	1.8% (27)	
Neither satisfied nor dissatisfied	6.6% (25)	8.9% (58)	8.5% (124)	
Satisfied	28.3% (108)	32.8% (213)	31.1% (455)	
Extremely satisfied	59.1% (225)	51.5% (334)	55.2% (808)	
Getting along with members of household				
Very badly	1.2% (4)	0.5% (3)	0.6% (8)	0.68
Badly	2.8% (9)	3.4% (19)	2.1% 27)	
Neither well nor badly	11.1% (36)	12.0% (67)	11.1% (143)	
Well	43.2% (140)	40.3% (225)	41.1% (528)	
Very well	41.7% (135)	43.8% (245)	45.15 (579)	
Change in contact with others outside bubble				
Decreased	36.1% (136)	28.7% (186)	33.7% (491)	0.008
Stayed the same or increased	63.9% (241)	71.2% (461)	66.4% (968)	
Feeling lonely or isolated				
All of the time	2.6% (10)	3.2% (21)	1.8% (26)	0.53

Table 3 cont.

Living circumstances, social connections, work demand, and COVID-19 testing	Healthcare worker	Other essential worker	Non-essential worker	p
Most of the time	4.7% (18)	4.9% (32)	4.7% (69)	0.53
Some of the time	19.7% (75)	21.9% (142)	21.7% (318)	
A little of the time	32% (122)	27.4% (178)	29.8% (437)	
None of the time	40.9% (156)	42.5% (276)	41.9% (614)	
Work				
Workload increased				
Yes	31.8% (121)	25.8% (167)	17.2% (252)	<0.001
Less paid work				
Less work	20.5% (78)	23.6% (153)	40.5% (594)	<0.001
COVID-19				
Having a COVID-19 test				
Tested	11.6% (44)	4.8% (31)	3.1% (45)	<0.001
Not tested	88.4% (336)	95.2% (918)	96.9% (1420)	<0.001

Data was missing for the following variables (n): living circumstances (2), feeling lonely or isolated (1), change in contact (12), Work (1), COVID-19-19 (1).

Main sources of stress

About 15% of participants had concerns about their own health and 33% concerns about other peoples' health, with no difference by worker category ($p = 0.45$ and $p = 0.19$, respectively). Essential workers were less likely to report uncertainty about finances than non-essential workers (healthcare workers 22%, 'other' essential workers 29% and non-essential workers 37%, $p < 0.001$). There was a similar pattern regarding concerns about employment (healthcare workers 14%, 'other' essential workers 24%, and non-essential workers 31%, $p < 0.001$). Healthcare workers were at a greater risk of reporting stress in relation to the wider consequences of COVID-19 (healthcare workers 60%, 'other' essential workers 50% and non-essential workers 53%, $p = 0.012$).

DISCUSSION

The aim of this study was to compare psychological outcomes, experiences, and sources of stress during the COVID-19 lockdown among NZ essential workers with those of other workers employed in non-essential roles. While most essential workers coped well, some did not. Essential workers (both those in healthcare, and those providing 'other' essential work) were at increased risk of anxiety compared to non-essential workers. In addition, healthcare workers (but not those in 'other' essential workers) were at increased risk of poor wellbeing. Although rates of psychological distress were well above baseline general population measures (29), there were no significant differences between the work groups. There was also no difference in rates of increased use of alcohol across the work categories.

Healthcare workers

The rates of moderate anxiety (16%) and moderate to high psychological distress (25%) in healthcare workers in our study are at the lower range of those reported internationally (26-30% and 34-36% respectively)(5, 30)]. It is likely that this reflects the comparatively low rates of infection and mortality in NZ at the time of data collection. Generally, lower rates of anxiety and depression in healthcare workers have been reported from countries where death rates were relatively low (31) or where there was an aggressive surveillance programme (32).

Our study found that healthcare workers had higher anxiety and poorer wellbeing than non-essential workers during the COVID-19 pandemic lockdown in NZ. To date, while studies have consistently identified healthcare workers as being at increased risk of psychological impacts in pandemics (5), mixed findings have been reported in comparison with other workers (rather than the general population); one study increased anxiety (12, 33) and another reduced anxiety (31) in healthcare workers compared with 'other' essential workers.

