Review

Anxiety Linked to COVID-19: A Systematic Review Comparing Anxiety rates in Different populations

Hafsah Saeed[1], Ardalan Eslami[1], Najah Nassif[2], Ann M. Simpson[2] and Sara Lal[1]

[1]Neuroscience Research Unit, School of Life Sciences, University of Technology Sydney, Australia; [2]School of Life Sciences, University of Technology Sydney, Australia

* Hafsahsaeed@outlook.com.au (H.S.);Ardalan.Eslami@uts.edu.au (A. E.);Najah.Nassif@uts.edu.au (N. N.); Ann.Simpson@uts.edu.au (A. S.); Sara.Lal@uts.edu.au (S. L.)

* Correspondence: Associate Professor Sara Lal; Sara.Lal@uts.edu.au; +612 9514 1592

Abstract: The COVID-19 pandemic has incited a rise in anxiety, with uncertainty regarding the specific impacts and risk factors across multiple populations. A qualitative systematic review was conducted to investigate the prevalence and associations of anxiety in different sample populations in relation to the COVID-19 pandemic. Four databases were utilised in the search (Medline, EMBASE, CINAHL and PsycINFO). The review period commenced in April 2021 and was finalised on the 5th of July (2021). A total of 3537 studies were identified of which 87 were included in the review (sample size: 755,180). Healthcare workers had the highest prevalence of anxiety (36%), followed by university students (34.7%), the general population (34%), teachers (27.2%), parents (23.3%), pregnant women (19.5%) and police (8.79%). Risk factors such as being female, having pre-existing mental conditions, lower socioeconomic status, increased exposure to infection and being younger all contributed to worsened anxiety. The review included studies published before July 2021, due to the ongoing nature of the COVID-19 pandemic, this may have excluded relevant papers. Restriction to only English papers and sample size > 1000 may have also limited the range of papers included. These findings identifies groups who are most vulnerable to developing anxiety in a pandemic and what specific risk factors are most common across multiple populations.

Keywords: COVID-19; Anxiety; Mental Health; Qualitative systematic review

1. Introduction

Infectious disease outbreaks have plagued human history for millennia, with an occurrence not unknown to man, the effects of these outbreaks have eluded many. With the complexities of society, there are a plethora of ways these events may cause mental turmoil. Anxiety is a condition perpetuated by stressful environments, when worry and fear regarding real or perceived threats hijacks an individual's ability to regulate these emotions. Infectious disease outbreaks often evolve into epidemics or pandemics, which bring about financial instability, quarantine and lockdowns, social isolation and the complete disturbance of the norm. It is in this state of pandemonium that mental health deterioration may occur.

Officially declared by the World Health Organisation (WHO) as a pandemic in March 2020 (WHO, 2021), COVID-19 has transformed the way the world functions and triggered an altered perception of the effects

and consequences of infectious disease. Originating in Wuhan, China, COVID-19 has spread rapidly worldwide, with 4,574,089 globally reported deaths as of September 2021 (WHO, 2021). An epidemiological measurement called the basic reproduction number, or R_0, is the average number of secondary cases that are derived from a single primary infection, with any number over one causing exponential infection growth (Locatelli et al., 2021). With an average R_0 of 3.38, COVID-19 is highly transmissible (Alimohamadi et al., 2020). This transmissibility has resulted in astonishing rates of infection and has placed a massive demand on hospital resources, challenging even the most established healthcare systems (Liu et al., 2020a). The physical manifestations of COVID-19 are apparent in the overburdened hospitals and long-lasting adverse effects of the disease. The scale of infection has been linked to psychological distress, implying something sinister may be emerging, a mental health crisis (Rajkumar, 2020).

Past infectious disease outbreaks, such as the severe acute respiratory syndrome (SARS), swine flu (H1N1) and Ebola, have, in each case, shown an increased prevalence of anxiety (Lee et al., 2007b; Lehmann et al., 2016). In the last two years, similar findings have been widely published regarding the COVID-19 pandemic (Bendau et al., 2021). A delineation between the COVID-19 pandemic and past infectious disease outbreaks are apparent through the unprecedented implementation of lockdowns, social isolation and quarantines effecting the global populace. The Australian Bureau of Statistics (ABS) reported that the incidence of anxiety had doubled in 2020 compared to previous years (ABS, 2020). A longitudinal study conducted in the United Kingdom (UK) stipulated that one month into lockdown orders, mental distress levels well exceeded the predicted trajectories of previous years (Pierce et al., 2020).

As the COVID-19 pandemic is ongoing, the long-term mental health effects are not yet known (Wu et al., 2021). During the SARS outbreak a range of literature concluded that the mental health consequences of SARS were not entirely immediate and lagged in comparison to the infectious outbreak (Chen et al., 2006; Lancee et al., 2008; Lee et al., 2007a; Lee et al., 2007b; Mak et al., 2009). Psychological distress among SARS survivors showed a 64% prevalence one year after the initial outbreak (Lee et al., 2007b). These results may be indicative of the effects we can expect from the current pandemic.

Studies exploring different population groups affected by COVID-19 have identified some common risk factors associated with a higher likelihood of developing anxiety symptoms, including; younger age groups, being female, having pre-existing mental health issues and lower socioeconomic status (SES) populations (Bohlken et al., 2021; Daly et al., 2020). The effects of COVID-19 on healthcare workers, the general population and other vulnerable groups such as pregnant women have been well documented. Reviews conducted on the comparison between health care workers and the general population have been extensive. However, no review comparing multiple different groups, namely, that of healthcare workers, the general population, university students, and other vulnerable groups (pregnant women, the elderly, teachers and police) currently exists.

The present study aims to, (1) systematically review and identify the prevalence and associations of anxiety in COVID-19 within multiple affected populations and (2) identify common risk factors across the

population groups, to aid the treatment of global mental health. The identification of vulnerable groups may aid in developing stronger accuracy in intervention strategies for future pandemics.

2. Methods

This qualitative systematic review was conducted to compare the anxiety levels amongst different sample populations in relation to the COVID-19 pandemic. The present review was structured on the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) criteria (Moher et al., 2009).

2.1. Eligibility Criteria

The inclusion of only full peer-reviewed journal publications with available full text was sourced for the present review. Only papers published within the last two years (2020-2021) were included. The purpose of the implementation of this timeframe was to limit the results to the COVID-19 pandemic. Non-English language publications and papers with formats such as letters to the editor, books/book chapters, short commentaries, review articles, news releases and research highlights were excluded.

Further exclusions included any studies on participants less than 18 years of age and those focused on populations containing comorbidities. Qualitative and mixed-method studies were also excluded from the study. Reasons pertaining to this exclusion include a higher likelihood of methodological bias and difficulties, as well as issues relating to the appraisal and synthesis of such data (Dixon-Woods et al., 2001). Studies that implemented self-made, unvalidated methods such as questionnaires were also excluded to ensure the papers included were of a uniform standard. The final mode of exclusion was based on sample size. The initial search on COVID-19 yielded many results to confirm that only the most vital papers were included; any studies with sample sizes less than 1000 were excluded (Turner et al., 2013).

2.2. Literature Search

The review period commenced in April of 2021, and was followed by further updates in May, June and July. The final search was updated on the 5th of July. Papers reporting the prevalence of anxiety in COVID-19 were selected for the review. The databases selected for the search were EMBASE, OVID MEDLINE, PsycINFO and CINAHL. These databases were chosen as they are likely to yield the most relevant results targeting the research question and selection criteria. The relevance of these databases is attributed to their comprehensive coverage and inclusion of various academic journals. Table 1 shows the full search strategy implemented for each database.

141 **Table 1. –** Search strategy implemented and results generated from each of the four databases utilised.
142 .

Database	Search Terms		Search Limiters	Result
EMBASE (Ovid)	(Coronavirus	OR	Journal Article	226
	COVID-19)	AND	English	
	(Anxiety)		2020-2021	
			No Medline Results	
Medline (Ovid)	(Coronavirus	OR	Journal Article	2641
	COVID-19)	AND	English	
	(Anxiety)		2020-2021	
CINAHL (EBSCO)	(Coronavirus	OR	Journal Article	268
	COVID-19)	AND	English	
	(Anxiety)		2020-2021	
			No Expanders	
psycINFO (EBSCO)	(Coronavirus	OR	Journal Article	402
	COVID-19)	AND	English	
	(Anxiety)		2020-2021	
			No Expanders	

143 *2.3. Study selection*

144 The total number of search results from all four databases were
145 imported into the Endnote version 20.1 (Australia) software. A final
146 number of 3537 journal articles were imported for the review on COVID-
147 19 and anxiety. Figure 1 summarises the methodology and shows the
148 steps taken to derive the final number of papers. During the identification
149 phase, 3537 papers were identified as relevant to the search terms, and a
150 total of 547 duplicate papers were removed. Following the subsequent
151 screening, 2990 studies were screened and from these, 2822 were
152 excluded for various reasons. Reasons for exclusion included studies not
153 meeting the inclusion criteria (44), being outside of the scope of the
154 project (19) and not reporting on anxiety (18). One hundred and sixty-
155 eight papers were sought for retrieval in full text, with a further 81 articles
156 excluded for reasons detailed in Figure 1. A total of 87 papers were
157 deemed eligible for inclusion in the present review.

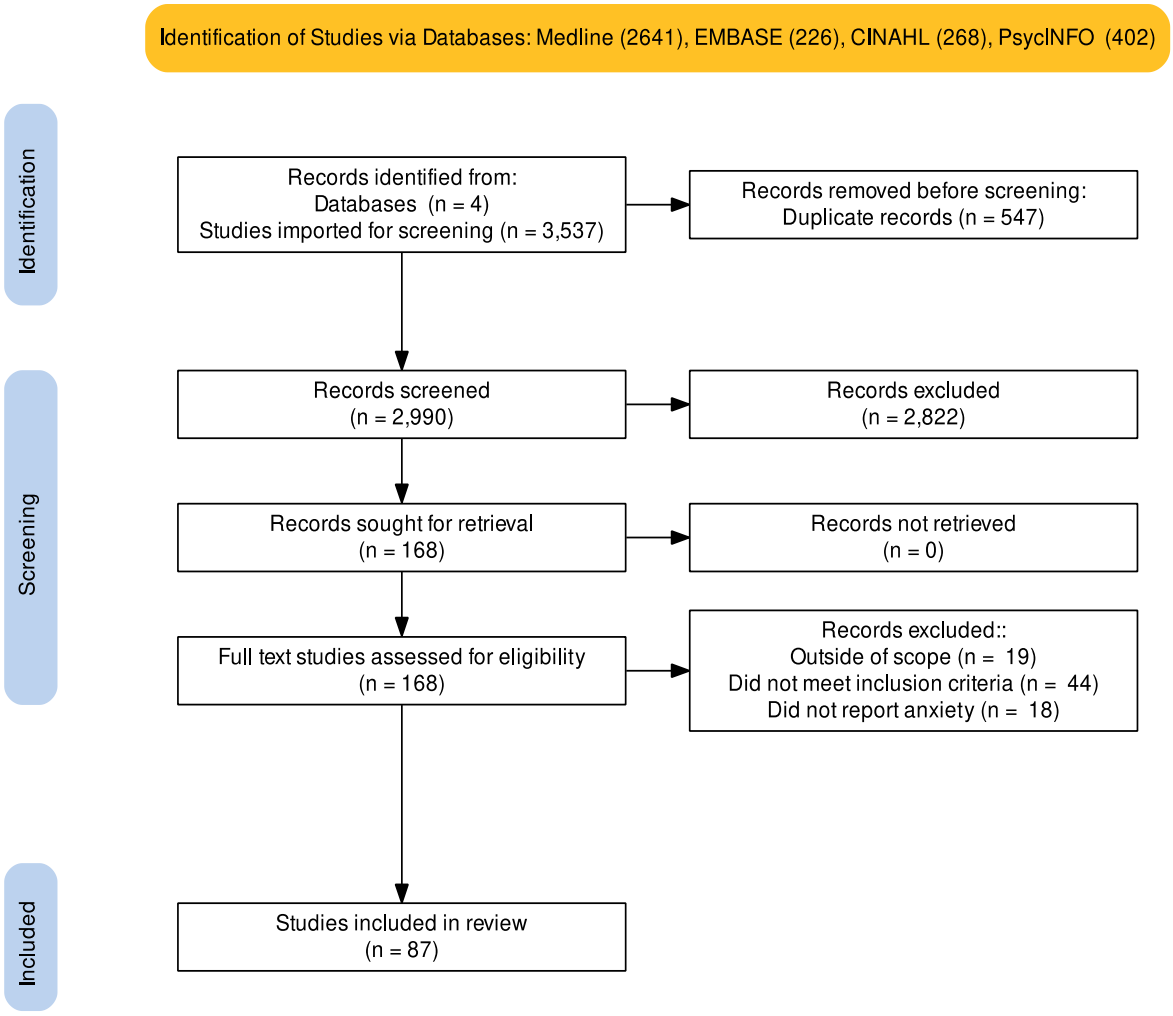

Figure 1. PRISMA flow diagram. The final number of papers included in the review was 87.

2.4. Quality assessment

Two authors, HS and AE, screened the studies in full text to determine the eligibility for inclusion. Any dispute in the inclusion of studies were resolved as the authors came to an agreement. The study design, quality, and methods were compared against The Joanna Briggs Institute (JBI) critical appraisal tool to ensure an adequate standard to be included in the review (Munn et al., 2014). The JBI critical appraisal tool provided varying checklists depending on the nature and design of the paper, with the most utilised checklist in this review being the checklist for analytical cross-sectional studies, as the majority of the selected papers used a cross-sectional study design.

2.5. Data Extraction and Synthesis

The studies were imported into Microsoft Excel version 16.54 (Australia), where the data for the results were extracted. The sample sizes, other study characteristics, study design, psychometric scores, results, and main findings of each study were extracted for the review. The results were collated into groups corresponding to the different population types.

3. Results

3.1. Study Characteristics

The sample size assessed in this review, derived from the total sample size of each study included in the review, was n = 755,180 with approximately n = 432,944 females, n = 280,089 males and n = 42,147 participants that identified as other or did not report their sex. The age range of individuals within the included papers was 18-100 years and encompassed participants from 32 countries, with the highest number of studies originating from China (26/87 studies). The majority of studies were cross-sectional in design (70 studies), followed by longitudinal studies (13 studies), cohort studies (3 studies) and one case-control. All studies utilised validated psychometric measures, with the most common measure being the generalised anxiety disorder (GAD) 7 item scale (Williams, 2014) (43 studies). A summary of the study characteristics and anxiety prevalence is detailed in Table 2.

