

DEPRESSION AMONG HEALTH PROFESSIONALS DURING THE COVID-19 PANDEMIC: A SYSTEMATIC REVIEW

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Contributors: LMFP, WFS, LTAM, and KSM designed this systematic review and meta-analysis. LMFP, drafted the manuscript, and KSM revised it. LMFP and KSM developed the search strategies and LMFP, WFS, and LTAM will implement it. LMFP, WFS, KSM, and LTAM will track potential studies, extract data, and assess the quality. In case of disagreement between the authors, AKG will advise on the methodology and will be the referee. AKG and KSM will complete the data synthesis. All authors have approved the final version of this manuscript.

Conflict of interest

The authors declare no conflicts of interest.

ABSTRACT

Objective: This systematic review study aims at assessing the prevalence of depression among healthcare professionals during the COVID-19 pandemic.

Introduction: Studies carried out during previous pandemics revealed an increase in the prevalence of depression among health professionals. A high prevalence of depression is also observed in some health categories, during the COVID-19 pandemic.

Inclusion criteria: Observational studies published from December 2019, without language restrictions in which the prevalence of depression among health professionals during the COVID-19 pandemic will be assessed.

Methods: PubMed, Web of Science, Embase, CINAHAL, PsycINFO, LILACS, SCOPUS, and The Cochrane Library will be searched for eligible studies. Two reviewers will independently screen and select studies, assess methodological quality, and extract data.

Results: The prevalence of depression among health professionals is notorious, and it can highlight single mothers, with children and working on the front line. But it is also worth mentioning factors that minimize the degree of depression, this happens for some reasons, being a man, educational level and performing some type of physical activity.

Conclusion: The prevalence of a higher trend prevalence in professionals in direct contact with patients with the SARS-COV-2 virus, than in times without a virus with a high infectivity power as it exists at the present time.

Systematic review registration number: CRD42020212036.

Keywords: Health Professions; Depression; Syndrome Depressive; COVID-19; SARS-Cov-2.

Introduction

During all these years diseases that devastated the world have always existed, such as the black plague, cholera, swine flu and more recently, at the end of 2019, a new severe acute respiratory syndrome (SARS-CoV-2) appeared in Wuhan, province of China, called coronavirus or covid-19. It has a high dissemination power as it is transmitted by respiratory, airborne and contact droplets, quickly worsened to a pandemic in mid-March 2020, affecting the whole world and bringing panic to the whole society¹⁻⁴.

Currently, according to the World Health Organization⁵, this new virus has already affected more than 60 million people, with the USA being the country most affected and Europe experiencing the second wave of cases in December 2020^{6,7}. Due to this great impact on the world and the introduction of strict health protection measures, such as social isolation, quarantine and wearing a mask, people had to adapt to a new way of living. In addition, health professionals were also impacted by this pandemic, developing several psychological problems.

The development of symptoms of psychological suffering originate especially from long work shifts, the precariousness of the service, the lack of inputs, the lack of appreciation of the profession, concern about transmissibility to relatives, being asymptomatic, among other factors that perpetuate the thought of the worked. As a result, high levels of stress, anxiety, depression, mental fatigue, irritability, loneliness, etc, are likely to exist in health professionals who work on the front lines to combat this virus, since they are constantly exposed to the virus^{8,9}.

Elbay et al. (2020), reports through his research that during the pandemic it was reported by health professionals that they developed symptoms of depression, being reported by more than half of the group. Finally, Song et al. (2020) expresses the importance of taking psychological intervention measures to promote the mental health of a team that works directly with the virus.

However, we have not identified a systematic review exclusively on the prevalence of depression among health professionals during a pandemic. For

this reason, this systematic review aims to uncover the real prevalence of depression among healthcare professionals during the COVID-19 pandemic.

Review questions

What is the prevalence of depression among health professionals during the COVID-19 pandemic?

Materials and methods

Protocol and registration

This systematic review is registered with the International Prospective Register of Systematic Reviews (PROSPERO) under the CRD number CRD42020212036. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA-P) guidelines were used to design this systematic review protocol and will follow the JBI methodology for systematic reviews¹².

Inclusion criteria

This systematic review protocol will included the following studies:

Participants

- Studies on healthcare professionals and the development of depression during the COVID-19 pandemic;
- Studies published from December 2019 until December 2020.