The extant literature suggests that even before the COVID-19 pandemic, healthcare work and associated work-related stress factors could lead to burnout, depression, anxiety disorders, sleep disorders, or other psychiatric disorders (34-36). In the context of the Covid-19 pandemic, significant additional challenges include increased risk of infection because of potential exposure, workload demands and challenges (with exposure to potentially traumatic events, grief, and ethical dilemmas), and social change including stigmatisation. Some, or all of these factors may be associated with detrimental psychological outcomes (37). Our study attempted to explore some of these issues in NZ where infection and mortality rates have been low by international standards (18).

healthcare workers were more likely to have been tested for, and tested positive for, COVID-19. These findings reflect the international literature (38) and the NZ context at the time of the survey, where one in 10 cases of COVID-19 were in healthcare workers (39). Compared with non-essential workers, healthcare workers were also more likely to report experiencing increased workload, and less likely to report concern about finances and employment than non-essential workers. Social isolation has been consistently identified as a risk factor for negative psychological impacts (40), and although not different from non-essential workers, about one-third of healthcare workers reported decreased contact with family and friends outside of their 'bubble'. This included not just face-to-face contact (which was reduced for everyone), but contact by video link, telephone, email, or letter.

Other essential workers

Our findings show that, in comparison with non-essential workers, 'other' essential workers, were also at increased risk of reporting at least moderate anxiety. Similar to those in healthcare, 'other' essential workers may face increased work demands and feel at increased risk of infection because of potential exposure during their work. Our findings suggest that these workers were also at greater risk of experiencing increased workload and less likely to report concern about finances and employment compared with non-essential workers. Interestingly, they were at less risk of reducing their social contact compared to non-essential workers. This may have impacted on wellbeing because it is established that social connectedness promotes wellbeing (41).

Although there is only a limited literature on psychological outcomes of the pandemic lockdown in 'other' essential workers (because this is effectively a pandemic work grouping), this literature suggests that type of work may be important. Studies have shown that having a role involving construction, manufacture, food retail and transport is associated with reduced

well-being (42) and that medical volunteers or those in medical, non-patient facing work report high rates of depression (14). However, workers in public safety roles (e.g. police and emergency personnel) have reported lower levels perceived stress (compared with healthcare workers) (12).

Importance of feeling safe

All worker categories reported concern about the safety of themselves, their family and friends, highlighting how crucial this concern is for most people. It is established that perceived lack of safety increases the risk of anxiety, depression and PTSD (40) and that improving this, through access to personal protective equipment, and training, mitigates detrimental psychological outcomes (43). It also underpins the established evidence for feelings of safety being associated with resilient outcomes after disasters (41).

The New Zealand context

The NZ Government's COVID-19 'elimination strategy' has been praised internationally, with NZ having had low case rates and mortality (44) (to date 26 deaths). Even at the time the survey was conducted the strategy was showing positive results. This meant that we examined the impact of strict lockdown restrictions in the absence of widespread direct effects of the virus which may limit the generalisability of the findings to settings in countries where there was much higher morbidity and mortality.

Limitations and strengths

Like all survey-based research, our study has some limitations. Outcomes were participants' subjective reports of their experiences and emotions, and while this is not equivalent to a structured diagnostic interview (45) it does allow comment on levels of distress. We did not ask respondents about other factors that may have been important such as the meaningfulness of their work (46), or how they might deal with moral dilemmas (which has been a concern in countries with high mortality) (12). The data were cross-sectional, and the lack of pre-COVID-19 benchmarks means we cannot determine if our results were indicative of changes resulting from the pandemic (and/or the lockdown response) rather than being more general differences between these groups of workers. However, we were able to adjust for some potential underlying confounders (e.g., income, history of mental illness, physical health vulnerability). While we did try and achieve a representative sample, there may have been some selection bias related to over-representation of those with higher socio-economic status and education, access to a computer/ mobile phone or for whom the topic of wellbeing had particular salience (perhaps because they were experiencing difficulties). The use of purposive sampling (through contacts of the MRINZ) to increase the number of essential workers from around NZ, may also have introduced selection bias. Overall however, the demographics (age, ethnicity and close for gender) broadly match the NZ population. There is a slight female preponderance (women more likely to answer surveys) but not to the same extent as seen in many other surveys (47). Other limitations relate to the grouping of essential workers into two broad categories, healthcare workers versus 'other' essential workers, which was done because of the small numbers involved (e.g. only n=100 respondents in emergency services and law enforcement). This meant that finer grained analyses were not possible within healthcare (e.g. unable to disaggregate type of health care role) or within different types of 'other' essential work.

Nevertheless, a strength of our study is that it is one of the few to examine the psychosocial outcomes in those working in non-healthcare essential roles. Other strengths are that the

survey was peer reviewed during development and pre-tested on members of the general public, and used validated outcome measures wherever possible.

CONCLUSIONS

Our study reports on the mental health and wellbeing of essential workers during the NZ lockdown, early in the COVID-19 pandemic. While most essential workers coped well, some did not. Essential workers as a category (both those in healthcare and those providing other eseential work) were at increased risk of anxiety compared with those employed in non-essential work, with those in healthcare also being at increased risk of poor wellbeing. It is important that employers and organisations recognise the challenges this vital workforce face in times of pandemics and implement appropriate support for these workers. We suggest that this support spans a range of domains: ensuring people have adequate protections around being able to work safely; that they have access to accurate information and training; and that their workload is manageable. Communication should promote the importance of social connections, and appropriate psychological interventions should be facilitated. We also suggest ongoing collection of robust mental health data to guide these approaches.