214 **Table 2** – Characteristics and Anxiety Prevalence of the Selected Studies

reference	Study design	Population Type	Country	Sample size	Sex	Assessment Tools	Prevalence of Anxiety (%)
Aharon et. al, 2020	Cross-sectional	General population	Israel and Italy	1015	Sex (f/m): 506/509	PHQ-4, SF-8	50.2% of Italian and 42.2% of Israelis
Albagmi et. al, 2012	Cross-sectional	General population	Saudi Arabia	3017	Sex: (f/m) 1690/1327	GAD-7	80% (mild), 11.4% (moderate), 8.2% (severe)
Alshekaili et. al, 2020	Cross-sectional	Healthcare workers	Oman	1139	Sex (f/m): 911/228	DASS-21	34.1%
Antonijevic et. al, 2020	Cross-sectional	Healthcare workers	Serbia	1678	Sex (f/m): 1315/363	GAD-7	43.31% (minimal), 30.9% (mild), 12.99% (moderate),12.8% (severe).
Ausin et. al, 2020	longitudinal	General population	Spain	1041	Sex (f/m): 841/ 200	GAD-2	N/A
Batterham et. al, 2021	longitudinal	General population	Australia	1296	Sex (f/m): 649/647	GAD-7, PHQ-9	77%
Bendau et. al, 2020	Longitudinal Observational	General population	Germany	2376	Sex (f/m): 1822/542	GAD-2, PHQ-4	N/A
Budimir et. al, 2021	Cross-sectional	General population	Austria and UK	2011	Sex (f/m): 1067/944	GAD-7	18.9% UK and 6% Austria
Cai et. al, 2020	case-control	Healthcare workers	China	2346	Sex (f/m): 1644/702	BAI	Frontline 15.7%, non-frontline 7.4%
Canet-Juric et. al, 2020	longitudinal	General population	Argentina	6057	Sex (f/m): 4886/1131 - 20: other	STAI	N/A
Cao et. al, 2020	Cluster Sampling	University Students	China	7143	Sex (f/m): 4975/2168	GAD-7	Mild (21.3%), moderate (2.7%), severe (0.9%)
Chen et. al, 2021	Cross-sectional	General population (quarantined)	China	1837	Sex (f/m): 1512/325	STAI	16.3%
Chew et. al, 2020	Cross-sectional	Healthcare workers	India, Indonesia, Singapore, Malaysia and Vietnam	1146	Sex(f/m): 2544/923	DASS-21	India (0.8%), Singapore (3.6%), Vietnam (6.7%), Indonesia (6.8%) and Malaysia (14.9%)
Dawel et. al,	longitudinal	General population	Australia	1296	Sex (f/m): 649/645	GAD-7, PHQ-9, WHO-5	N/A
Denning et. al, 2021	Cross-sectional	Healthcare workers	UK, Poland and Singapore	3537	Sex (f/m): 2544/923	HADS	20%
Di Blasi et. al, 2021	longitudinal	General population	Italy	1129	Sex (f/m): 893/236	DASS-21	N/A
Di Giuseppe et. al, 2020	Cross-sectional	General population	Italy	5683	Sex (f/m): 4256/1427	SCL-90	51.1%
Di Mattei et. al, 2021	Baseline assessment	Healthcare workers	Italy	1055	Sex (f/m): 799/256	DASS-21	69.4%

Fiorillo et. al, 2020	longitudinal	General population	Italy	20,720	Sex (f/m): 14,720/6000	DASS-21, GHQ	Moderate (16.7%) and severe or extremely severe (17.6%)
Fisher et. al, 2020	Cross-sectional	General Population	Australia	13,829	Sex (f/m): 10,434/3328	GAD-7, PHQ-9	21%
Fu et. al, 2020	Cross-sectional	General population	China	1242	Sex (f/m): 866/376	GAD-7, PHQ-9	27.6%
Fu et. al, 2021	Cross-sectional	University students	China	89,588	Sex (f/m): 50, 394/ 39,194	GAD-7	41.1%
Gainer et. al, 2021	Cross-sectional	Healthcare workers	US	1724	Sex (f/m): 959/750	GAD-7, PHQ-9	36.5%
Garcia-Fernandez et. al, 2020	Cross-sectional	Elderly population	Spain	1639	Sex (f/m):	HARS	N/A
Garcia-Fernandez et. al, 2020	Cross-sectional	General population	Spain	1635	Sex (f/m): 1115/520	HARS	N/A
Giardino et. al, 2020	Cross-sectional	Healthcare workers	Argentina	1059	Sex (f/m): 770/287	DASS-18	76.5%
Gundogmus et. al, 2021	longitudinal	Healthcare Workers	Turkey	2460	Sex (f/m): 1637/823	DASS-21	29.6%
Hacimusalar et. al, 2020	Cross-sectional	Healthcare, non-healthcare	Turkey	2156	Sex (f/m): 1547/609	STAI	89.5%
Halperin et. al, 2021	Cross-sectional	University students	US	1428	Sex (f/m): 952/462 (12 non-binary/3rd gender, 2 not answered)	GAD-7, PHQ-9	30.6%
Hammarberg et. al, 2020	Cross-sectional	General population	Australia	13,762	Sex (f/m): 10,434/3328	GAD-7	21.8% females, 14.2% males
Hassannia et. al, 2021	Cross-sectional	Healthcare workers and general population	Iran	2045	Sex (f/m): 1374/671	HADS	65.6%
He et. al, 2021	Cross-sectional	Healthcare workers	China	1971	Sex (f/m): 1899/35	GAD-7	29.3%
Hennein et. al, 2021	Cross-sectional	Healthcare workers	US	1092	Sex (f/m): 72%/28%	GAD-7	15.6%
Huang et. al, 2021	Cross-sectional	Healthcare workers	Singapore	1638	Sex (f/m): 1249/389	GAD-7	12.5%
Islam et. al, 2020	Cross-sectional	University students	Bangladesh	3122	Sex (f/m): 40.5%/59.5%	DASS-21	Mild anxiety (71.5%), moderate (63.6%), severe (40.3%) and very severe (27.5%).
Jacques-Avino et. al, 2020	Cross-sectional	General population	Spain	7053	Sex (f/m): 5014/2039	GAD-7	31.2% females, 17.7% males

Jia et. al, 2020	Cross-sectional	General population	UK	3097	Sex (f/m): 2618/479	GAD-7	57% (26% moderate to severe anxiety)
Jiang et. al, 2020	Cross-sectional	General population	China	60,199	Sex (f/m): 34,418/25,781	SAI	Mild (33.21%), moderate (41.27%) and severe (22.99%).
Johnson et. al, 2021	longitudinal	Parents	Norway	2868	Sex (f/m): 2278/590	GAD-7	N/A
Kantor and Kantor, 2020	Cross-sectional	General population	US	1005	Sex (f/m): 518/494	GAD-7	52.1% mild, 26.8% anxiety disorder
Karaivazoglou et. al, 2021	Cross-sectional	General population	Greece	1443	Sex (f/m): 1052/391	HADS	20%
Khubchandani et. al 2021	Cross-sectional	General population	US	1978	Sex (f/m): 1008/970	GAD-2, PHQ-4	42%
Kim et. al, 2021	longitudinal	University Students	US	8613	Sex (f/m): 2662/977 (2 intersex)	GAD	No significant changes were found in the rates of anxiety from before the pandemic.
Lai et. al, 2020	Cross-sectional	Healthcare workers	China	1257	Sex (f/m): 964/293	GAD-7	44.6%
Lei et. al, 2020	Cross-sectional	General population	China	1593	Sex (f/m): 976/617	SAS	8.3%
Li et. al, 2020	Cross-sectional	Teachers	China	88,611	Sex (f/m): 68,169/20,442	GAD-7	13.67%
Li et. al, 2021	Cross-sectional	General population	China	1201	Sex (f/m): 763/438	DASS-21	34.2%
Liu et. al, 2021	Cross-sectional	Healthcare workers	China	1090		GAD-7	13.3%
Liu et. al, 2020	Cross-sectional	Healthcare workers (paediatric)	China	2031	Sex (f/m): 1737/294	DASS-21	18.3%
Lu et. al, 2020a	Cross-sectional	General population and frontline workers	China	1417	Sex (f/m):	GAD-7	52.1% of the general public and 56% of frontline workers
Lu et. al, 2020b	Cross-sectional	Healthcare workers	China	2299	Sex (f/m): 1591/451	HAMA	22.6% of medical staff showed mild to moderate anxiety and 2.9% were severe
Luceno-Moreno et. al, 2020	Cross-sectional	Healthcare workers	Spain	1422	Sex (f/m): 1228/194	HADS	58.6% healthcare workers presented with an anxiety disorder.
Mattila et. al, 2020	Cross-sectional	Healthcare workers	Finland	1995	Sex (f/m): 1731/255	GAD-7	30% mild anxiety, 10% moderate and 5% severe anxiety.
Meesala et. al, 2021	Cross-sectional	General population	India	1346	Sex (f/m): 594/752	CAS-7	N/A
Mosheva et. al, 2020	Cross-sectional	Healthcare workers	Israel	1106	Sex (f/m): 542/564	PROMIS	52.8%
Duong et. al, 2020	Cross-sectional	General population	Vietnam	1385	Sex (f/m): 505/880	DASS-21	14.1%
Nkire et. al, 2021	Cross-sectional	General population	Canada	6041	Sex (f/m): 5186/855	GAD-7	46.7%

Odriozola-Gonzalez et. al, 2020	Cross-sectional	University students and workers.	Spain	2530	Sex (f/m): 1672/858	DASS-21, IES	21.34%
Ozamiz-Etxebarria et. al, 2021	Cross-sectional	Teachers	Spain	1633	Sex (f/m): 1293/330	DASS-21	49.5% (8.1% extreme severe and 7.6% severe)
Ozamiz-Etxebarria et. al, 2020	longitudinal	General population	Spain	1933	Sex (f/m): 1584/401	DASS-21	26.9%
Pandey et. al, 2020	Cross-sectional	General population	India	1395	Sex (f/m): 805/582	DASS-21	Anxiety prevalence was 22.4% in the second week and 26.6% in the third week of lockdowns
Passavanti et. al, 2021	Cross-sectional	General population	Australia, Iran, China, Ecuador, Italy, Norway and the US	1612	Sex (f/m): 968/644	DASS-21	44.7% (5.2% mild, 17.4% moderate, 5.8% severe and 16.3% extremely severe).
Pieh et. al, 2021	Cross-sectional	General population	UK	1006	Sex (f/m): 544/462	GAD-7	39%
Peih et. al, 2020	Cross-sectional	General population	Austria	1005	Sex (f/m): 530/475	GAD-7	19%
Planchuelo-Gomez et. al, 2020	longitudinal	General population	Spain	4724	Sex (f/m): 2304/1246	DASS-21	49.66%
Robb et. al, 2020	Cross-sectional	Elderly population	UK	7127	Sex (f/m): 3855/3114	HADS	N/A
Rossi et. al, 2020	Cross-sectional	Healthcare workers and general population	Italy	24,050	Sex (f/m): 19334/4717	GAD-7	21.25% in the general population, 18.05% in second line healthcare workers and 20.55% in frontline workers.
Ruengorn et. al, 2020	Cross-sectional	General population	Thailand	2303	Sex (f/m): 1382/921	GAD-7	56.9%
Serafim et. al, 2021	Cross-sectional	General population	Brazil	3000	Sex (f/m): 2493/507	DASS-21	39.7%
Shen et. al, 2020	Cross-sectional	Healthcare Workers	China	1637	Sex (f/m): 1471/166	SAS	10.02%
Sinawi et. al, 2021	Cross-sectional	General Population	Oman	1538	Sex (f/m): 1148/309	GAD-7	22%
Solomou et. al, 2020	Cohort study	General population	Cyprus	1642	Sex (f/m): 1176/466	GAD-7	41% mild, 23.1% moderate-severe
Sun et. al, 2020	Cross-sectional	University Students	China	1912	Sex (f/m): 1334/578	GAD-7	34.73%
Tang et. al, 2020	Cross-sectional	General population	China	1389	Sex (f/m): 696/464	GAD-7	70.78%
Van der Velden et. al, 2020	Longitudinal	General population	Holland	3983	Sex (f/m): 2020/1963	GAD-7	No significant anxiety found
Wang et. al, 2021a	Case-control	General population	China	1674	Sex (f/m): 843/840	ADS	27% in quarantined, 11.2% in general population
Wang et. al, 2021b	Cross-sectional	Healthcare workers	China	1063	Sex (f/m): 10,396/5427	GAD-7	48.7% in patients, 25.7% general population, 13.3% healthcare

Wang et. al, 2020	Cross-sectional	General, covid and health	China	49,015	N/A	DASS-21	10.02%
Wanigasooriya et. al, 2021	Cross-sectional	Healthcare workers	UK	2638	Sex (f/m): 2096/524	PHQ-4	34.31%
Warren et. al, 2021	Cross-sectional	General population	United States	5023	Sex (f/m): 2981/2042	PHQ-4	14.4%
Wathelet et. al, 2020	Cross-sectional	University Students	France	69,054	Sex (f/m): 50,251/18,019	STAI	27.47%
Wu et. al, 2020	Cross-sectional	General population	China	24,789	Sex (f/m): 11,485/13,304	STAI	51.6%
Yuan et. al, 2020	Cross-sectional	Police	China	3517	Sex (f/m): 557/2960	HADS	8.79%
Zhang et. al, 2020a	Cross-sectional	Healthcare workers	China	2143	Sex (f/m): 1890/197	GAD-7	14.23%
Zhang et. al, 2020b	Cross-sectional	General population	China	123,768	Sex (f/m): 36,438/87,330	GAD-7	3.4%
Zhou et. al, 2020	Cross-sectional	Healthcare workers	China	1705	Sex (f/m): 1255/450	SAS	45.4%
Zilver et. al, 2021	Cohort study	Pregnant women	Holland	1466	100% female	GAD-7	19.5%

Key: GAD-7 – Generalised Anxiety Disorder – 7 Item Scale; **DASS-21** – Depression Anxiety Stress Scale – 21 Item; **PHQ-4 –** Patient Health Questionnaire – 4 Item; **SAS –** Self-Rating Anxiety Scale; **HARS –** Hamilton Anxiety Rating Scale; **SCL-90 –** Symptom Checklist – 90 Item; **CAS –** Coronavirus Anxiety Scale; **PROMIS –** Patient-Reported Outcomes Measurement Information System; **STAI –** State-Trait Anxiety Inventory; **HADS –** Hospital Anxiety and Depression Scale.