Exposure

- Health professionals involved at the frontline of combating COVID-19.

Outcome

The outcome of interest is the prevalence of depression among health professionals during the COVID-19 pandemic. The outcome must be measured after the exposure assessment, using the following scales: Patient Health Questionnaire-2 (PHQ-2); Patient Health Questionnaire-9 (PHQ-9); The Symptom Check-List-90 (SCL-90); Center for Epidemiological Scale - Depression (CES-D); Depression Anxiety Stress Scales (DASS-21), Self Rating Depression Scale (SDS); Brief Job Stress Questionnaire (BJSQ); Hospital

Anxiety Depression scale (HADS); Self-Reporting Questionnaire(SRQ-20) and Beck Depression Inventory (BDI).

Types of studies

Only specific human observational study designs was included such as: longitudinal cohort studies (prospective and retrospective), cross-sectional studies, and case-control studies. Case series and case reports was excluded due to their low level of scientific evidence. Randomized controlled trials and quasi-experiments was also be excluded because this review does not examine the role of any intervention related to depression. There was be no language restrictions when selecting studies.

Exclusion criteria

1. Case reports, case studies, letters to the editor, fact sheets, conference abstracts and review articles.
2. Studies with children and adolescents <18 years.
3. Studies that include health professionals with other medical conditions.

Information sources

A search was performed in the following databases: PubMed, Web of Science, Embase, Cumulative Index to Nursing and Allied Health Literature (CINAHAL), PsycINFO, Latin American and Caribbean Literature in Health Sciences (LILACS), SCOPUS and The Cochrane Library. Articles dated between December 2019 and December 2020 were searched. The reference lists will be examined. The search strategy is to use the subjective medical titles (MeSH) and the terms that were included in Table 1. The screening of the literature was performed by four reviewers.

Search

The terms of the MeSH will be: (Health Professions OR Health Occupation OR Health Profession OR Nurses OR Nursing Personnel OR Physicians OR Doctor OR Physiotherapist OR Physical Therapists) AND (Depressive Disorder OR Syndrome Depressive OR Depression OR Depressive Neuroses) AND (COVID-19 OR SARS-Cov-2 OR severe acute respiratory syndrome coronavirus 2 OR

Pandemics OR coronavirus disease 2019) AND (Epidemiology OR Prevalence OR Observational Study OR Longitudinal Studies OR Cross-sectional Studies OR Cohort Studies OR Case-control Studies)) (Table 1).

Study selection

Four authors, KSM, LMFP, WFS, and LTAM was selected the articles independently, using titles and abstracts. Duplicate studies was be excluded. The same authors were review the text to determine whether the studies meet the inclusion criteria. A fifth reviewer, AKG, was solve the discrepancies. The selection of the studies were be summarized in a PRISMA flow diagram (figure 1).

Data collection process

Assessment of methodological quality

The methodological quality of each included study was be assessed by two reviewers (KSM and APFC) independently. They were do so using a widely-recognized standardized critical appraisal instrument from the Joanna Briggs Institute¹³ for the following study types: cohort studies (retrospective and prospective) and case-control studies.

Synthesis of results

Several characteristics of the eligible studies were extracted, including the surnames of the first authors, year of publication, study location (country), study design, primary objective, number of patients, sex, average patient age, specialty, evaluation tools, depression(n). Standardized data extraction forms were created specifically in Excel for this review, and the results were inserted into a database. All data entries were checked twice. We was provide a narrative synthesis of the study findings.

Results and Discussion

The 68 approved studies involved 99,265 health professionals. The features of the selected studies are indicated in Table 2.

All studies were published in 2020 and most were cross-sectional studies. There are studies in various countries in the world, with prevalence in studies Chinese.

The overall depression prevalence found for all specialties was 35.1% (95% CI: 26.8% - 43.5%). This estimate was based on 68 studies.

The main comorbidities reported in articles were: respiratory disease, psychiatric disease, or history of mental disorders¹⁴, hypertension (4.8%), chronic obstructive pulmonary disease or asthma (7.1%), diabetes (2.3%), the disease that causes immunosuppression (2.1%), other diseases (eg, mental disorders, musculoskeletal diseases, and peptic ulcer) (14.2%)¹⁵. Other studies¹⁶ describe rates and other comorbidities, such as hypertension(3.8%), hyperlipidemia (3.2%), diabetes mellitus (1.4%), asthma (4.0%), eczema (4.1%), migraine (9.6%), Ischemic Heart Disease (0.4%) and stroke (0.1%) and other comorbid conditions (3.3%)¹⁷.