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Contributors

Study conception and design: SE-P, PG, MJ, CB, BB. Acquisition of data: SE-P, PG, MJ, JS and JW. Analysis and interpretation of data: CB, JW, JS and SE-P. Drafting of the manuscript: CB. Critical revision and editing: CB, JW, BB, JS, MJ, PG, CR and SE-P. All authors have approved the submission of this version.

Competing interests

The authors have declared that no competing interests exist.

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Protocol

There is no protocol for this observational survey.

Data sharing

Data are available upon reasonable request: De-identified participant data for participants from the survey analysed are available from Caroline Bell (caroline.bell@otago.ac.nz).

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1. Introduction

Kia Ora and Welcome

Thank you for clicking through to our survey; it should take you around 10 to 15 minutes to complete.

The survey is being conducted by researchers from the University of Otago, with generous support from Dynata.

To go directly to the survey please click on the 'Next' button at the bottom of the page

If you lose your connection to the Internet or this survey at any point, please click the link provided in the email you received and it will take you back to the point where you left off.

THE EFFECTS OF COVID-19 AND THE LOCKDOWN ON WELLBEING IN NEW ZEALAND

Information for participants

What will participants be asked to do? The COVID-19 pandemic has resulted in major disruptions to our lives. Research from overseas has shown that pandemics and lockdowns have significant effects on people's well-being and mental health, but we do not yet have similar research from Aotearoa New Zealand. We are interested in the experience of New Zealanders and this is what we would like to ask you about. Should you agree to take part in this survey, you will be asked about your experiences over the course of the COVID-19 lockdown, including how it has affected your employment, your mental health and well-being, your behaviours, and any 'silver linings' or positive experiences. The survey should take about 10 to 15 minutes to complete.

Thank you for showing an interest in this study. Please read this information sheet carefully before deciding whether or not to participate. If you decide to participate, we thank you. If you decide not to take part there will be no disadvantage to you and we thank you for considering our request.

What is the aim of the project? This study explores the experiences of the New Zealand population during the current COVID-19 event, including the subsequent imposed social isolation measures (the Level 4 'lockdown').

What types of participants are being sought? We are seeking 2000 adult participants from the general population aged 16 years and older. We are applying quotas so we ensure our sample has reasonable numbers of people from different ethnicities, and roughly similar numbers across genders.

What data or information will be collected and what use will be made of it? All your answers will be completely anonymous to the research team, only Dynata will know the identity of participants. The results of the project may be published and will be available in the University of Otago (New Zealand) library; however there will be no way to trace responses back to individuals therefore the anonymity of participants will be preserved. The results will also be shared with the Ministry of Health to inform the support packages they offer in response to the COVID-19 crisis. The data collected will be securely stored in such a way that only members of the research team will be able to gain access to it. Data obtained as a result of the research will be retained for at least five years in secure storage. Any information held may be destroyed after five years even though the data derived from the research will, in most cases, be kept for much longer or possibly indefinitely.

Can participants change their mind and withdraw from the project? You may withdraw from participation in the survey at any time and without any disadvantage to yourself.

What supports are available? Some of the questions are about potentially sensitive topics like suicidal thoughts or family violence. We are asking about these topics because overseas evidence has suggested changes in their frequency related to the COVID-19 crisis. Like all other questions, your response to these questions is anonymous. You do not have to answer

any question you do not wish to. If you feel negatively affected thinking about any of these topics, please use the contact details for the support services provided or free call or text 1737 any time, 24 hours a day to talk to a trained counsellor. This service is completely free.

What if participants have any questions? If you have any questions about our project, either now or in the future, please feel free to contact:
Dr Matthew Jenkins
Department of Psychological Medicine, University of Otago, Wellington
Email Address: matthew.jenkins@otago.ac.nz

This study has been approved by the University of Otago Human Ethics Committee (reference F20/003). However, if you have any concerns about the ethical conduct of the research you may contact the University of Otago Human Ethics Committee (Gary Witte: gary.witte@otago.ac.nz or Jo Farron de Diaz: jo.farrondediaz@otago.ac.nz). Any issues you raise will be treated in confidence and investigated and you will be informed of the outcome.

As part of the University of Otago's ethics approval process we need to ask you to answer the following question before starting our survey.

I have read the Information Sheet for this project and agree to take part in the study.

- ○ Yes
- ○ No

2. Quota screen

First, a few questions to see if you qualify for this survey.

Which of these do you <u>most</u> identify with?

- ○ Male
- ○ Female
- ○ Gender diverse

Which age group are you in?