3.2. The General Population Group

The general population was the most common group studied amongst the studies included in the review, with 47 papers focusing on anxiety assessment. The 47 papers comprised of a sample size of n = 421,598 participants, with n = 208,675 females, n = 178,187 males, and n = 34,736 other or sex not reported. The prevalence of anxiety ranged from 3.4% - 97.47% across the 47 study populations. The overall pooled anxiety prevalence was 34%, although eight studies did not directly report the prevalence of anxiety in their populations.

Amongst the general population, three studies (Aharon et al., 2021; Dawel et al., 2020; Pieh et al., 2020) showed that the prevalence of anxiety during the COVID-19 pandemic had risen when compared to data from preceding years. That is, in 2017 anxiety rates were 6%, but after the pandemic hit, this figure inflated to 19% (Pieh et al., 2020). Conversely, Velden (2020) reported no significant increase in the prevalence of anxiety in a before and after study comparing mental health rates in 2019 and 2020. However, the authors did note that despite an absence of an increase in anxiety, the risk factors predisposing participants to mental distress had changed since the onset of the pandemic, leaving students, job seekers, those with children and those who housekeep more at risk in 2020 compared to the previous year.

Geographical locations that were identified as COVID-19 epicentres had higher instances of anxiety compared to non-epicentre areas (Aharon et al., 2021; Albagmi et al., 2021; Canet-Juric et al., 2020; Di Giuseppe et al., 2020; Li et al., 2021; Ngoc Cong Duong et al., 2020; Zhang et al., 2020b). Moreover, COVID-19 prevalent areas that exemplified elevated testing rates reported decreased anxiety (Tang et al., 2020). Those with increased contact with COVID-19 infected individuals exhibited stronger associations with anxiety (Fisher et al., 2020; Passavanti et al., 2021; Serafim et al., 2021), especially if the individual was exposed to COVID-19 in a working environment such as healthcare (Hassannia et al., 2021; Khubchandani et al., 2021). Populations infected with COVID-19 expressed more anxiety than those who were not infected (Fiorillo et al., 2020; Hassannia et al., 2021; Jacques-Avino et al., 2020; Wang et al., 2021b). Job loss or financial hardship due to COVID-19 was often a predictor or factor for worse anxiety (Dawel et al., 2020; Ruengorn et al., 2021).

Quarantine and lockdown orders proved detrimental to mental health, as seen in ten studies (Aharon et al., 2021; Chen et al., 2021a; Di Giuseppe et al., 2020; Fisher et al., 2020; Nkire et al., 2021; Ozamiz-Etxebarria et al., 2020a; Pandey et al., 2020; Tang et al., 2020; Wang et al., 2021a) with increased loneliness and isolation being the cause of significant increases in anxiety. In an Australian longitudinal study (Batterham et al., 2021), there was a 23% increase in anxiety over a 12-week restriction period. Quarantining alone resulted in lower anxiety than people isolating with elderly dependents (Canet-Juric et al., 2020). Three studies concluded that anxiety levels in populations decreased when rules were eased or when participants were exempted from participating in quarantines (Bendau et al., 2021; Canet-Juric et al., 2020; Lu et al., 2020a).

Certain demographic groups were identified as having a higher prevalence of anxiety or being more at risk of developing adverse mental health issues. Twenty-two studies found that females consistently had

higher levels of anxiety than males. However, two studies found that males were more anxious when living with dependents under 18 (Garcia-Fernandez et al., 2021; Jacques-Avino et al., 2020) and that younger males had higher instances of anxiety (Hassannia et al., 2021). One study reported that males had higher rates of anxiety than females overall (Wu et al., 2020). Two studies (Nkire et al., 2021) and (Wang et al., 2021a) did not delineate any significant differences between the sexes. Five studies reported that lower socioeconomic status was representative of greater anxiety (Chen et al., 2021a; Fisher et al., 2020; Khubchandani et al., 2021; Lei et al., 2020; Wang et al., 2021a). Prior mental illness was also a contributing factor for worse mental health after COVID-19 (Dawel et al., 2020; Fiorillo et al., 2020; Jiang et al., 2020; Kantor & Kantor, 2020; Solomou & Constantinidou, 2020). Younger age groups showed more anxiety than older age groups in sixteen studies (Albagmi et al., 2021; Batterham et al., 2021; Chen et al., 2021a; Dawel et al., 2020; Di Giuseppe et al., 2020; Fisher et al., 2020; Jacques-Avino et al., 2020; Jia et al., 2020; Ozamiz-Etxebarria et al., 2020a; Pandey et al., 2020; Pieh et al., 2020; Serafim et al., 2021; Solomou & Constantinidou, 2020; Wang et al., 2021a; Wang et al., 2021b).

Contrastingly, four studies identified an opposite trend, with elderly and older populations experiencing more anxiety than younger groups (Fu et al., 2020; Meesala et al., 2020; Nkire et al., 2021; Planchuelo-Gomez et al., 2020). Six studies identified having a higher education being associated with worse anxiety (Budimir et al., 2021; Chen et al., 2021a; Fu et al., 2021; Karaivazoglou et al., 2021; Khubchandani et al., 2021; Wang et al., 2021a) while two studies identified that lower education equated to increased anxiety (Pandey et al., 2020; Solomou & Constantinidou, 2020). Living alone or remotely and being unemployed were influences on increased anxiety (Fisher et al., 2020; Kantor & Kantor, 2020; Pieh et al., 2020; Solomou & Constantinidou, 2020). Adversely, Fu and colleagues (2020b) indicated that living in a city may be predictive of worse mental health. Two studies reported no difference in the anxiety levels between different demographics, including sex, age, education or socioeconomic status (Passavanti et al., 2021; Rossi et al., 2020).

3.3. Healthcare Worker Group

Healthcare workers constituted the subject of 25 of the 87 studies included in this review, with a total sample size of 43,387 participants. This sample consisted of n = 32,185 females, n = 9675 males, and n = 1527 participants who identified as other. The prevalence of anxiety ranged from 13.3% - 100% in all study populations, with a pooled prevalence of 36%.

Five studies found that the prevalence of anxiety was higher in healthcare workers than in other professions and this included clinical, non-clinical and administrative healthcare workers (Antonijevic et al., 2020; Denning et al., 2021; Mattila et al., 2021; Mosheva et al., 2020; Zhou et al., 2020). A greater prevalence of anxiety was found in frontline healthcare responders compared to second-line or non-COVID-19 healthcare workers and this was highlighted in twelve papers (Alshekaili et al., 2020; Antonijevic et al., 2020; Cai et al., 2020; Di Mattei et al., 2021; Gainer et al., 2021; Giardino et al., 2020; Hacimusalar et al., 2020; Huang et al., 2021; Lai et al., 2020; Liu et al., 2020b; Lu et al., 2020b; Zhang et al., 2020a). This was further endorsed as healthcare staff not working in COVID-19 epicentres scored lower for anxiety (He et al., 2021). Amongst

clinical healthcare workers, more studies found that nurses suffered to a greater level from anxiety than physicians (Hacimusalar et al., 2020; Lai et al., 2020; Liu et al., 2021; Shen et al., 2020). However, this was countered by Lie et al (Liu et al., 2020b), where it was found that physicians displayed more anxiety-like symptomology than nurses. Non-clinical healthcare workers, such as administrative staff and clerks, scored higher on anxiety psychometric measurements than clinical staff (Chew et al., 2020; Giardino et al., 2020; Hennein et al., 2021). One study contradicted this suggesting that anxiety in clinical staff was more significant than that seen in non-clinical staff (Lu et al., 2020b).

A lack of resources, including testing equipment and personal protective equipment (PPE), increased the likelihood of anxiety symptoms amongst hospital staff (Huang et al., 2021; Wanigasooriya et al., 2020). Additional anxiety was promoted by the worry of infecting family members with COVID-19 or being infected themselves (Lai et al., 2020; Luceno-Moreno et al., 2020), hence there was a strong association between job risk and anxiety (Shen et al., 2020). Hacimusalar and colleagues found that situational anxiety was much higher in healthcare staff, whereas general anxiety was more common in the broader population (Hacimusalar et al., 2020). During subsequent waves of COVID-19 infection, anxiety levels worsened among healthcare workers (Gundogmus et al., 2021). The increased demand in working hours exposed Healthcare workers, both clinical and non-clinical, to be more at risk (Huang et al., 2021; Liu et al., 2020b). The occurrence of medical violence during peak COVID-19 periods also exacerbated mental health conditions. In ten studies females were found to have increased levels of anxiety (Chew et al., 2020; Gainer et al., 2021; Giardino et al., 2020; He et al., 2021; Huang et al., 2021; Lai et al., 2020; Luceno-Moreno et al., 2020; Shen et al., 2020; Wanigasooriya et al., 2020; Zhang et al., 2020a). Five papers reported that younger healthcare workers such as trainees experienced more anxiety than older workers (Gainer et al., 2021; Giardino et al., 2020; Huang et al., 2021; Lai et al., 2020; Liu et al., 2021), but others reported that older healthcare workers were the more affected group (He et al., 2021; Hennein et al., 2021; Zhang et al., 2020a). The existence of a prior mental health illness or living alone were also reported as significant risk factors (Hennein et al., 2021; Liu et al., 2021; Wanigasooriya et al., 2020).

3.4. University Students

Eight papers focused on the prevalence of anxiety in university students (Cao et al., 2020; Fu et al., 2021; Halperin et al., 2021; IslamI et al., 2020; Kim et al., 2021a; Odriozola-Gonzalez et al., 2020; Sun et al., 2021; Wathelet et al., 2020). The total sample size of the student group was n = 183,390, with n = 113504 females, n = 64,114 males and n = 2772 participants who identified as other. The prevalence of anxiety ranged from 0% - 71.5% in all study populations, with the pooled prevalence being 34.7%.

Islaml and colleagues (2020) reported that anxiety amongst university students had worsened compared to pre-pandemic rates and with the duration of lockdowns. Conversely, Kim et al., (2021) reported no significant changes in anxiety throughout lockdowns (Kim et al., 2021a). Two papers denoted adverse anxiety related to worry about academics and dissatisfaction with COVID-19 distance learning measures (Cao et al., 2020; IslamI et al., 2020). The impact of restrictions

on daily life was proven detrimental to anxiety symptoms (Cao et al., 2020; Odriozola-Gonzalez et al., 2020). The implications of lockdowns resulted in increased loneliness and lack of social support, and both of these factors were uncovered to be responsible for a rapid increase in clinical anxiety scores (Cao et al., 2020; Fu et al., 2020). Although restrictive orders caused some populations to experience more anxiety, another study showed that self-efficacy as a result of isolation decreased anxiety (Sun et al., 2021). Living in a COVID-19 hotspot or personally knowing an infected person were predictors of higher anxiety (Halperin et al., 2021; Wathelet et al., 2020). Sun and colleagues (2021) found that the threat of being infected with COVID-19 and the stigma associated with that caused university students to be more anxious about contracting the infection (Sun et al., 2021). Being exposed to more news and to COVID-19 related social media was strongly associated with worsened anxiety (Sun et al., 2021; Wathelet et al., 2020). Financial instability caused by the pandemic was a significant factor for increased anxiety in four studies (Cao et al., 2020; Fu et al., 2021; Sun et al., 2021; Wathelet et al., 2020). Further, residing with more than five family members was also predictive of anxiety (Halperin et al., 2021). Five studies identified female students as having higher scores of anxiety compared to male students (Fu et al., 2021; Halperin et al., 2021; Sun et al., 2021; Wathelet et al., 2020). Two studies found that postgraduate students aged in their mid-to-late 20s had higher levels of anxiety when compared to undergraduates (Fu et al., 2021; IslamI et al., 2020). This was opposed by Odriozola-Gonzalez and colleagues (2020), where it was established that undergraduate students were more anxious than postgraduates.

3.4.1. Other Adults of the General Population

The remaining seven studies focused on multiple different groups, including parents, teachers, the elderly, police and pregnant women, in which the effects of COVID-19 on anxiety level varied as detailed below.

Anxiety in Parents

Johnson and colleagues (2021) conducted a longitudinal study on the mechanisms of parental distress during the COVID-19 pandemic. This study had a sample size of n = 2868, consisting of n = 2278 females and n = 590 males. They found that at T1, when lockdowns were strictest, 23.3% of participants met the clinical cut-off for generalised anxiety and at T2, when restrictions were being eased, anxiety prevalence was lowered to 13.8% (Johnson et al., 2021). Anxiety was also higher in females than males (T1: 25.7% vs 14%) (Johnson et al., 2021).

Anxiety in Teachers

Two studies focused on teachers with a combined sample size of n = 90,244, with n = 69,462 females and n = 20,772 males. The pooled prevalence of anxiety in both populations was 27.2%, with either 49.5% (Ozamiz-Etxebarria et al., 2020b) or and 26.6% (Li et al., 2020b) of participants reporting COVID-19 related anxiety. In both studies, female teachers experienced more anxiety than male teachers and older teachers more so than younger teachers.

Anxiety in the Elderly Population

Two studies focused on the elderly with a sample size of n = 8766, with n = 4817 females and n = 3791 males (Garcia-Fernandez et al., 2020; Robb et al., 2020). Both studies concluded that those living alone, experiencing financial hardship, not exercising and being widowed indicated increased anxiety. Robb and colleagues (2020) reported that with every five-year increase in age group within the study population, there was a 22% decrease in anxiety results. This was contrasted in a study by Garcia-Fernandez and colleagues (2020), which found no differences in anxiety based on age. Thirty four percent of participants reported anxiety when they scored within the normal clinical range (Robb et al., 2020).

Anxiety in Police

Yuan and colleagues (2020) investigated the psychological impact of COVID-19 on police officers in a sample size of n = 3517, with n = 557 females and n = 2960 males. Of this population group, 8.79% reported moderate to severe anxiety, with older, more educated officers residing in or near a city having higher anxiety levels (Yuan et al., 2020). Males had a lower frequency of anxiety than females (34.1% vs 37.7%) (Yuan et al., 2020).

Anxiety in Pregnant Women

Zilver and colleagues (2021) assessed a sample of n = 1466 pregnant women and found a 19.5% prevalence of anxiety in the study sample but the study concluded this was not a significant increase compared to anxiety rates before the pandemic (Zilver et al., 2021).