The main risk factors associated with the development of depression in health professionals defined in the articles were attending emergency shifts and night shifts and watching or reading COVID-19 news ≥ 2 h/day during the previous month; inadequate sleeping during the previous month; age ≤ 30 years was associated with severe to very severe forms of depression (OR 2.88, 95% CI: 1.25, 6.62) and stress (OR 2.49, 95% CI: 1.00, 6.18)¹⁸. In addition, other authors report that if the health professionals were female and less than 40 years old were more likely to experience depression¹⁹. Also, participants frontline healthcare, workers directly engaged in diagnosing, treating, or caring for patients with or suspected to have COVID-19^{19,20}; anxiety, stress, and insomnia^{18,19}.

Juan et al (2020) shows that lower-income groups were associated with a higher incidence rate of psychological distress, especially in terms of anxiety symptoms ($P = 0.028$) and depression symptoms ($P = 0.005$)²¹.

In contradiction, Liu et al (2020) show that compared with junior and intermediate workers, workers with senior job titles had higher average scores and probabilities of perceived stress and depression. And, Regarding gender and age, being a woman is positively and significantly associated with posttraumatic stress, anxiety and depression. Changing address or living with

people who are at risk is positively related to symptoms of posttraumatic stress, anxiety or depression.

Finally, having symptoms of depression is positively and significantly related to: emotional exhaustion, depersonalization, 12- or 24-h shifts or on-call hours, the number of guards per month, being very concerned that someone with whom you live may be infected, not having a family and thinking that it is very likely that you will be infected with COVID-19²³.

The protective factors for depression listed by the articles were: educational level²⁰; being male was a protective factor for depression in physicians²⁴; and, regular activity/exercise^{25,26}; engaging with faith-based religion and/or spirituality, yoga, and/or meditation; engaging with talk therapy and virtual provider support groups²⁶. Furthermore, the protective factors for depressive symptoms were receiving adequate guidance regarding COVID-19 and ensuring the use of PPE²⁷.

According to research carried out by Que et al. (2020), receiving bad news and working on the front lines to fight the virus are the main factors for the development of symptoms of psychological suffering and that due to the unbridled appearance of these symptoms they end up being treated generalized form²⁵.

Neto et al. (2020), on the other hand, provides that doctors are at their limit in relation to stress and depression, and these symptoms worsen when the patient is dying²⁸. Nurses for working directly with the patient, according to a survey by Zerbini et al (2020), are the most affected psychologically by the effects of the pandemic²⁹.

Conclusion

It is noticeable the increase in the prevalence of depression among health professionals during the pandemic. This increase is highlighted in women, frontline professionals, in the night shift, and those who have people considered to be at risk in their home life. Spirituality, physical exercise, and guidance on the use of protective equipment were considered protective factors in these professionals.