- ○ Under 18
- ○ 18-34
- ○ 35-54
- ○ 55-74
- ○ 75 and older

Which of these ethnic groups do you identify with?

Please select <u>ALL</u> the ethnic groups that you identify with.

- ☐ New Zealand European
- ☐ Māori
- ☐ Samoan
- ☐ Cook Island Māori
- ☐ Tongan
- ☐ Niuean

- [ ] Chinese
- [ ] Indian
- [ ] Other (e.g. Dutch, Japanese, Tokelauan). Please state:

Do you belong to any local iwi close to where you live?

- ○ Yes
- ○ No
- ○ Don't know

Thinking about your connection to Māori culture, in the last 12 months, but prior to lockdown, did you do any of these things?

Please tick all that apply

- [ ] Went to a marae
- [ ] Went to a Māori festival (e.g., Pā Wars. Matariki, or Waitangi Day)
- [ ] Sang a Māori song, performed a haka, given a mihi or speech, or taken part in Māori performing arts or crafts
- [ ] Took part in traditional Māori healing or massage.
- [ ] None of these

In the last 12 months, other than those listed in the previous question, are there any other important ways that you have connected to or expressed your Māori identity or heritage.

- ○ Yes (please specify) [ ]
- ○ No
- ○ Don't know

3. Living circumstances

Your living circumstances

These questions are about your living circumstances during the COVID-19 lockdown, which started on Thursday 26 March.

We define your 'bubble' as the household that you are in during the lockdown period, including anybody you are living with. Please note - this does not include people in other households, if you are living alone during lockdown.

During the lockdown, who has been living with you in your 'bubble'?

- ○ No one, I live by myself and have no pets
- ○ No one, I live by myself but I have one or more pets
- ○ Flatmates or tenants

- ○ Adult family/whānau member(s) only
- ○ Family/whānau members, including a child/children
- ○ Friends
- ○ A mixture of flatmates, family/whānau members or friends

Including yourself, how many people live with you in your bubble?

☐

Not everybody has ended up in their bubble of choice.

How satisfied are you with the bubble you are in?

- ○ Extremely dissatisfied
- ○ Dissatisfied
- ○ Neither satisfied nor dissatisfied
- ○ Satisfied
- ○ Extremely satisfied

In your lockdown residence, which of the following are available to you?

Please tick all that apply.

- ☐ Personal or quiet space
- ☐ Internet
- ☐ Computer
- ☐ Easy access to a garden/green space
- ☐ None of these

During the lockdown, how easy has it been to stay connected with your family/whānau and friends outside your 'bubble'?

- ○ Extremely hard
- ○ Somewhat hard
- ○ Neither easy nor hard
- ○ Somewhat easy
- ○ Extremely easy
- ○ I haven't tried to stay connected

During the lockdown, how often have you connected each week with your family/whānau and friends outside your bubble?

	Not at all	Once a week	2-3 times a week	4-6 times a week	Every day
Talked in person	○	○	○	○	○
Talked by video (eg, Skype, WhatsApp)	○	○	○	○	○

	Not at all	Once a week	2-3 times a week	4-6 times a week	Every day
Talked over the telephone	○	○	○	○	○
Connected by writing (text, email, snail mail)	○	○	○	○	○

Since the lockdown began, how has your level of contact changed with family/whānau and friends outside your bubble?

- ○ It has increased
- ○ It has decreased
- ○ It has stayed the same

Overall, thinking about how well your family/whānau has been doing since the lockdown, would you say that things are currently getting better, getting worse, or staying about the same?

- ○ Getting better
- ○ Getting worse
- ○ Staying the same

During the lockdown, how are you and the people you are living with getting along with each other?

- ○ Very badly
- ○ Badly
- ○ Neither well nor badly
- ○ Well
- ○ Very well

During the lockdown, how often have you felt lonely or isolated?

- ○ All of the time
- ○ Most of the time
- ○ Some of the time
- ○ A little of the time
- ○ None of the time

During the lockdown how much time have you been spending looking at information related to COVID-19?

- ○ Less than an hour a day
- ○ 1-2 hours per day
- ○ 2-4 hours per day
- ○ 4-8 hours per day
- ○ More than 8 hours a day

5. New Employment

The following questions are about jobs and businesses during the COVID-19 lockdown.

Do you have a job now?

- ○ Yes, I have a job
- ○ No, I don't have a job
- ○ I am self-employed
- ○ I am a business owner
- ○ I am retired
- ○ I have never had a job

Have your hours of paid work been drastically reduced as a result of the lockdown?

- ○ Yes
- ○ No
- ○ Doesn't apply to me

Has your paid workload drastically increased as a result of the lockdown?