4. Discussion

There have been many recent systematic reviews published on the mental health effects of the COVID-19 pandemic. The majority of these studies however, focus on specific sample populations (Johns et al., 2022). Wu and colleagues (2021) completed a systematic review of various mental health outcomes related to COVD-19 in multiple sample groups. However, this review was limited to the early phase of the pandemic (January – March, 2020) and mostly was contained to China (Wu et al., 2021).

The results of this systematic review show that the COVID-19 pandemic has negatively impacted the mental health of many populations in society. Anxiety is prevalent within the general population, healthcare workers, university students and other vulnerable groups (Albagmi et al., 2021; Denning et al., 2021; Giardino et al., 2020; IslamI et al., 2020; Jia et al., 2020), and the onset of COVID-19 has exacerbated it (Planchuelo-Gomez et al., 2020). The main contributors to this observed increase in anxiety are unique to this current outbreak alone. The implementation of stringent global lockdowns and quarantine orders have been one of the primary methods to achieve infection control. Although proven as effective measures to reduce transmission and COVID-19 case numbers, they have brought about great mental turmoil globally (Huang et al., 2020).

Social isolation was common during previous episodes of infectious disease outbreaks such as the quarantining of populations during the SARS and Ebola outbreaks, although this was mostly restricted to those infected or in contact with the disease (Drazen et al., 2014; Reynolds et al.,

2008). However, the COVID-19 pandemic has set a new precedent in this regard as orders of social isolation, quarantine, and lockdowns have, to some level, been imposed upon the majority of the world's populations. Literature shows that individuals with otherwise good mental health at the start of lockdown experienced mental decline the longer and more stringent the lockdown was (Santabárbara et al., 2021). This coincides with the findings of this systematic review that shows quarantine and lockdown orders increased the instances of loneliness and isolation, which in turn promoted anxiety levels. Sharma and colleagues (2020) found that 50% of participants showed anxiety symptoms after being subjected to quarantine (Sharma et al., 2020). This alarmingly high figure is indicative of a more significant issue at hand that demonstrates that the support networks in place are lacking. As apparent in the recent, more than 100-day (June – October) lockdown in Sydney in 2021, the mental health risk associated with longer more stringent lockdowns could see anxiety cases reach a much higher level should such lockdowns continue into the future.

Alternatively, some studies indicate that lockdown and quarantine orders have a small or no impact on mental health (van der Velden et al., 2020). However, these findings can be explained by the limited sample size in some of these studies that did not include a wide range of socioeconomic diversity and a degree of heterogeneity in the data (Qian et al., 2020).

4.1. Anxiety Before and After COVID-19

The majority of papers in the present systematic review found that the prevalence of anxiety was higher in 2020 when compared to the rates of previous years (2019) (Cai et al., 2020; Chen et al., 2021a; Tang et al., 2020). The Australian Institute of Health and Welfare (AIHW) reported that the COVID-19 related restriction on movement, physical and social isolation, loss of employment and other adverse effects of the lockdowns resulted in an 18.4% and 30.7% increase in calls to Lifeline and Beyond Blue, respectively (AIHW, 2021). The call volume had increased compared to the volume of calls received at the same time the previous year in 2019 (AIHW, 2021). Following the onset of the COVID-19 pandemic, the Australian Government implemented a range of mental health services under the Medicare Benefits Schedule (MBS), which included subsidising telehealth services (AIHW, 2021). The AIHW reported that after the new telehealth items were added to the MBS, there was a high uptake in the number of people accessing these services (AIHW, 2021).

4.2. Anxiety in Different Populations during COVID-19

The results indicate that COVID-19 affected anxiety levels in all the different study populations evaluated (general population, healthcare workers, university students, teachers, pregnant women, the elderly, parents, and police). The degree of anxiety varied, as groups such as healthcare workers, females and younger populations were more vulnerable than others (Hou et al., 2020; Korkmaz et al., 2020). During COVID-19, the overall prevalence of anxiety was highest in the initial stage of the outbreak with the highest rate among healthcare workers (36%), followed by university students (34.7%) and the general population (34%). Among the other groups, teachers experienced the most anxiety (27.2%) compared to police officers, who had the lowest

prevalence (8.79%). As discussed below, many factors are attributed to the variation in anxiety levels among different study samples.

Anxiety in the General Population

In this systematic review, the prevalence of anxiety among the general population (34%) coincided with the prevalence of anxiety found in other studies (Kantor & Kantor, 2020). A systematic review (Kantor & Kantor, 2020) concluded that the prevalence of anxiety in 103 studies on the general population was 27.3%. Other studies reported levels as low as 21.6% (Shevlin et al., 2020) or as high as 81.9% (Goularte et al., 2021).

The present study found that anxiety was significantly higher in populations living in epicentre regions, such as Wuhan, China (Zhang et al., 2020a). This is supported by Zhao and colleagues (2020), who found that those who residing within high infection areas, such as Hubei, China, showed higher moderate to severe anxiety rates than those who lived in lower epidemic areas (less affected regions of mainland China) (Zhao et al., 2020). The increased health-related anxiety can explain this phenomenon in regions of more significant infectious outbreaks (Zhao et al., 2020). The escalation of health anxiety was predictive of generalised anxiety during the COVID-19 pandemic (Nikčević et al., 2021). Within epicentre regions, additional testing carried out above the average rate resulted in a marked reduction in population anxiety (Ran et al., 2020), reducing the overall health anxiety and exemplifying a control over the outbreak. Increased exposure to COVID-19 was an indicator of worse anxiety, whether through casual contacts, workplace environments or being infected with COVID-19 directly (Kharroubi & Saleh, 2020). Literature suggests that exposure to COVID-19 infection results in a much higher prevalence of anxiety, especially if the contact is through family members (Huang et al., 2020). Huang and colleagues (2020) reported that of the populations presenting with COVID-19 related anxiety, those with higher contact histories and those with confirmed infections displayed an elevated risk of anxiety symptoms (Huang et al., 2020).

Sex was a major determinant for anxiety amongst the general population, with twenty-two studies finding that females experienced significantly higher anxiety levels than males. Multiple studies support these findings, suggesting that females do, in fact, experience higher levels of mental distress and anxiety concerning COVID-19 (Hou et al., 2020; Kantor & Kantor, 2020; Özdin & Bayrak Özdin, 2020). Evidence shows that this increased effect on females could be attributed to the burden many females feel as primary caregivers. With the added stressor of the pandemic, females are more likely than males to care for dependent family members (Rodríguez-Rey et al., 2020). Fu and colleagues (2020a) also suggested that females were more likely to score positive for anxiety because they were more likely to convey their emotions than males. Divergencies in neurochemistry may expose females to a slightly heightened risk of developing anxiety disorders (Fu et al., 2020). One study analysed in this review found that males had experienced higher levels of anxiety than females (Wu et al., 2020). This can be attributed to the decreased likelihood of males to seek mental health assistance due to the perceived stigma (Chatmon, 2020). An additional two studies found that although females experienced higher anxiety levels overall, males who care for dependents under the age of 18 had higher instances of anxiety than other male groups (Garcia-Fernandez et al., 2021; Jacques-

Avino et al., 2020). The additional stress of caring for young children during lockdown, whilst working from home can explain this trend (Johnson et al., 2021).

Socioeconomic status was another contributor to the severity of anxiety, with the COVID-19 related lockdowns resulting in a peak unemployment rate of 7.5%, the highest rate in the last 20 years, as reported by the ABS (ABS, 2020). A multitude of studies found that job loss as a result of COVID-19 was a major contributor to significant surges in anxiety and attributed financial instability as a leading cause of a myriad of other severe mental health issues (Nagasu et al., 2021; Nicola et al., 2020). The present review also found that those with pre-existing mental health issues were at a heightened risk of aggravating their conditions. These findings are supported within current literature as the implication of quarantine and restriction has disrupted the routines of daily life many individuals rely on to uphold their mental health (Pashazadeh et al., 2021; Zhao et al., 2021). As access to health services have been restricted due to the pandemic, relapses in anxiety attacks and disorders have seen a marked escalation (Prati & Mancini, 2021).

Age was yet another factor linked to heightened anxiety levels with the majority of included papers identifying younger age groups as more at risk for anxiety (Bendau et al., 2021; Canet-Juric et al., 2020; Dawel et al., 2020; Fisher et al., 2020; Halperin et al., 2021; Kim et al., 2021a). Recent findings have also concluded that younger age groups have higher rates of anxiety as they often experience more financial and employment instability than older groups (Bonanad et al., 2020). In conjunction with this, younger age groups are much more likely to consume more media coverage on the pandemic than older groups, with up to 3 hours of social media exposure a day. This increased exposure has been found to increase anxiety odds by up to 3 times (Bonanad et al., 2020; Halperin et al., 2021). However, four studies identified higher anxiety levels in older groups (Fu et al., 2021; Meesala et al., 2020; Nkire et al., 2021; Planchuelo-Gomez et al., 2020), which can be explained by older groups being more likely to suffer from more extreme effects of COVID-19 (Khademi et al., 2021). The vulnerability of older populations is evident as mortality rates of those aged over 70 are upwards of 22.8% compared to a rate of 1.1% for those aged below 50 (Bonanad et al., 2020). This increased mortality rate is directly linked to worse psychological outcomes, with increased occurrences of death anxiety (Khademi et al., 2021).

Anxiety in Healthcare Workers

The prevalence of anxiety experienced by healthcare workers was the highest rate amongst all the population groups, with a pooled prevalence of 36% from 25 studies. This finding is greater than the frequency found in the current literature. The prevalence in a systematic review on healthcare workers found that 23.2% of the population experienced anxiety (Pappa et al., 2020). An Indonesian study did find a more similar prevalence of 33% (Setiawati et al., 2021).

Frontline healthcare workers were found to experience more anxiety than non-frontline healthcare workers and non-clinical healthcare staff (administrative clerks). This finding can be justified as studies show that increased exposure to COVID-19 infection via a workplace setting is responsible for higher anxiety (Antonijevic et al., 2020). As frontline healthcare workers are at a greater risk of becoming infected, job anxiety is more prevalent in these populations than healthcare workers who have

limited contact with infected patients (Cai et al., 2020). Due to the influx of hospitalisations related to covid, healthcare staff have had to work longer hours with limited resources increasing their vulnerability to burnout and stress (Hacimusalar et al., 2020). This has, in turn, drastically affected mental health, with reports of heightened anxiety found in frontline healthcare staff across many countries (Bohlken et al., 2021; Cheng & Cheung, 2005). Non-frontline workers also had an increase in anxiety. However, frontline workers were more impacted as the lack of hospital resources and diminished staffing due to need in COVID-19 wards caused a stretch in healthcare systems (Setiawati et al., 2021). Some studies in the present review found that the non- clinical healthcare workers presented with higher anxiety levels than the clinical staff (Chew et al., 2020; Giardino et al., 2020; Hennein et al., 2021). This was attributed to limited training in regard to infectious disease and crisis management (Hennein et al., 2021). It was found that upon completion of crisis training, the anxiety psychometric measures of non-clinical healthcare workers decreased drastically (Hennein et al., 2021).

The fear of healthcare workers infecting their families was a major determinant for health and job-related anxiety. This is supported by Dai and colleagues (2020) who found that one of the greatest fears healthcare workers expressed was infecting others outside of the workplace (Dai et al., 2020). Younger healthcare workers also expressed higher scores of anxiety, which could be explained by their lack of training and experience in the role (Gainer et al., 2021; Giardino et al., 2020; Huang et al., 2021; Lai et al., 2020; Liu et al., 2021). This also coincides with the findings in the general population, as younger age groups were found to be more at risk. However, three papers reported higher anxiety levels in older groups, with the vulnerability of older aged populations to COVID-19 infection, and the increased likelihood of older participants having dependants could explain this finding (He et al., 2021; Hennein et al., 2021; Zhang et al., 2020a). Similar to the results of the general population, females experienced higher anxiety than males amongst the healthcare workers.

Anxiety in University Students

The prevalence of anxiety among university students was 34.7%, which was close to the prevalence found in the general population (34%) and is in line with literature as Halperin and colleagues (2021) reported anxiety prevalence among university students to be 30.6%.

Two studies conflicted in their findings on the prevalence of anxiety in university students before and after the pandemic (IslamI et al., 2020; Kim et al., 2021a). The study that did not identify an increase in anxiety from before the pandemic highlights that introducing university aid and classes moving to pass/fail systems may have dampened the mental effects of COVID- 19 (Kim et al., 2021a). Literature also suggests that the introduction of lockdowns has allowed students to focus on hobbies and get more sleep as classes moved online (Rizun & Strzelecki, 2020). In contrast to this, a plethora of studies have supported the finding that anxiety has increased significantly since that onset of the COVID-19 pandemic (Fu et al., 2021; Halperin et al., 2021; IslamI et al., 2020). Students living on campus were found to have more anxiety symptoms than those who did not. The financial instability of living on campus while not being able to work to support themselves has caused many university students to become vulnerable to mental deterioration (Halperin et al., 2021). Literature also supports the finding that the

increased loneliness experienced by students living on campus is determinative of higher anxiety psychometric scores (Arslan et al., 2020).

Academic anxiety was a significant source of stress among university students. With the transition of classes to an online setting, the cracks in many education systems have begun to show (Sun et al., 2021). The transition to online schooling has caused distress in many students who have issues with self-learning, which has caused an upsurge in anxiety related to academics and with isolation, and a lowered perception of academic self-efficacy (Alemany-Arrebola et al., 2020). Due to the younger age demographic of university students, they consume more social media akin to the younger age groups in the general population and the mass consumption of COVID-19 related media indicates increased anxiety (Bendau et al., 2021; Hou et al., 2020). Parallel to the other population groups, those living in hotspot areas and females had higher levels of anxiety. Literature supports that female students were more likely to score positively for anxiety than male students (Odriozola-Gonzalez et al., 2020; Sun et al., 2021). Although females may experience higher anxiety for many reasons, the greater percentage of females that participate in studies may explain this phenomenon (Zhan et al., 2021).

Anxiety in Other Adults of the General Population

There were 7 papers assessing the other adult populations that varied in the severity of anxiety present (Garcia-Fernandez et al., 2020; Johnson et al., 2021; Li et al., 2020b; Ozamiz-Etxebarria et al., 2020b; Robb et al., 2020; Yuan et al., 2020; Zilver et al., 2021). The levels of anxiety found in the different sample populations had a direct correlation to the degree of vulnerability they experienced as a result of the COVID-19 pandemic.