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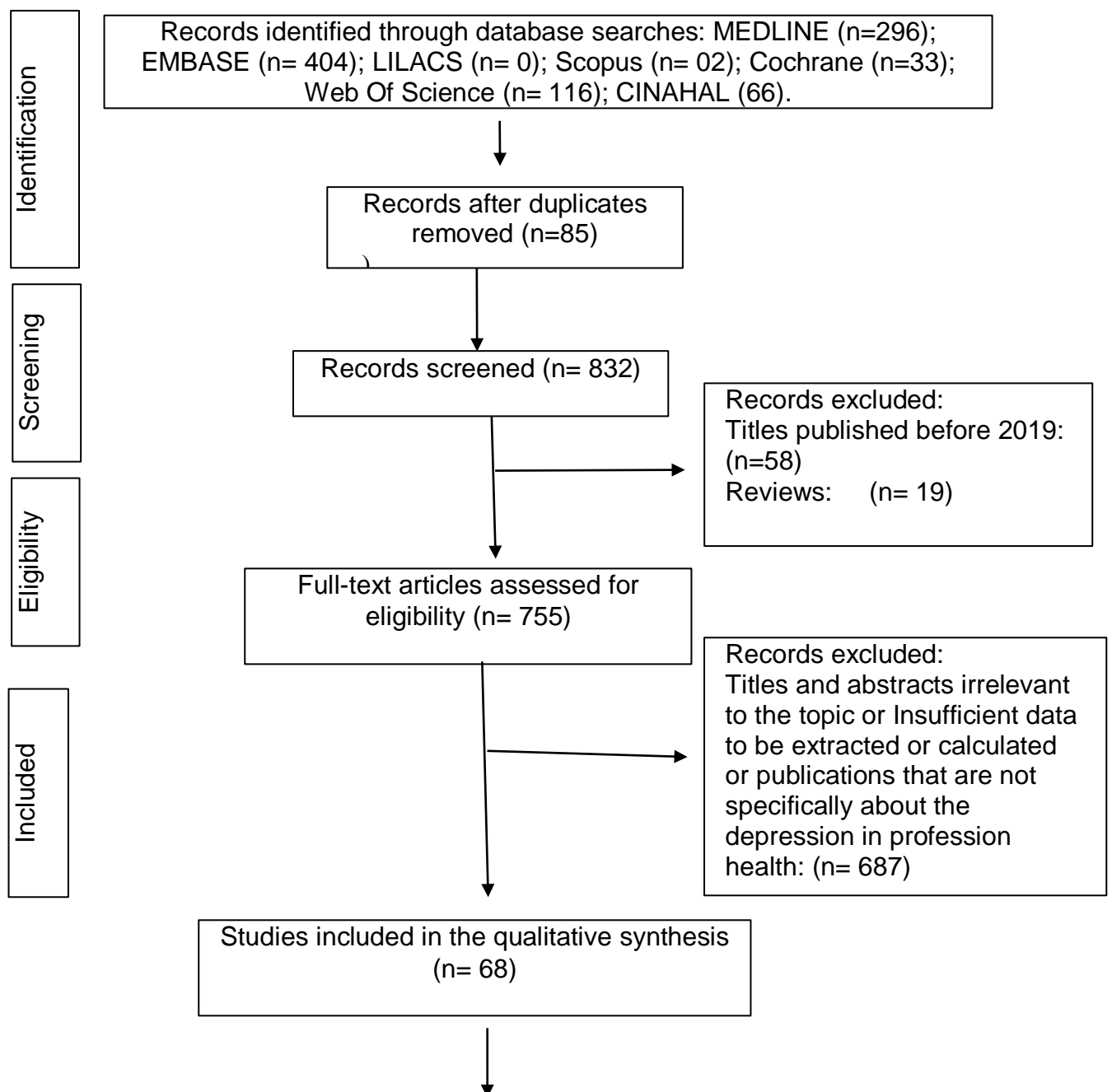
Apêndices

Table 1 **Medline search strategy**

Search items	
1	Health Professions
2	Health Occupation
3	Health Profession
4	Nurses OR Nursing Personnel
5	Physicians
6	Doctor
7	Physiotherapist
8	Physical Therapists
9	Depressive Disorder
10	Syndrome Depressive
11	Depression
12	Depressive Neuroses
13	COVID-19
14	SARS-Cov-2
15	Severe acute respiratory syndrome coronavirus 2
16	Pandemic
17	Coronavirus disease 2019
18	Epidemiology
19	Prevalence
20	Observational Study
21	Longitudinal Studies

22	Cross-sectional Studies
23	Cohort Studies
24	Case-control Studies

Table 1 Medline search strategy.



Studies included in the quantitative synthesis
(meta-analysis)
(n=)

Figure 1 Flow diagram of the search for eligible studies on the prevalence of depression among health professionals during the COVID-19 pandemic: CENTRAL, Cochrane Central Register of Controlled Trials.