- ○ Yes
- ○ No
- ○ Doesn't apply to me

Have you lost your job (or jobs) as a result of the lockdown?

- ○ Yes
- ○ No
- ○ I didn't have a job before the lockdown

Are you an 'essential worker' (e.g., healthcare, law enforcement, emergency services, provider of essential goods)?

- ○ Yes
- ○ No

Is someone in your bubble an essential worker (e.g., healthcare, law enforcement, emergency services, provider of essential goods)?

- ○ Yes
- ○ No
- ○ Not applicable

What type of essential work do you do?

- ○ Healthcare
- ○ Law enforcement
- ○ Other emergency services (e.g., fire service)
- ○ Provider of other essential goods or services (e.g., food supply, fuel, waste removal, internet, financial support, transport)

Through your job, have you had known direct contact with COVID-19 patients?

- ○ I have had direct contact with people who I knew at the time were **suspected of having** COVID-19
- ○ I have had direct contact with people who I knew at the time had **been diagnosed with** COVID-19
- ○ I found out later that people I had contact with were probable or confirmed COVID-19 cases but I did not know at the time
- ○ I may have had contact with probable or confirmed COVID-19 cases
- ○ To the best of my knowledge, I have not yet had contact with probable or confirmed COVID-19 cases

Do you personally own or run a business whose reduction in turnover due to COVID-19 threatens the survival of your business?

- ○ Yes
- ○ No

Have you personally had to make people in your organisation redundant or lose their jobs?

- ○ Yes
- ○ No

If there has been a reduction in your hours, have you applied (or has your employer applied on your behalf) for any of the following?

Please select all that apply.

- ☐ COVID-19 wage subsidy
- ☐ COVID-19 leave payment
- ☐ Financial support for your business
- ☐ Other government financial support
- ☐ None of the above
- ☐ Not applicable to me
- ☐ I don't know

How much has any reduction in your hours, losing your job, or loss of turnover in your business made it more difficult for you to meet basic living costs such as rent, mortgage payments, or food bills?

- ○ A great deal

- ○ A lot
- ○ A moderate amount
- ○ A little
- ○ None at all
- ○ Not applicable to me

6. General Health

Your general health

The next few questions are about your general (physical) health.

How would you describe your general (physical) health?

- ○ Poor
- ○ Fair
- ○ Good
- ○ Very good
- ○ Excellent

Over the <u>past 5 years</u>, have you had a medical condition that may make you more vulnerable to COVID-19 such as heart disease, COPD (difficulty breathing), weakened

immunity, or cancer?

- ○ Yes
- ○ No
- ○ Prefer not to say

Do you have a family member who has a medical condition that may make them more vulnerable to COVID-19 such as heart disease, COPD (difficulty breathing), weakened immunity, or cancer?

- ○ Yes
- ○ No
- ○ Prefer not to say

Do you live with somebody, apart from a family member, who has a medical condition that may make them more vulnerable to COVID-19 such as heart disease, COPD (difficulty breathing), weakened immunity, or cancer?

- ○ Yes
- ○ No
- ○ Prefer not to say

Do you think you have had COVID-19?

- ○ Yes
- ○ No
- ○ Not sure

Have you been tested for COVID-19?

- ○ Yes
- ○ No

What were the results of this test?

- ○ Positive
- ○ Negative
- ○ Awaiting results

Have you fully recovered from COVID-19?

- ○ Yes
- ○ No

Do you have any physical condition or disability that affects your ability to function (e.g., leave the house for essential goods or for physical activity) during the lockdown?