Teachers had the highest prevalence of anxiety with 49.5% of teachers reporting COVID-19 related anxiety (Ozamiz-Etxebarria et al., 2020b). The additional strain placed on education systems due to the closing of schools and online learning has resulted in teachers experiencing high levels of mental distress (Allen et al., 2020). Contrastingly, the delayed closure of schools caused teachers to have increased anxiety regarding their safety and risk of contracting COVID-19 (Wakui et al., 2021). Parents had the second highest prevalence of anxiety with 23.3% having anxiety induced by lockdowns (Johnson et al., 2021). Similar to teachers, the closure of schools exacerbated anxiety in parents as they were left responsible for their children's education (Johnson et al., 2021). Due to lockdowns, movement outside of the home was limited on a necessity basis, such as grocery shopping or work, anxiety in parents were elevated due to the confinement of children within the home (Johnson et al., 2021).

The elderly population did not have significant levels of anxiety and anxiety symptoms were found to be lowered by 22% as age increased (Garcia-Fernandez et al., 2020; Robb et al., 2020). The already limited mobility of older populations outside of the home promoted lower levels of anxiety as many did not perceive themselves to be at risk of transmission (Garcia- Fernandez et al., 2021). Anxiety was present in 19.5% of pregnant women, although this was not significant from pre-pandemic rates (Zilver et al., 2021). This was attributed to COVID-19 hospital interventions that allowed pregnant women to have their partners present while giving birth (Zilver et al., 2021). Finally, police officers were the least impacted group, exhibiting low anxiety rates at

8.79% (Yuan et al., 2020). The COVID-19 pandemic did not have an impact on police officers due to the overall compliance of the general population in adhering to regulations and lockdowns (Yuan et al., 2020).

4.3. Limitations

The strengths of the present review were in the extensive comparison of anxiety in multiple sample population groups. To the best of the authors' knowledge, the comparison between the general population, healthcare workers, university students, teachers, parents, the elderly, pregnant women and police officers has not been drawn before.

Although the present systematic review presents some important findings, various limitations were noted during the process. Firstly, restricting the review to only English language publications may have potentially introduced language bias into the study. Language bias is the phenomenon where studies of languages other than English, the predominant language utilised within research, may be overlooked and thus potentially limit the scope of the review (Egger et al., 1997). Secondly, the sample size constraint implemented also posed a limitation. The exclusion of studies that did not meet the 1000 sample size criteria may have possibly excluded many relevant studies. As the COVID-19 pandemic is ongoing, the mental health effects are not fully characterised and are transforming as more literature is being published. In light of this information, this review was restricted to papers published before August 2021.

5. Conclusions

The COVID-19 pandemic has been shown to have significantly contributed to worse anxiety in all populations studied. Those most exposed to infection, such as healthcare workers, are at risk of succumbing to immense mental pressure. If this is not remedied, a multitude of issues will arise as a healthy state of mind is vital to the success of society (Prince et al., 2007). Without addressing the high rates of anxiety, we may see the breakdown of healthcare systems struggling to cope, a general population havocked by economic and personal strain and university students, the professionals of the future, being inflicted with mental anguish. Further longitudinal study is required to better understanding the factors and associations contributing to anxiety during pandemics and will help guide such future outbreaks as well as prepare for emergency situations, this is critical for success in the future.

Funding: This research was completed as part of an honours project for HS to which SL was primary supervisor. This study was funded by the University of Technology Sydney.

Author Contributions: Developed the study question (S. L.), developed the protocol (H. S, S. L, A. E, N. N, A. M. S.), conducted the literature search (H. S.), selected the studies (H. S, A. E, S. L.) analysed the data and interpreted the findings (H. S.), drafted the manuscript for submission (H. S, N. N, A. M. S, S. L, A. E.). The final manuscript was approved by all authors before submission.

Conflicts of Interest: All authors declare no conflicts of interest.

Acknowledgments: The researchers acknowledge the University of Technology Sydney as well as the Neuroscience Research unit and School of Life Sciences.

References

1. ABS. (2020). *Labour Force, Australia* Australian Bureau of Statistics. Retrieved 3/9/21 from https://www.abs.gov.au/statistics/labour/employment-and-unemployment/labour-force-australia/jul-2020
2. Aharon, A. A., Dubovi, I., & Ruban, A. (2021). Differences in mental health and health-related quality of life between the Israeli and Italian population during a COVID-19 quarantine. *Quality of life research : an international journal of quality of life aspects of treatment, care and rehabilitation*, *30*(6), 1675-1684. https://doi.org/https://dx.doi.org/10.1007/s11136-020-02746-5
3. AIHW. (2021). *COVID-19 Impact on Mental Health*. Australian Institute of Health and Welfare. Retrieved 2/10/21 from https://www.aihw.gov.au/reports/mental-health-services/mental-health-services-in-australia/report-contents/mental-health-impact-of-covid-19
4. Albagmi, F. M., AlNujaidi, H. Y., & Al Shawan, D. S. (2021). Anxiety Levels Amid the COVID-19 Lockdown in Saudi Arabia. *International journal of general medicine*, *14*, 2161-2170. https://doi.org/https://dx.doi.org/10.2147/IJGM.S312465
5. Alemany-Arrebola, I., Rojas-Ruiz, G., Granda-Vera, J., & Mingorance-Estrada, Á. C. (2020). Influence of COVID-19 on the Perception of Academic Self-Efficacy, State Anxiety, and Trait Anxiety in College Students. *Frontiers in psychology*, *11*, 570017-570017. https://doi.org/10.3389/fpsyg.2020.570017
6. Alimohamadi, Y., Taghdir, M., & Sepandi, M. (2020). Estimate of the Basic Reproduction Number for COVID-19: A Systematic Review and Meta-analysis. *Journal of Preventive Medicine and Public Health*, *53*(3), 151-157. https://doi.org/10.3961/jpmph.20.076
7. Allen, R., Jerrim, J., & Sims, S. (2020). How did the early stages of the COVID-19 pandemic affect teacher wellbeing. *Centre for Education Policy and Equalising Opportunities (CEPEO) Working Paper*(20-15), 20-15.
8. Alshekaili, M., Hassan, W., Al Said, N., Al Sulaimani, F., Jayapal, S. K., Al-Mawali, A., Chan, M. F., Mahadevan, S., & Al-Adawi, S. (2020). Factors associated with mental health outcomes across healthcare settings in Oman during COVID-19: frontline versus non-frontline healthcare workers. *BMJ open*, *10*(10), e042030. https://doi.org/https://dx.doi.org/10.1136/bmjopen-2020-042030
9. Antonijevic, J., Binic, I., Zikic, O., Manojlovic, S., Tosic-Golubovic, S., & Popovic, N. (2020). Mental health of medical personnel during the COVID-19 pandemic. *Brain and behavior*, *10*(12), e01881. https://doi.org/https://dx.doi.org/10.1002/brb3.1881
10. Arslan, G., Yıldırım, M., & Aytaç, M. (2020). Subjective vitality and loneliness explain how coronavirus anxiety increases rumination among college students. *Death Studies*, 1-10. https://doi.org/10.1080/07481187.2020.1824204
11. Batterham, P. J., Calear, A. L., McCallum, S. M., Morse, A. R., Banfield, M., Farrer, L. M., Gulliver, A., Cherbuin, N., Rodney Harris, R. M., Shou, Y., & Dawel, A. (2021). Trajectories of depression and anxiety symptoms during the COVID-19 pandemic in a representative Australian adult cohort. *The Medical journal of Australia*, *214*(10), 462-468. https://doi.org/https://dx.doi.org/10.5694/mja2.51043 (Comment in: Med J Aust. 2021 Jun;214(10):460-461; PMID: 33977529 [https://www.ncbi.nlm.nih.gov/pubmed/33977529])
12. Bendau, A., Plag, J., Kunas, S., Wyka, S., Strohle, A., & Petzold, M. B. (2021). Longitudinal changes in anxiety and psychological distress, and associated risk and protective factors during the first three months of the COVID-19 pandemic in Germany. *Brain and behavior*, *11*(2), e01964. https://doi.org/https://dx.doi.org/10.1002/brb3.1964
13. Bohlken, J., Kostev, K., Riedel-Heller, S., Hoffmann, W., & Michalowsky, B. (2021). Effect of the COVID-19 pandemic on stress, anxiety, and depressive disorders in German primary care: A cross-sectional study. *Journal of psychiatric research*, *143*, 43-49. https://doi.org/https://doi.org/10.1016/j.jpsychires.2021.08.016
14. Bonanad, C., García-Blas, S., Tarazona-Santabalbina, F., Sanchis, J., Bertomeu-González, V., Fácila, L., Ariza, A., Núñez, J., & Cordero, A. (2020). The Effect of Age on Mortality in Patients With COVID-19: A Meta-Analysis With 611,583 Subjects. *Journal of the American Medical Directors Association*, *21*(7), 915-918. https://doi.org/10.1016/j.jamda.2020.05.045
15. Budimir, S., Pieh, C., Dale, R., & Probst, T. (2021). Severe Mental Health Symptoms during COVID-19: A Comparison of the United Kingdom and Austria. *Healthcare (Basel, Switzerland)*, *9*(2). https://doi.org/https://dx.doi.org/10.3390/healthcare9020191
16. Cai, Q., Feng, H., Huang, J., Wang, M., Wang, Q., Lu, X., Xie, Y., Wang, X., Liu, Z., Hou, B., Ouyang, K., Pan, J., Li, Q., Fu, B., Deng, Y., & Liu, Y. (2020). The mental health of frontline and non-frontline medical workers during the coronavirus disease 2019 (COVID-19) outbreak in China: A case-control study. *Journal of Affective Disorders*, *275*, 210-215. https://doi.org/https://dx.doi.org/10.1016/j.jad.2020.06.031
17. Canet-Juric, L., Andres, M. L., Del Valle, M., Lopez-Morales, H., Poo, F., Galli, J. I., Yerro, M., & Urquijo, S. (2020). A Longitudinal Study on the Emotional Impact Cause by the COVID-19 Pandemic Quarantine on General Population. *Frontiers in psychology*, *11*, 565688. https://doi.org/https://dx.doi.org/10.3389/fpsyg.2020.565688

18. Cao, W., Fang, Z., Hou, G., Han, M., Xu, X., Dong, J., & Zheng, J. (2020). The psychological impact of the COVID-19 epidemic on college students in China. *Psychiatry research*, *287*, 112934. https://doi.org/https://dx.doi.org/10.1016/j.psychres.2020.112934
19. Chatmon, B. N. (2020). Males and Mental Health Stigma. *American Journal of Men's Health*, *14*(4), 155798832094932. https://doi.org/10.1177/1557988320949322
20. Chen, L., Zhao, H., Razin, D., Song, T., Wu, Y., Ma, X., HuerxidaAji, Wang, G., Wang, M., & Yan, L. (2021a). Anxiety levels during a second local COVID-19 pandemic breakout among quarantined people: A cross sectional survey in China. *Journal of psychiatric research*, *135*, 37-46. https://doi.org/https://dx.doi.org/10.1016/j.jpsychires.2020.12.067
21. Chen, R., Chou, K.-R., Huang, Y.-J., Wang, T.-S., Liu, S.-Y., & Ho, L.-Y. (2006). Effects of a SARS prevention programme in Taiwan on nursing staff's anxiety, depression and sleep quality: A longitudinal survey. *International Journal of Nursing Studies*, *43*(2), 215-225. https://doi.org/10.1016/j.ijnurstu.2005.03.006
22. Cheng, C., & Cheung, M. W. L. (2005). Psychological responses to outbreak of severe acute respiratory syndrome: a prospective, multiple time-point study. *Journal of personality*, *73*(1), 261-285. http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=med6&NEWS=N&AN=15660679
23. Chew, N. W. S., Ngiam, J. N., Tan, B. Y.-Q., Tham, S.-M., Tan, C. Y.-S., Jing, M., Sagayanathan, R., Chen, J. T., Wong, L. Y. H., Ahmad, A., Khan, F. A., Marmin, M., Hassan, F. B., Sharon, T. M.-L., Lim, C. H., Mohaini, M. I. B., Danuaji, R., Nguyen, T. H., Tsivgoulis, G., Tsiodras, S., Fragkou, P. C., Dimopoulou, D., Sharma, A. K., Shah, K., Patel, B., Sharma, S., Komalkumar, R. N., Meenakshi, R. V., Talati, S., Teoh, H. L., Ho, C. S., Ho, R. C., & Sharma, V. K. (2020). Asian-Pacific perspective on the psychological well-being of healthcare workers during the evolution of the COVID-19 pandemic. *BJPsych open*, *6*(6), e116. https://doi.org/https://dx.doi.org/10.1192/bjo.2020.98
24. Daly, M., Sutin, A. R., & Robinson, E. (2020). Longitudinal changes in mental health and the COVID-19 pandemic: evidence from the UK Household Longitudinal Study. *Psychological medicine*, 1-10. https://doi.org/10.1017/s0033291720004432
25. Dawel, A., Shou, Y., Smithson, M., Cherbuin, N., Banfield, M., Calear, A. L., Farrer, L. M., Gray, D., Gulliver, A., Housen, T., McCallum, S. M., Morse, A. R., Murray, K., Newman, E., Rodney Harris, R. M., & Batterham, P. J. (2020). The Effect of COVID-19 on Mental Health and Wellbeing in a Representative Sample of Australian Adults. *Frontiers in psychiatry*, *11*, 579985. https://doi.org/https://dx.doi.org/10.3389/fpsyt.2020.579985 (Erratum in: Front Psychiatry. 2021 Jan 21;11:619331; PMID: 33551879 [https://www.ncbi.nlm.nih.gov/pubmed/33551879])
26. Denning, M., Goh, E. T., Tan, B., Kanneganti, A., Almonte, M., Scott, A., Martin, G., Clarke, J., Sounderajah, V., Markar, S., Przybylowicz, J., Chan, Y. H., Sia, C.-H., Chua, Y. X., Sim, K., Lim, L., Tan, L., Tan, M., Sharma, V., Ooi, S., Beatty, J. W., Flott, K., Mason, S., Chidambaram, S., Yalamanchili, S., Zbikowska, G., Fedorowski, J., Dykowska, G., Wells, M., Purkayastha, S., & Kinross, J. (2021). Determinants of burnout and other aspects of psychological well-being in healthcare workers during the COVID-19 pandemic: A multinational cross-sectional study. *PLOS ONE*, *16*(4). https://doi.org/10.1371/journal.pone.0238666
27. Di Giuseppe, M., Zilcha-Mano, S., Prout, T. A., Perry, J. C., Orru, G., & Conversano, C. (2020). Psychological Impact of Coronavirus Disease 2019 Among Italians During the First Week of Lockdown. *Frontiers in psychiatry*, *11*, 576597. https://doi.org/https://dx.doi.org/10.3389/fpsyt.2020.576597
28. Di Mattei, V. E., Perego, G., Milano, F., Mazzetti, M., Taranto, P., Di Pierro, R., De Panfilis, C., Madeddu, F., & Preti, E. (2021). The "Healthcare Workers' Wellbeing (Benessere Operatori)" Project: A Picture of the Mental Health Conditions of Italian Healthcare Workers during the First Wave of the COVID-19 Pandemic. *International journal of environmental research and public health*, *18*(10). https://doi.org/https://dx.doi.org/10.3390/ijerph18105267
29. Dixon-Woods, M., Fitzpatrick, R., & Roberts, K. (2001). Including qualitative research in systematic reviews: opportunities and problems. *J Eval Clin Pract*, *7*(2), 125-133. https://doi.org/10.1046/j.1365-2753.2001.00257.x
30. Drazen, J. M., Kanapathipillai, R., Campion, E. W., Rubin, E. J., Hammer, S. M., Morrissey, S., & Baden, L. R. (2014). Ebola and Quarantine. *New England Journal of Medicine*, *371*(21), 2029-2030. https://doi.org/10.1056/nejme1413139
31. Egger, M., Zellweger-Zähner, T., Schneider, M., Junker, C., Lengeler, C., & Antes, G. (1997). Language bias in randomised controlled trials published in English and German. *Lancet*, *350*(9074), 326-329. https://doi.org/10.1016/s0140-6736(97)02419-7
32. Fiorillo, A., Sampogna, G., Giallonardo, V., Del Vecchio, V., Luciano, M., Albert, U., Carmassi, C., Carra, G., Cirulli, F., Dell'Osso, B., Nanni, M. G., Pompili, M., Sani, G., Tortorella, A., & Volpe, U. (2020). Effects of the lockdown on the mental health of the general population during the COVID-19 pandemic in Italy: Results from the COMET collaborative network. *European psychiatry : the journal of the Association of European Psychiatrists*, *63*(1), e87. https://doi.org/https://dx.doi.org/10.1192/j.eurpsy.2020.89
33. Fisher, J. R., Tran, T. D., Hammarberg, K., Sastry, J., Nguyen, H., Rowe, H., Popplestone, S., Stocker, R., Stubber, C., & Kirkman, M. (2020). Mental health of people in Australia in the first month of COVID-19

restrictions: a national survey. *The Medical journal of Australia*, *213*(10), 458-464. https://doi.org/https://dx.doi.org/10.5694/mja2.50831
34. Fu, W., Wang, C., Zou, L., Guo, Y., Lu, Z., Yan, S., & Mao, J. (2020). Psychological health, sleep quality, and coping styles to stress facing the COVID-19 in Wuhan, China. *Translational psychiatry*, *10*(1), 225. https://doi.org/https://dx.doi.org/10.1038/s41398-020-00913-3
35. Fu, W., Yan, S., Zong, Q., Anderson-Luxford, D., Song, X., Lv, Z., & Lv, C. (2021). Mental health of college students during the COVID-19 epidemic in China. *Journal of Affective Disorders*, *280*(Pt A), 7-10. https://doi.org/https://dx.doi.org/10.1016/j.jad.2020.11.032
36. Gainer, D. M., Nahhas, R. W., Bhatt, N. V., Merrill, A., & McCormack, J. (2021). Association Between Proportion of Workday Treating COVID-19 and Depression, Anxiety, and PTSD Outcomes in US Physicians. *Journal of occupational and environmental medicine*, *63*(2), 89-97. https://doi.org/https://dx.doi.org/10.1097/JOM.0000000000002086
37. Garcia-Fernandez, L., Romero-Ferreiro, V., Lopez-Roldan, P. D., Padilla, S., & Rodriguez-Jimenez, R. (2020). Mental Health in Elderly Spanish People in Times of COVID-19 Outbreak. *The American journal of geriatric psychiatry : official journal of the American Association for Geriatric Psychiatry*, *28*(10), 1040-1045. https://doi.org/https://dx.doi.org/10.1016/j.jagp.2020.06.027
38. Garcia-Fernandez, L., Romero-Ferreiro, V., Padilla, S., David Lopez-Roldan, P., Monzo-Garcia, M., & Rodriguez-Jimenez, R. (2021). Gender differences in emotional response to the COVID-19 outbreak in Spain. *Brain and behavior*, *11*(1), e01934. https://doi.org/https://dx.doi.org/10.1002/brb3.1934
39. Giardino, D. L., Huck-Iriart, C., Riddick, M., & Garay, A. (2020). The endless quarantine: the impact of the COVID-19 outbreak on healthcare workers after three months of mandatory social isolation in Argentina. *Sleep medicine*, *76*, 16-25. https://doi.org/https://dx.doi.org/10.1016/j.sleep.2020.09.022
40. Goularte, J. F., Serafim, S. D., Colombo, R., Hogg, B., Caldieraro, M. A., & Rosa, A. R. (2021). COVID-19 and mental health in Brazil: Psychiatric symptoms in the general population. *Journal of psychiatric research*, *132*, 32-37. https://doi.org/10.1016/j.jpsychires.2020.09.021
41. Gundogmus, I., Unsal, C., Bolu, A., Takmaz, T., Okten, S. B., Aydin, M. B., Ucar, H., Gunduz, A., & Kul, A. T. (2021). The comparison of anxiety, depression and stress symptoms levels of healthcare workers between the first and second COVID-19 peaks. *Psychiatry research*, *301*, 113976. https://doi.org/https://dx.doi.org/10.1016/j.psychres.2021.113976
42. Hacimusalar, Y., Kahve, A. C., Yasar, A. B., & Aydin, M. S. (2020). Anxiety and hopelessness levels in COVID-19 pandemic: A comparative study of healthcare professionals and other community sample in Turkey. *Journal of psychiatric research*, *129*, 181-188. https://doi.org/https://dx.doi.org/10.1016/j.jpsychires.2020.07.024
43. Halperin, S. J., Henderson, M. N., Prenner, S., & Grauer, J. N. (2021). Prevalence of Anxiety and Depression Among Medical Students During the Covid-19 Pandemic: A Cross-Sectional Study. *Journal of medical education and curricular development*, *8*, 2382120521991150. https://doi.org/https://dx.doi.org/10.1177/2382120521991150
44. Hassannia, L., Taghizadeh, F., Moosazadeh, M., Zarghami, M., Taghizadeh, H., Dooki, A. F., Fathi, M., Alizadeh-Navaei, R., Hedayatizadeh-Omran, A., & Dehghan, N. (2021). Anxiety and Depression in Health Workers and General Population During COVID-19 in IRAN: A Cross-Sectional Study. *Neuropsychopharmacology reports*, *41*(1), 40-49. https://doi.org/https://dx.doi.org/10.1002/npr2.12153
45. He, Q., Ren, J., Wang, G., Zhang, J., Xiang, J., & He, D. (2021). Psychological effects of the COVID-19 outbreak on nurses working in tertiary women's and children's hospitals from Sichuan, China: A cross-sectional study. *International journal of disaster risk reduction : IJDRR*, *58*, 102188. https://doi.org/https://dx.doi.org/10.1016/j.ijdrr.2021.102188
46. Hennein, R., Mew, E. J., & Lowe, S. R. (2021). Socio-ecological predictors of mental health outcomes among healthcare workers during the COVID-19 pandemic in the United States. *PLOS ONE*, *16*(2), e0246602. https://doi.org/https://dx.doi.org/10.1371/journal.pone.0246602
47. Hou, F., Bi, F., Jiao, R., Luo, D., & Song, K. (2020). Gender differences of depression and anxiety among social media users during the COVID-19 outbreak in China:a cross-sectional study. *BMC public health*, *20*(1). https://doi.org/10.1186/s12889-020-09738-7
48. Huang, H. L., Chen, R. C., Teo, I., Chaudhry, I., Heng, A. L., Zhuang, K. D., Tan, H. K., & Tan, B. S. (2021). A survey of anxiety and burnout in the radiology workforce of a tertiary hospital during the COVID-19 pandemic. *Journal of medical imaging and radiation oncology*, *65*(2), 139-145. https://doi.org/https://dx.doi.org/10.1111/1754-9485.13152
49. Huang, J., Liu, F., Teng, Z., Chen, J., Zhao, J., Wang, X., Wu, Y., Xiao, J., Wang, Y., & Wu, R. (2020). Public behavior change, perceptions, depression, and anxiety in relation to the COVID-19 outbreak. *Open Forum Infectious Diseases*. https://doi.org/10.1093/ofid/ofaa273
50. IslamI, M. S., Sujan, M. S. H., Tasnim, R., Sikder, M. T., Potenza, M. N., & van Os, J. (2020). Psychological responses during the COVID-19 outbreak among university students in Bangladesh. *PLOS ONE*, *15*(12).

https://www.lib.uts.edu.au/goto?url=http://search.ebscohost.com/login.aspx?direct=true&db=psyh&AN=2021-09376-001&site=ehost-live
51. saiful@phiju.edu.bd
52. Jacques-Avino, C., Lopez-Jimenez, T., Medina-Perucha, L., de Bont, J., Goncalves, A. Q., Duarte-Salles, T., & Berenguera, A. (2020). Gender-based approach on the social impact and mental health in Spain during COVID-19 lockdown: a cross-sectional study. *BMJ open*, *10*(11), e044617. https://doi.org/https://dx.doi.org/10.1136/bmjopen-2020-044617
53. Jia, R., Ayling, K., Chalder, T., Massey, A., Broadbent, E., Coupland, C., & Vedhara, K. (2020). Mental health in the UK during the COVID-19 pandemic: cross-sectional analyses from a community cohort study. *BMJ open*, *10*(9), e040620. https://doi.org/https://dx.doi.org/10.1136/bmjopen-2020-040620
54. Jiang, W., Liu, X., Zhang, J., & Feng, Z. (2020). Mental health status of Chinese residents during the COVID-19 epidemic. *BMC psychiatry*, *20*(1), 580. https://doi.org/https://dx.doi.org/10.1186/s12888-020-02966-6
55. Johns, G., Samuel, V., Freemantle, L., Lewis, J., & Waddington, L. (2022). The global prevalence of depression and anxiety among doctors during the covid-19 pandemic: Systematic review and meta-analysis. *Journal of Affective Disorders*, *298*, 431-441. https://doi.org/https://doi.org/10.1016/j.jad.2021.11.026
56. Johnson, M. S., Skjerdingstad, N., Ebrahimi, O. V., Hoffart, A., & Urnes Johnson, S. (2021). Mechanisms of parental distress during and after the first COVID-19 lockdown phase: A two-wave longitudinal study. *PLOS ONE*, *16*(6), e0253087. https://doi.org/https://dx.doi.org/10.1371/journal.pone.0253087
57. Kantor, B. N., & Kantor, J. (2020). Mental Health Outcomes and Associations During the COVID-19 Pandemic: A Cross-Sectional Population-Based Study in the United States. *Frontiers in psychiatry*, *11*, 569083. https://doi.org/https://dx.doi.org/10.3389/fpsyt.2020.569083
58. Karaivazoglou, K., Konstantopoulou, G., Kalogeropoulou, M., Iliou, T., Vorvolakos, T., Assimakopoulos, K., Gourzis, P., & Alexopoulos, P. (2021). Psychological distress in the Greek general population during the first COVID-19 lockdown. *BJPsych open*, *7*(2), e59. https://doi.org/https://dx.doi.org/10.1192/bjo.2021.17
59. Khademi, F., Moayedi, S., Golitaleb, M., & Karbalaie, N. (2021). The COVID-19 pandemic and death anxiety in the elderly. *International Journal of Mental Health Nursing*, *30*(1), 346-349. https://doi.org/10.1111/inm.12824
60. Kharroubi, S., & Saleh, F. (2020). Are Lockdown Measures Effective Against COVID-19? [Perspective]. *Frontiers in Public Health*, *8*(610). https://doi.org/10.3389/fpubh.2020.549692
61. Khubchandani, J., Sharma, S., Webb, F. J., Wiblishauser, M. J., & Bowman, S. L. (2021). Post-lockdown depression and anxiety in the USA during the COVID-19 pandemic. *Journal of public health (Oxford, England)*, *43*(2), 246-253. https://doi.org/https://dx.doi.org/10.1093/pubmed/fdaa250
62. Kim, H., Rackoff, G. N., Zainal, N. H., Schwob, J. T., Newman, M. G., Fitzsimmons-Craft, E. E., Wilfley, D. E., Shin, K. E., Eisenberg, D., & Taylor, C. B. (2021a). College Mental Health Before and During the COVID-19 Pandemic: Results From a Nationwide Survey. *Cognitive Therapy and Research*. https://doi.org/http://dx.doi.org/10.1007/s10608-021-10241-5
63. Korkmaz, S., Kazgan, A., Çekiç, S., Tartar, A. S., Balcı, H. N., & Atmaca, M. (2020). The anxiety levels, quality of sleep and life and problem-solving skills in healthcare workers employed in COVID-19 services. *Journal of Clinical Neuroscience*, *80*, 131-136. https://doi.org/10.1016/j.jocn.2020.07.073
64. Lai, J., Ma, S., Wang, Y., Cai, Z., Hu, J., Wei, N., Wu, J., Du, H., Chen, T., Li, R., Tan, H., Kang, L., Yao, L., Huang, M., Wang, H., Wang, G., Liu, Z., & Hu, S. (2020). Factors Associated With Mental Health Outcomes Among Health Care Workers Exposed to Coronavirus Disease 2019. *JAMA network open*, *3*(3), e203976. https://doi.org/https://dx.doi.org/10.1001/jamanetworkopen.2020.3976 (Comment in: JAMA Netw Open. 2020 Mar 2;3(3):e204006; PMID: 32202641 [https://www.ncbi.nlm.nih.gov/pubmed/32202641]Comment in: Postgrad Med J. 2020 Jul;96(1137):425; PMID: 32345755 [https://www.ncbi.nlm.nih.gov/pubmed/32345755]Comment in: Psychiatry Res. 2020 Jul;289:113053; PMID: 32388173 [https://www.ncbi.nlm.nih.gov/pubmed/32388173]Comment in: JAMA Netw Open. 2020 Jun 1;3(6):e2010705; PMID: 32478846 [https://www.ncbi.nlm.nih.gov/pubmed/32478846]Comment in: Qual Manag Health Care. 2021 Jan/Mar 01;30(1):78-79; PMID: 33230000 [https://www.ncbi.nlm.nih.gov/pubmed/33230000])
65. Lancee, W. J., Maunder, R. G., & Goldbloom, D. S. (2008). Prevalence of Psychiatric Disorders Among Toronto Hospital Workers One to Two Years After the SARS Outbreak. *Psychiatric Services*, *59*(1), 91-95. https://doi.org/10.1176/ps.2008.59.1.91
66. Lee, A. M., Wong, J. G., McAlonan, G. M., Cheung, V., Cheung, C., Sham, P. C., Chu, C.-M., Wong, P.-C., Tsang, K. W., & Chua, S. E. (2007a). Stress and Psychological Distress among SARS Survivors 1 Year after the Outbreak. *The Canadian Journal of Psychiatry*, *52*(4), 233-240. https://doi.org/10.1177/070674370705200405
67. Lee, A. M., Wong, J. G. W. S., McAlonan, G. M., Cheung, V., Cheung, C., Sham, P. C., Chu, C.-M., Wong, P.-C., Tsang, K. W. T., & Chua, S. E. (2007b). Stress and psychological distress among SARS survivors 1 year after the outbreak. *Canadian journal of psychiatry. Revue canadienne de psychiatrie*, *52*(4), 233-240. http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=med6&NEWS=N&AN=17500304