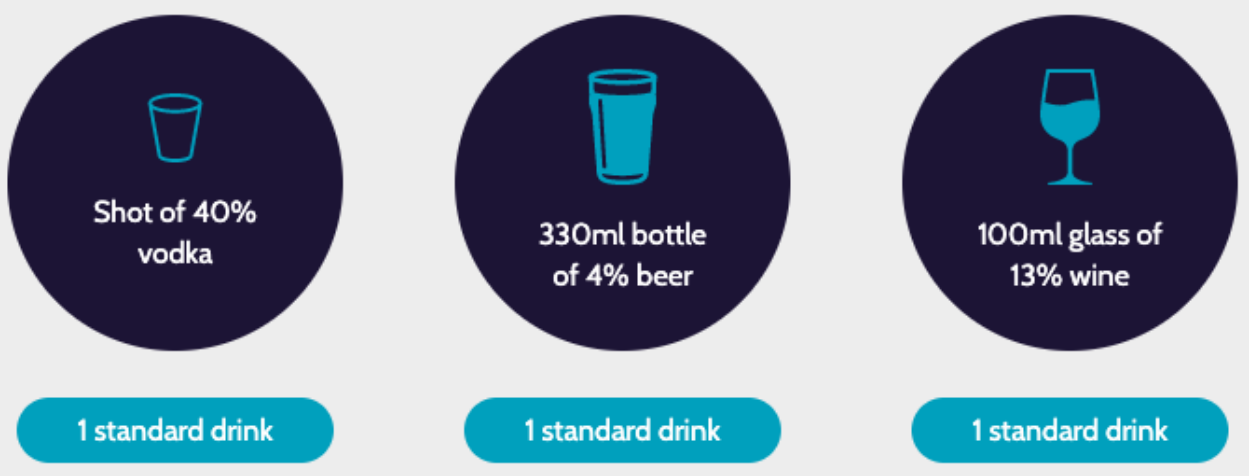
○ Yes

○ No

7. Alcohol use

Alcohol and Smoking

The following questions are about your alcohol intake and smoking since the start of the COVID-19 lockdown.



Using the above graphic as a guide, BEFORE the lockdown, how many standard drinks would you have consumed in a typical 7 days?

Please answer using a number

How many standard drinks have you consumed in the last 7 days?

Please answer using a number

8. Smoking

How often do you <u>CURRENTLY</u> smoke tobacco cigarettes (either tailor-made or roll-your-own)?

- ○ I smoke cigarettes every day
- ○ I smoke cigarettes at least once a week, but not daily
- ○ I smoke cigarettes less than once a week
- ○ I am an ex-smoker
- ○ I have never been a smoker

<u>BEFORE</u> the lockdown, about how many cigarettes did you smoke each day?

Please answer using a number

<u>DURING</u> the lockdown, about how many cigarettes do you smoke each day?

Please answer using a number

<u>BEFORE</u> the lockdown, about how many cigarettes did you smoke each week?

Please answer using a number

DURING the lockdown, about how many cigarettes do you smoke each week?

Please answer using a number

9. Mental health

How are you feeling?

The next questions are about your mental health and wellbeing. We are interested in whether people's mental health or wellbeing may have been affected by recent COVID-19 events.

Some of these questions may seem a bit repetitive but they come from surveys that are used all over the world. Please bear with us and answer them all.

Like all of the questions in the survey, your answers are completely confidential and anonymous, and will be used for research purposes only.

DURING the lockdown:

	At no time	Some of the time	Less than half of the time	More than half of the time	Most of the time	All of the time
I have felt cheerful and in good spirits	○	○	○	○	○	○
I have felt calm and relaxed	○	○	○	○	○	○
I have felt active and vigorous	○	○	○	○	○	○
I woke up feeling fresh and rested	○	○	○	○	○	○
My daily life has filled me with things that interest me	○	○	○	○	○	○

The following question refers to your overall sleep quality for most nights both before and since the lockdown.

Please think about the quality of your sleep overall, such as how many hours of sleep you got, how easily you fell asleep, how often you woke up during the night (except to go to the bathroom), how often you woke up earlier than you had to in the morning, and how refreshing your sleep was.

BEFORE the lockdown, how would you rate your sleep quality overall?

1 (Terrible)	2	3	4	5	6	7	8	9	10 (Excellent)
○	○	○	○	○	○	○	○	○	○

DURING the lockdown, how would you rate your sleep quality overall?

1 (Terrible)	2	3	4	5	6	7	8	9	10 (Excellent)
○	○	○	○	○	○	○	○	○	○

DURING the lockdown, how often have you been bothered by the following?

	Not at all	Some days	Most days	Nearly every day
Feeling nervous, anxious, or on edge	○	○	○	○
Not being able to stop or control worrying	○	○	○	○
Worrying too much about different things	○	○	○	○
Having trouble relaxing	○	○	○	○
Being so restless that it's hard to sit still	○	○	○	○
Becoming easily annoyed or irritable	○	○	○	○

	Not at all	Some days	Most days	Nearly every day
Feeling afraid as if something awful might happen	○	○	○	○

DURING the lockdown, about how often have you felt tired out for no good reason?

- ○ None of the time
- ○ A little of the time
- ○ Some of the time
- ○ Most of the time
- ○ All of the time
- ○ Don't know

DURING the lockdown, about how often have you felt nervous?

- ○ None of the time
- ○ A little of the time
- ○ Some of the time
- ○ Most of the time
- ○ All of the time
- ○ Don't know

DURING the lockdown about how often have you felt so nervous that nothing could calm you down?

- ○ None of the time
- ○ A little of the time
- ○ Some of the time
- ○ Most of the time
- ○ All of the time
- ○ Don't know

DURING the lockdown, about how often have you felt hopeless?

- ○ None of the time
- ○ A little of the time
- ○ Some of the time
- ○ Most of the time
- ○ All of the time
- ○ Don't know

DURING the lockdown, about how often have you felt restless or fidgety?