68. Lehmann, M., Bruenahl, C. A., Addo, M. M., Becker, S., Schmiedel, S., Lohse, A. W., Schramm, C., & Lowe, B. (2016). Acute Ebola virus disease patient treatment and health-related quality of life in health care professionals: A controlled study. *Journal of psychosomatic research*, *83*, 69-74. https://doi.org/https://dx.doi.org/10.1016/j.jpsychores.2015.09.002
69. Lei, L., Huang, X., Zhang, S., Yang, J., Yang, L., & Xu, M. (2020). Comparison of Prevalence and Associated Factors of Anxiety and Depression Among People Affected by versus People Unaffected by Quarantine During the COVID-19 Epidemic in Southwestern China. *Medical science monitor : international medical journal of experimental and clinical research*, *26*, e924609. https://doi.org/https://dx.doi.org/10.12659/MSM.924609
70. Li, Q., Miao, Y., Zeng, X., Tarimo, C. S., Wu, C., & Wu, J. (2020b). Prevalence and factors for anxiety during the coronavirus disease 2019 (COVID-19) epidemic among the teachers in China. *Journal of Affective Disorders*, *277*, 153-158. https://doi.org/https://dx.doi.org/10.1016/j.jad.2020.08.017
71. Li, W. W., Li, Y., Yu, H., Miller, D. J., Rouen, C., & Yang, F. (2021). Mental Health of Chinese People During the COVID-19 Pandemic: Associations With Infection Severity of Region of Residence and Filial Piety. *Frontiers in psychology*, *12*, 633452. https://doi.org/https://dx.doi.org/10.3389/fpsyg.2021.633452
72. Liu, C.-Y., Yang, Y.-Z., Zhang, X.-M., Xu, X., Dou, Q.-L., Zhang, W.-W., & Cheng, A. S. K. (2020a). The prevalence and influencing factors in anxiety in medical workers fighting COVID-19 in China: a cross-sectional survey. *Epidemiology and Infection*, *148*, 1-17. https://doi.org/10.1017/s0950268820001107
73. Liu, Y., Chen, H., Zhang, N., Wang, X., Fan, Q., Zhang, Y., Huang, L., Hu, B., & Li, M. (2021). Anxiety and depression symptoms of medical staff under COVID-19 epidemic in China. *Journal of Affective Disorders*, *278*, 144-148. https://doi.org/https://dx.doi.org/10.1016/j.jad.2020.09.004
74. Liu, Y., Wang, L., Chen, L., Zhang, X., Bao, L., & Shi, Y. (2020b). Mental Health Status of Paediatric Medical Workers in China During the COVID-19 Outbreak. *Frontiers in psychiatry*, *11*, 702. https://doi.org/https://dx.doi.org/10.3389/fpsyt.2020.00702
75. Locatelli, I., Trächsel, B., & Rousson, V. (2021). Estimating the basic reproduction number for COVID-19 in Western Europe. *PLOS ONE*, *16*(3), e0248731-e0248731. https://doi.org/10.1371/journal.pone.0248731
76. Lu, P., Li, X., Lu, L., & Zhang, Y. (2020a). The psychological states of people after Wuhan eased the lockdown. *PLOS ONE*, *15*(11). https://doi.org/10.1371/journal.pone.0241173
77. Lu, W., Wang, H., Lin, Y., & Li, L. (2020b). Psychological status of medical workforce during the COVID-19 pandemic: A cross-sectional study. *Psychiatry research*, *288*, 112936. https://doi.org/https://dx.doi.org/10.1016/j.psychres.2020.112936
78. Luceno-Moreno, L., Talavera-Velasco, B., Garcia-Albuerne, Y., & Martin-Garcia, J. (2020). Symptoms of Posttraumatic Stress, Anxiety, Depression, Levels of Resilience and Burnout in Spanish Health Personnel during the COVID-19 Pandemic. *International journal of environmental research and public health*, *17*(15). https://doi.org/https://dx.doi.org/10.3390/ijerph17155514
79. Mak, I. W. C., Chu, C. M., Pan, P. C., Yiu, M. G. C., & Chan, V. L. (2009). Long-term psychiatric morbidities among SARS survivors. *General Hospital Psychiatry*, *31*(4), 318-326. https://doi.org/10.1016/j.genhosppsych.2009.03.001
80. Mattila, E., Peltokoski, J., Neva, M. H., Kaunonen, M., Helminen, M., & Parkkila, A.-K. (2021). COVID-19: anxiety among hospital staff and associated factors. *Annals of medicine*, *53*(1), 237-246. https://doi.org/https://dx.doi.org/10.1080/07853890.2020.1862905
81. Meesala, N., Harsha, G., Kandikatla, P., Karteekvarma, P. V., Nadakuditi, S. R., & Kakaraparthi, S. K. (2020). Measuring the impact of COVID-19 on mental health as a preliminary procedure in primary care provision: A cross-sectional study using COVID-19 anxiety scale. *Journal of family medicine and primary care*, *9*(11), 5554-5558. https://doi.org/https://dx.doi.org/10.4103/jfmpc.jfmpc_1244_20
82. Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. *PLoS Medicine*, *6*(7), e1000097. https://doi.org/10.1371/journal.pmed.1000097
83. Mosheva, M., Hertz-Palmor, N., Dorman Ilan, S., Matalon, N., Pessach, I. M., Afek, A., Ziv, A., Kreiss, Y., Gross, R., & Gothelf, D. (2020). Anxiety, pandemic-related stress and resilience among physicians during the COVID-19 pandemic. *Depression and anxiety*, *37*(10), 965-971. https://doi.org/https://dx.doi.org/10.1002/da.23085
84. Munn, Z., Tufanaru, C., & Aromataris, E. (2014). JBI's Systematic Reviews: Data Extraction and Synthesis. *AJN The American Journal of Nursing*, *114*(7). https://journals.lww.com/ajnonline/Fulltext/2014/07000/JBI_s_Systematic_Reviews__Data_Extraction_and.28.aspx
85. Nagasu, M., Muto, K., & Yamamoto, I. (2021). Impacts of anxiety and socioeconomic factors on mental health in the early phases of the COVID-19 pandemic in the general population in Japan: A web-based survey. *PLOS ONE*, *16*(3), e0247705. https://doi.org/10.1371/journal.pone.0247705
86. Ngoc Cong Duong, K., Nguyen Le Bao, T., Thi Lan Nguyen, P., Vo Van, T., Phung Lam, T., Pham Gia, A., Anuratpanich, L., & Vo Van, B. (2020). Psychological Impacts of COVID-19 During the First Nationwide Lockdown in Vietnam: Web-Based, Cross-Sectional Survey Study. *JMIR formative research*, *4*(12), e24776.

https://doi.org/https://dx.doi.org/10.2196/24776 (Erratum in: JMIR Form Res. 2021 Mar 5;5(3):e28357; PMID: 33667175 [https://www.ncbi.nlm.nih.gov/pubmed/33667175])
87. Nicola, M., Alsafi, Z., Sohrabi, C., Kerwan, A., Al-Jabir, A., Iosifidis, C., Agha, M., & Agha, R. (2020). The socio-economic implications of the coronavirus pandemic (COVID-19): A review. *Int J Surg*, *78*, 185-193. https://doi.org/10.1016/j.ijsu.2020.04.018
88. Nikčević, A. V., Marino, C., Kolubinski, D. C., Leach, D., & Spada, M. M. (2021). Modelling the contribution of the Big Five personality traits, health anxiety, and COVID-19 psychological distress to generalised anxiety and depressive symptoms during the COVID-19 pandemic. *Journal of Affective Disorders*, *279*, 578-584. https://doi.org/10.1016/j.jad.2020.10.053
89. Nkire, N., Mrklas, K., Hrabok, M., Gusnowski, A., Vuong, W., Surood, S., Abba-Aji, A., Urichuk, L., Cao, B., Greenshaw, A. J., & Agyapong, V. I. O. (2021). COVID-19 Pandemic: Demographic Predictors of Self-Isolation or Self-Quarantine and Impact of Isolation and Quarantine on Perceived Stress, Anxiety, and Depression. *Frontiers in psychiatry*, *12*, 553468. https://doi.org/https://dx.doi.org/10.3389/fpsyt.2021.553468
90. Odriozola-Gonzalez, P., Planchuelo-Gomez, A., Irurtia, M. J., & de Luis-Garcia, R. (2020). Psychological effects of the COVID-19 outbreak and lockdown among students and workers of a Spanish university. *Psychiatry research*, *290*, 113108. https://doi.org/https://dx.doi.org/10.1016/j.psychres.2020.113108
91. Ozamiz-Etxebarria, N., Berasategi Santxo, N., Idoiaga Mondragon, N., & Dosil Santamaria, M. (2020b). The Psychological State of Teachers During the COVID-19 Crisis: The Challenge of Returning to Face-to-Face Teaching. *Frontiers in psychology*, *11*, 620718. https://doi.org/https://dx.doi.org/10.3389/fpsyg.2020.620718
92. Ozamiz-Etxebarria, N., Idoiaga Mondragon, N., Dosil Santamaria, M., & Picaza Gorrotxategi, M. (2020a). Psychological Symptoms During the Two Stages of Lockdown in Response to the COVID-19 Outbreak: An Investigation in a Sample of Citizens in Northern Spain. *Frontiers in psychology*, *11*, 1491. https://doi.org/https://dx.doi.org/10.3389/fpsyg.2020.01491 (Erratum in: Front Psychol. 2020 Sep 01;11:2116; PMID: 32982865 [https://www.ncbi.nlm.nih.gov/pubmed/32982865])
93. Özdin, S., & Bayrak Özdin, Ş. (2020). Levels and predictors of anxiety, depression and health anxiety during COVID-19 pandemic in Turkish society: The importance of gender. *International Journal of Social Psychiatry*, *66*(5), 504-511. https://doi.org/10.1177/0020764020927051
94. Pandey, D., Bansal, S., Goyal, S., Garg, A., Sethi, N., Pothiyill, D. I., Sreelakshmi, E. S., Sayyad, M. G., & Sethi, R. (2020). Psychological impact of mass quarantine on population during pandemics-The COVID-19 Lock-Down (COLD) study. *PLOS ONE*, *15*(10), e0240501. https://doi.org/https://dx.doi.org/10.1371/journal.pone.0240501
95. Pappa, S., Ntella, V., Giannakas, T., Giannakoulis, V. G., Papoutsi, E., & Katsaounou, P. (2020). Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: A systematic review and meta-analysis. *Brain, Behavior, and Immunity*, *88*, 901-907. https://doi.org/https://doi.org/10.1016/j.bbi.2020.05.026
96. Pashazadeh, F., Raoofi, S., Rafiei, S., Khani, S., Hosseinifard, H., Tajik, F., Raoofi, N., Ahmadi, S., Aghalou, S., Torabi, F., Dehnad, A., Rezaei, S., Hosseinipalangi, Z., & Ghashghaee, A. (2021). A systematic review of the prevalence of anxiety among the general population during the COVID-19 pandemic. *Journal of Affective Disorders*, *293*, 391-398. https://doi.org/10.1016/j.jad.2021.06.073
97. Passavanti, M., Argentieri, A., Barbieri, D. M., Lou, B., Wijayaratna, K., Foroutan Mirhosseini, A. S., Wang, F., Naseri, S., Qamhia, I., Tangeras, M., Pelliciari, M., & Ho, C.-H. (2021). The psychological impact of COVID-19 and restrictive measures in the world. *Journal of Affective Disorders*, *283*, 36-51. https://doi.org/https://dx.doi.org/10.1016/j.jad.2021.01.020
98. Pieh, C., Budimir, S., & Probst, T. (2020). The effect of age, gender, income, work, and physical activity on mental health during coronavirus disease (COVID-19) lockdown in Austria. *Journal of psychosomatic research*, *136*, 110186. https://doi.org/https://dx.doi.org/10.1016/j.jpsychores.2020.110186 (Erratum in: J Psychosom Res. 2020 Dec;139:110278; PMID: 33075602 [https://www.ncbi.nlm.nih.gov/pubmed/33075602])
99. Pierce, M., Hope, H., Ford, T., Hatch, S., Hotopf, M., John, A., Kontopantelis, E., Webb, R., Wessely, S., McManus, S., & Abel, K. M. (2020). Mental health before and during the COVID-19 pandemic: a longitudinal probability sample survey of the UK population. *The Lancet Psychiatry*, *7*(10), 883-892. https://doi.org/10.1016/s2215-0366(20)30308-4
100. Planchuelo-Gomez, A., Odriozola-Gonzalez, P., Irurtia, M. J., & de Luis-Garcia, R. (2020). Longitudinal evaluation of the psychological impact of the COVID-19 crisis in Spain. *Journal of Affective Disorders*, *277*, 842-849. https://doi.org/https://dx.doi.org/10.1016/j.jad.2020.09.018
101. Prati, G., & Mancini, A. D. (2021). The psychological impact of COVID-19 pandemic lockdowns: a review and meta-analysis of longitudinal studies and natural experiments. *Psychological medicine*, *51*(2), 201-211. https://doi.org/10.1017/s0033291721000015
102. Prince, M., Patel, V., Saxena, S., Maj, M., Maselko, J., Phillips, M. R., & Rahman, A. (2007). No health without mental health. *The Lancet*, *370*(9590), 859-877. https://doi.org/https://doi.org/10.1016/S0140-6736(07)61238-0
103. Qian, M., Wu, Q., Wu, P., Hou, Z., Liang, Y., Cowling, B. J., & Yu, H. (2020). Anxiety levels, precautionary behaviours and public perceptions during the early phase of the COVID-19 outbreak in China: a

population-based cross-sectional survey. *BMJ open*, *10*(10), e040910. https://doi.org/10.1136/bmjopen-2020-040910