- ○ None of the time
- ○ A little of the time
- ○ Some of the time
- ○ Most of the time

- ○ All of the time
- ○ Don't know

DURING the lockdown, about how often have you felt so restless you could not sit still?

- ○ None of the time
- ○ A little of the time
- ○ Some of the time
- ○ Most of the time
- ○ All of the time
- ○ Don't know

DURING the lockdown, about how often have you felt depressed?

- ○ None of the time
- ○ A little of the time
- ○ Some of the time
- ○ Most of the time
- ○ All of the time
- ○ Don't know

DURING the lockdown, about how often have you felt that everything was an effort?

- ○ None of the time
- ○ A little of the time
- ○ Some of the time
- ○ Most of the time
- ○ All of the time
- ○ Don't know

DURING the lockdown, about how often have you felt so sad that nothing could cheer you up?

- ○ None of the time
- ○ A little of the time
- ○ Some of the time
- ○ Most of the time
- ○ All of the time
- ○ Don't know

DURING the lockdown about how often have you felt worthless?

- ○ None of the time
- ○ A little of the time
- ○ Some of the time
- ○ Most of the time
- ○ All of the time
- ○ Don't know

DURING the lockdown what have you found to be the main sources of stress or anxiety for you?

Please tick all that apply

- ☐ Uncertainty regarding my health
- ☐ Uncertainty regarding the health of my family or friends
- ☐ Uncertainty regarding my finances
- ☐ Uncertainty regarding my employment security
- ☐ The wider consequences of COVID-19
- ☐ Not applicable
- ☐ Something else ____

Have you previously been diagnosed with a mental illness by a doctor or psychologist?

- ○ Yes
- ○ No
- ○ Prefer not to say

What diagnosis or diagnoses did they make?

Please tick all that apply

- [ ] Depression
- [ ] Bipolar disorder
- [ ] Anxiety disorder
- [ ] Personality disorder
- [ ] Psychotic disorder
- [ ] Alcohol or drug disorder
- [ ] Other
- [ ] Don't know
- [ ] Prefer not to say

DURING the lockdown, how is your mental health compared to usual?

- ○ Much worse than usual
- ○ Worse than usual
- ○ The same as usual
- ○ Better than usual
- ○ Much better than usual
- ○ Prefer not to say

Important

If any of these questions have caused you to feel distressed, or if you are struggling with your mental health, please free call or text 1737 or visit https://1737.org.nz to speak to a trained counseller. This also applies if you have any concerns for your friends, family or whānau.

Alternatively, you can call Depression.org.nz on 0800 111 757 or text 4202.

10. Previous trauma

Have you ever been exposed to any of the following (aside from the current COVID-related events)?

Please tick all that apply

- ☐ Childhood adversity (neglect, physical or sexual abuse)
- ☐ Physical or sexual abuse after the age of 16
- ☐ Exposure to a traumatic event involving physical or sexual abuse to others
- ☐ Natural disaster (e.g., fire, flood, earthquake)
- ☐ Serious physical injury (e.g. car accident)
- ☐ Serious illness
- ☐ [ ] Other (please state)
- ☐ None of the above

11. Suicide

Please note: The following questions ask about potentially sensitive topics.

Like all of the questions in this survey, your answers are completely confidential and anonymous, and will be used for research purposes only.

But, if there are some questions you would prefer not to answer, just skip them.

BEFORE the lockdown, but during the previous 12 months, had you:

	Yes	No	Prefer not to say
Seriously thought about ending your own life?	○	○	○
Made plans to end your own life?	○	○	○
Made an attempt to end your own life?	○	○	○

DURING the lockdown, have you:

	Yes	No	Prefer not to say
Seriously thought about ending your own life?	○	○	○
Made plans to end your own life?	○	○	○

	Yes	No	Prefer not to say
Made an attempt to end your own life?	○	○	○

If you feel distressed or feel like you want to talk about anything related to these issues, please call Lifeline on 0800 543 354 or text 4357.

Alternatively, visit the Lifeline website at https://www.lifeline.org.nz/.

12. Domestic violence

Family violence

The next two questions are about any incidents of family violence that have occurred in your household.

Remember, you are not obliged to answer these questions, but all responses are completely confidential and anonymous, and your responses will be used for research purposes only.

If family violence is curently an issue for your family/whānau or friends, please contact one of the following organisations for assistance:

Women's Refuge crisis line on 0800 733 843 - (24 hours)

Family violence information line on 0800 456 450

Emergency services on 111.

DURING the lockdown, have you experienced any of the following as a result of an action from a family/whānau member?

Please tick all that apply, and include threats made to you directly (face-to-face, phone, email, text), or via someone else.

- ☐ Been frightened
- ☐ Been insulted or abused
- ☐ Been threatened with harm to you, your children or your pets
- ☐ Been threatened with being hit, slapped or punched
- ☐ Been threatened with a weapon or other object
- ☐ Been slapped, punched or kicked
- ☐ Been hit with a weapon or other object
- ☐ Been touched sexually in a way you didn't like
- ☐ Been forced to have sex when you didn't want to
- ☐ None of these
- ☐ Prefer not to say

DURING the lockdown, have you been a witness to any of the above in your 'bubble' ?

- ○ Yes

○ No

○ Prefer not to say

Useful contacts for family violence-related incidents

If family violence is currently an issue for your family/whānau or friends please contact one of the following organisations for assistance:

Women's Refuge

Call the crisis line on 0800 733 843 (24 hours)

'It's Not OK' family violence prevention

Call the information line on 0800 456 450

Rape Crisis

Call 0800 88 33 00 or visit http://www.rapecrisisnz.org.nz/

If you are presently in danger call the emergency services on 111.

13. Silver lining

Positive aspects of COVID-19

Have you experienced any 'silver linings' or positive aspects during the COVID-19 lockdown?

Please tick all that apply

- ☐ Yes, for me personally
- ☐ Yes, for wider society
- ☐ No

What are these silver linings, for you personally or for wider society?

14. Demographics

Finally, a few questions about yourself

Which of the following best describes your highest formal qualification?

- ○ No formal qualification
- ○ High school qualifications (school certificate, NCEA, UE, Bursary)
- ○ Certificate or diploma below Bachelor's level
- ○ Bachelor's degree
- ○ Post-graduate or higher qualification

What is your exact age (in years)?

Which gender do you identify with?

- Male
- Female
- Gender diverse

Are you?

- Transgender female to male
- Transgender male to female
- Intersexed
- Gender non-conforming
- Genderqueer
- Two-spirit
- Third gender
- Other

Are you pregnant?

- ○ Yes
- ○ No
- ○ Don't know

What is the total income that you yourself received from all sources, before tax or any other deductions, over the last 12 months?

- ○ Less than $10,000
- ○ $10,001 – $20,000
- ○ $20,001 – $30,000
- ○ $30,001 – $40,000
- ○ $40,001 – $50,000
- ○ $50,001 – $60,000
- ○ $60,001 – $70,000
- ○ $70,001 – $100,000
- ○ $100,001 – $150,000
- ○ $150,001 or more
- ○ Prefer not to say

What is your postcode?

15. Signposting

Are there any comments you'd like to make about COVID-19, the lockdown or this survey? If so, please write them in the box below.

Remember

If you are feeling distressed by any of the content in this survey, think that these issues may be affecting family/whānau members or friends, or if you simply want more information, please note the following helplines and services.

Family violence

Women's Refuge

Call the crisis line on 0800 733 843 (24 hours)

'It's Not OK' family violence prevention

Call the information line on 0800 456 450

Rape Crisis

Call 0800 88 33 00 or visit http://www.rapecrisisnz.org.nz/

If you are in danger, call the emergency services on 111.

Depression or suicide

Lifeline

Call 0800 543 354 or text 4357 or on the web at https://www.lifeline.org.nz/.

NZ free and confidential counselling

Call or text 1737 or visit https://1737.org.nz/

Depression.org.nz

Call 0800 111 757, text 4202, or visit depression.org.nz.

COVID-19 information

Call the Ministry of Health Healthline on 0800 611 116 for advice, or visit https://covid19.govt.nz/ for up-to-date and accurate information on COVID-19.

Thank you for taking part in our survey.

Please click 'Next' to submit your answers.

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STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1 and 2
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	3
Objectives	3	State specific objectives, including any prespecified hypotheses	4
Methods			
Study design	4	Present key elements of study design early in the paper	4
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	4
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	4
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	4-6
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	4-5
Bias	9	Describe any efforts to address potential sources of bias	4 and 13
Study size	10	Explain how the study size was arrived at	5
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	5-6
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	5-6
		(*b*) Describe any methods used to examine subgroups and interactions	5-6
		(*c*) Explain how missing data were addressed	6
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	5-6

		(*e*) Describe any sensitivity analyses	There was no sensitivity analyses
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	6
		(b) Give reasons for non-participation at each stage	Not applicable - Simple cross-sectional study
		(c) Consider use of a flow diagram	Text 6
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	6-8
		(b) Indicate number of participants with missing data for each variable of interest	Bottom of each Table; 8,9,11
Outcome data	15*	Report numbers of outcome events or summary measures	7-11
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	8-9
		(*b*) Report category boundaries when continuous variables were categorized	Not applicable - No continuous variables were captured, all were pre-categorised in the questionnaire.
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	8-9
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	Not applicable
Discussion			
Key results	18	Summarise key results with reference to study objectives	11-13
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	13
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	14
Generalisability	21	Discuss the generalisability (external validity) of the study results	13

Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	16

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.