104. Rajkumar, R. P. (2020). COVID-19 and mental health: A review of the existing literature. *Asian Journal of Psychiatry*, *52*, 102066. https://doi.org/https://doi.org/10.1016/j.ajp.2020.102066
105. Ran, L., Wang, W., Ai, M., Kong, Y., Chen, J., & Kuang, L. (2020). Psychological resilience, depression, anxiety, and somatization symptoms in response to COVID-19: A study of the general population in China at the peak of its epidemic. *Social Science & Medicine*, *262*, 113261. https://doi.org/10.1016/j.socscimed.2020.113261
106. Reynolds, D. L., Garay, J. R., Deamond, S. L., Moran, M. K., Gold, W., & Styra, R. (2008). Understanding, compliance and psychological impact of the SARS quarantine experience. *Epidemiology and Infection*, *136*(7), 997-1007. https://doi.org/10.1017/S0950268807009156
107. Rizun, M., & Strzelecki, A. (2020). Students' Acceptance of the COVID-19 Impact on Shifting Higher Education to Distance Learning in Poland. *International journal of environmental research and public health*, *17*(18), 6468. https://doi.org/10.3390/ijerph17186468
108. Robb, C. E., de Jager, C. A., Ahmadi-Abhari, S., Giannakopoulou, P., Udeh-Momoh, C., McKeand, J., Price, G., Car, J., Majeed, A., Ward, H., & Middleton, L. (2020). Associations of Social Isolation with Anxiety and Depression During the Early COVID-19 Pandemic: A Survey of Older Adults in London, UK. *Frontiers in psychiatry*, *11*, 591120. https://doi.org/https://dx.doi.org/10.3389/fpsyt.2020.591120
109. Rodríguez-Rey, R., Garrido-Hernansaiz, H., & Collado, S. (2020). Psychological Impact and Associated Factors During the Initial Stage of the Coronavirus (COVID-19) Pandemic Among the General Population in Spain [Original Research]. *Frontiers in psychology*, *11*(1540). https://doi.org/10.3389/fpsyg.2020.01540
110. Rossi, R., Socci, V., Pacitti, F., Mensi, S., Di Marco, A., Siracusano, A., & Di Lorenzo, G. (2020). Mental Health Outcomes Among Healthcare Workers and the General Population During the COVID-19 in Italy. *Frontiers in psychology*, *11*, 608986. https://doi.org/https://dx.doi.org/10.3389/fpsyg.2020.608986
111. Ruengorn, C., Awiphan, R., Wongpakaran, N., Wongpakaran, T., Nochaiwong, S., Health, O., & Mental Health Care Evaluation Survey Research, G. (2021). Association of job loss, income loss, and financial burden with adverse mental health outcomes during coronavirus disease 2019 pandemic in Thailand: A nationwide cross-sectional study. *Depression and anxiety*, *38*(6), 648-660. https://doi.org/https://dx.doi.org/10.1002/da.23155
112. Santabárbara, J., Lasheras, I., Lipnicki, D. M., Bueno-Notivol, J., Pérez-Moreno, M., López-Antón, R., De La Cámara, C., Lobo, A., & Gracia-García, P. (2021). Prevalence of anxiety in the COVID-19 pandemic: An updated meta-analysis of community-based studies. *Progress in Neuro-Psychopharmacology and Biological Psychiatry*, *109*, 110207. https://doi.org/10.1016/j.pnpbp.2020.110207
113. Serafim, A. P., Duraes, R. S. S., Rocca, C. C. A., Goncalves, P. D., Saffi, F., Cappellozza, A., Paulino, M., Dumas-Diniz, R., Brissos, S., Brites, R., Alho, L., & Lotufo-Neto, F. (2021). Exploratory study on the psychological impact of COVID-19 on the general Brazilian population. *PLOS ONE*, *16*(2), e0245868. https://doi.org/https://dx.doi.org/10.1371/journal.pone.0245868
114. Setiawati, Y., Wahyuhadi, J., Joestandari, F., Maramis, M. M., & Atika, A. (2021). Anxiety and Resilience of Healthcare Workers During COVID-19 Pandemic in Indonesia. *Journal of Multidisciplinary Healthcare*, *Volume 14*, 1-8. https://doi.org/10.2147/jmdh.s276655
115. Sharma, K., Saji, J., Kumar, R., & Raju, A. (2020). Psychological and Anxiety/Depression Level Assessment among Quarantine People during Covid19 Outbreak. *Journal of Drug Delivery and Therapeutics*, *10*(3), 198-201. https://doi.org/10.22270/jddt.v10i3.4103
116. Shen, M., Xu, H., Fu, J., Wang, T., Fu, Z., Zhao, X., Zhou, G., Jin, Q., & Tong, G. (2020). Investigation of anxiety levels of 1637 healthcare workers during the epidemic of COVID-19. *PLOS ONE*, *15*(12). https://doi.org/10.1371/journal.pone.0243890
117. Shevlin, M., McBride, O., Murphy, J., Miller, J. G., Hartman, T. K., Levita, L., Mason, L., Martinez, A. P., McKay, R., Stocks, T. V. A., Bennett, K. M., Hyland, P., Karatzias, T., & Bentall, R. P. (2020). Anxiety, depression, traumatic stress and COVID-19-related anxiety in the UK general population during the COVID-19 pandemic. *BJPsych open*, *6*(6). https://doi.org/10.1192/bjo.2020.109
118. Solomou, I., & Constantinidou, F. (2020). Prevalence and Predictors of Anxiety and Depression Symptoms during the COVID-19 Pandemic and Compliance with Precautionary Measures: Age and Sex Matter. *International journal of environmental research and public health*, *17*(14). https://doi.org/https://dx.doi.org/10.3390/ijerph17144924
119. Sun, S., Goldberg, S. B., Lin, D., Qiao, S., & Operario, D. (2021). Psychiatric symptoms, risk, and protective factors among university students in quarantine during the COVID-19 pandemic in China. *Globalization and health*, *17*(1), 15. https://doi.org/https://dx.doi.org/10.1186/s12992-021-00663-x (Erratum in: Global Health. 2021 Apr 26;17(1):52; PMID: 33902637 [https://www.ncbi.nlm.nih.gov/pubmed/33902637])
120. Tang, F., Liang, J., Zhang, H., Kelifa, M. M., He, Q., & Wang, P. (2020). Covid-19 related depression and anxiety among quarantined respondents. *Psychology & Health*. https://doi.org/10.1080/08870446.2020.1782410

121. Turner, R. M., Bird, S. M., & Higgins, J. P. (2013). The impact of study size on meta-analyses: examination of underpowered studies in Cochrane reviews. *PLOS ONE*, *8*(3), e59202. https://doi.org/10.1371/journal.pone.0059202
122. van der Velden, P. G., Contino, C., Das, M., van Loon, P., & Bosmans, M. W. G. (2020). Anxiety and depression symptoms, and lack of emotional support among the general population before and during the COVID-19 pandemic. A prospective national study on prevalence and risk factors. *Journal of Affective Disorders*, *277*, 540-548. https://doi.org/https://dx.doi.org/10.1016/j.jad.2020.08.026
123. Wakui, N., Abe, S., Shirozu, S., Yamamoto, Y., Yamamura, M., Abe, Y., Murata, S., Ozawa, M., Igarashi, T., Yanagiya, T., Machida, Y., & Kikuchi, M. (2021). Causes of anxiety among teachers giving face-to-face lessons after the reopening of schools during the COVID-19 pandemic: a cross-sectional study. *BMC public health*, *21*(1), 1050. https://doi.org/10.1186/s12889-021-11130-y
124. Wang, C., Song, W., Hu, X., Yan, S., Zhang, X., Wang, X., & Chen, W. (2021a). Depressive, anxiety, and insomnia symptoms between population in quarantine and general population during the COVID-19 pandemic: a case-controlled study. *BMC psychiatry*, *21*(1), 99. https://doi.org/https://dx.doi.org/10.1186/s12888-021-03108-2
125. Wang, X., Tao, J., Zhu, Q., Wu, X., Li, T., Zhao, C., Yang, W., Wang, X., Zhang, J., & Guan, N. (2021b). Depression and anxiety symptoms to COVID-19 outbreak among the public, medical staff and patients during the initial phase of the pandemic: an online questionnaire survey by a WeChat Mini Program. *BMJ open*, *11*(6), e046350. https://doi.org/https://dx.doi.org/10.1136/bmjopen-2020-046350
126. Wanigasooriya, K., Palimar, P., Naumann, D. N., Ismail, K., Fellows, J. L., Logan, P., Thompson, C. V., Bermingham, H., Beggs, A. D., & Ismail, T. (2020). Mental health symptoms in a cohort of hospital healthcare workers following the first peak of the COVID-19 pandemic in the UK. *BJPsych open*, *7*(1), e24. https://doi.org/https://dx.doi.org/10.1192/bjo.2020.150
127. Wathelet, M., Duhem, S., Vaiva, G., Baubet, T., Habran, E., Veerapa, E., Debien, C., Molenda, S., Horn, M., Grandgenevre, P., Notredame, C.-E., & D'Hondt, F. (2020). Factors Associated With Mental Health Disorders Among University Students in France Confined During the COVID-19 Pandemic. *JAMA network open*, *3*(10), e2025591. https://doi.org/https://dx.doi.org/10.1001/jamanetworkopen.2020.25591
128. WHO. (2021). *WHO Coronavirus (COVID-19) Dashboard*. Retrieved 15/08/2021 from https://covid19.who.int/
129. Williams, N. (2014). The GAD-7 questionnaire. *Occupational Medicine*, *64*(3), 224-224. https://doi.org/10.1093/occmed/kqt161
130. Wu, M., Han, H., Lin, T., Chen, M., Wu, J., Du, X., Su, G., Wu, D., Chen, F., Zhang, Q., Zhou, H., Huang, D., Wu, B., Wu, J., & Lai, T. (2020). Prevalence and risk factors of mental distress in China during the outbreak of COVID-19: A national cross-sectional survey. *Brain and behavior*, *10*(11), e01818. https://doi.org/https://dx.doi.org/10.1002/brb3.1818
131. Wu, T., Jia, X., Shi, H., Niu, J., Yin, X., Xie, J., & Wang, X. (2021). Prevalence of mental health problems during the COVID-19 pandemic: A systematic review and meta-analysis. *Journal of Affective Disorders*, *281*, 91-98. https://doi.org/https://doi.org/10.1016/j.jad.2020.11.117
132. Yuan, L., Zhu, L., Chen, F., Cheng, Q., Yang, Q., Zhou, Z. Z., Zhu, Y., Wu, Y., Zhou, Y., & Zha, X. (2020). A Survey of Psychological Responses During the Coronavirus Disease 2019 (COVID-19) Epidemic among Chinese Police Officers in Wuhu. *Risk management and healthcare policy*, *13*, 2689-2697. https://doi.org/https://dx.doi.org/10.2147/RMHP.S269886
133. Zhan, H., Zheng, C., Zhang, X., Yang, M., Zhang, L., & Jia, X. (2021). Chinese College Students' Stress and Anxiety Levels Under COVID-19. *Frontiers in psychiatry*, *12*, 615390-615390. https://doi.org/10.3389/fpsyt.2021.615390
134. Zhang, L., Wang, S., Shen, J., Wang, Y., Huang, X., Wu, F., Zheng, X., Zeng, P., & Qiu, D. (2020a). The mental health of Chinese healthcare staff in non-epicenter of COVID-19: a cross-sectional study. *Annals of palliative medicine*, *9*(6), 4127-4136. https://doi.org/https://dx.doi.org/10.21037/apm-20-2041
135. Zhang, X.-R., Huang, Q.-M., Wang, X.-M., Cheng, X., Li, Z.-H., Wang, Z.-H., Zhong, W.-F., Liu, D., Shen, D., Chen, P.-L., Song, W.-Q., Wu, X.-B., Yang, X., & Mao, C. (2020b). Prevalence of anxiety and depression symptoms, and association with epidemic-related factors during the epidemic period of COVID-19 among 123,768 workers in China: A large cross-sectional study. *Journal of Affective Disorders*, *277*, 495-502. https://doi.org/https://dx.doi.org/10.1016/j.jad.2020.08.041
136. Zhao, H., He, X., Fan, G., Li, L., Huang, Q., Qiu, Q., Kang, Z., Du, T., Han, L., Ding, L., & Xu, H. (2020). COVID-19 infection outbreak increases anxiety level of general public in China: involved mechanisms and influencing factors. *Journal of Affective Disorders*, *276*, 446-452. https://doi.org/10.1016/j.jad.2020.07.085
137. Zhao, Y.-J., Jin, Y., Rao, W.-W., Li, W., Zhao, N., Cheung, T., Ng, C. H., Wang, Y.-Y., Zhang, Q.-E., & Xiang, Y.-T. (2021). The prevalence of psychiatric comorbidities during the SARS and COVID-19 epidemics: a systematic review and meta-analysis of observational studies. *Journal of Affective Disorders*, *287*, 145-157. https://doi.org/https://doi.org/10.1016/j.jad.2021.03.016
138. Zhou, Y., Wang, W., Sun, Y., Qian, W., Liu, Z., Wang, R., Qi, L., Yang, J., Song, X., Zhou, X., Zeng, L., Liu, T., Li, Z., & Zhang, X. (2020). The prevalence and risk factors of psychological disturbances of frontline

medical staff in china under the COVID-19 epidemic: Workload should be concerned. *Journal of Affective Disorders*, *277*, 510-514. https://doi.org/https://dx.doi.org/10.1016/j.jad.2020.08.059

139. Zilver, S. J. M., Broekman, B. F. P., Hendrix, Y. M. G. A., de Leeuw, R. A., Mentzel, S. V., van Pampus, M. G., & de Groot, C. J. M. (2021). Stress, anxiety and depression in 1466 pregnant women during and before the COVID-19 pandemic: a Dutch cohort study. *Journal of psychosomatic obstetrics and gynaecology*, *42*(2), 108-114. https://doi.org/https://dx.doi.org/10.1080/0167482X.2021.1907338