Table 2:

Author	Publication year	Country	Study design	Specialties	Samples (n)	Gender (n)	Depression (n)	Evaluation tools
Elbay	2020	China	cross-sectional	Doctor	442	251 female and 191 male	286	DASS-21
Song	2020	China	cross-sectional	Physicians and nurses	14825	9,536 female and 5,289 male	3733	CES-D
Florin	2020	French	cross-sectional	radiologists	1515	Female 671 and Male 844	189	HADS
Koksal	2020	Turkey	cross-sectional	anesthetic technicians and nurses	702	Female 492 and Male 210	259	HADS
Chatterjee	2020	India	cross-sectional	Doctors	152	male 119 and female 33	53	DASS-21
Chew	2020	India	cross-sectional	Doctor, Nurse, Allied health professional, Technician	906	583 female and 323 male	96	DASS-21
Arafa	2020	Egypt and Saudi Arabia	cross-sectional	Physicians, nurses, pharmacists, technicians and paramedics	426	male 214 and female 212	69%	DASS-21
Cai	2020	China	cross-sectional	Nurses	1330	Male 25 and Female 684	709	PHQ-9
Elkholy	2020	Egypt	cross-sectional	physicians, specialized	502	NA	353	PHQ-9

				nurses, non-specialized nurses				
Juan	2020	China	cross-sectional	doctors and nurses	456	male 134 and female 322	135	PHQ-9
Liu	2020	China	cross-sectional	doctors and nurses	2031	Male 294 and Female 1737	289	DASS-21
Moreno	2020	Spain	cross-sectional	Doctors	1422	male 194 and female 122	730	HADS
Zhu	2020	China	cross-sectional	Nurse and doctor	86	137 female and 28 male	76	SAS
Que	2020	China	cross-sectional	Medical residents, physicians, nurses, technicians and public health practitioners.	2285	1,578 female and 707 male	1,013	PHQ-9
Shechter	2020	USA	cross-sectional	Attending physician, resident or fellow, nurse, advanced practice provider.	657	509 female and 143 male	315	PHQ-2
Gupta	2020	India	cross-sectional	doctors, nurses, paramedics	1124	Female 131 and Male 223	354	HADS
Yildirim	2020	Turkey	cross-sectional	doctors, dentists, nurses, health technicians, secretaries, staff assistants, and physiotherapists.	270	Males 100 and 170 females	168	BDI
Spiller	2020	Switzerland	cross-sectional	Nurses and	812	female 580 and	5 (median)	PHQ-9

				Physicians		232 male		
Li	2020	China	cross-sectional	Nurse and Doctor	4369	4369 female	621	PHQ-9
Di Tella	2020	Italy	cross-sectional	medical doctors and nurses	145	female 105 and man 40	45	BDI
Xiong	2020	China	cross-sectional	Nurses	231	female 215 and 16 male	59	PHQ-9
Arnetz	2020	USA	cross-sectional	Nurses	688	Males 44 and Females 644	641	PHQ-9
Han	2020	China	cross-sectional	Nurses	21.199	Male 297 and Female 20,902	NA	SDS
Ning	2020	China	cross-sectional	Neurological doctors and nurses	612	Male 166 and Female 446	153	SDS
Vafaei	2020	Iran	cross-sectional	nurses/midwives, obstetrics and gynecology (OB & GYN) specialists, resident physicians/medical students	599	599 Female	228	PHQ-9
Amin	2020	Pakistan	cross-sectional	post graduate trainees, post graduate qualification. physicians who were working in emergency service	389	Male 201 and female 188	166	questionnaire was designed on Google app
Lam	2020	China and Hong Kong	cross-sectional	Nurses and physicians.	932	male 231 and female 701	331	PHQ-9
Sampaio	2020	Portugal	cross-sectional	Nurses	767	148 female and 619 male	4.0 median	DASS-21
Krasavtse	2020	Russia	NA	Urologists	90	6 female and 84	NA	DASS-21

va						male		
Shah	2020	United Kingdom	cross-sectional	Doctors	207	Male 39 and Female 167	33	PHQ-2
keubo	2020	Cameroun	cross-sectional	Assistant Laboratory personnel, Assistant Nurse, Nurse, Medical Doctor, Clinical Psychologist, Medical Laboratory Technician, Other Health Technicians.	292	Female 159 and male 133	127	HADS
Nie	2020	China	cross-sectional	physicians residents	263	Female 202 and Male 61	66	GHQ-12
Li	2020	China	cross-sectional	Ophthalmologists	385	female 247 and male 138	NA	PHQ-9
Almater	2020	Saudi Arabia	cross-sectional	hospital staff	107	Male 60 and Female 47	56	PHQ-9
Zhou	2020	China	cross-sectional	hospital staff	606	492 female and 114 male	349	PHQ-9
Jiang	2020	Changsha	cross-sectional	nurse and technician	2060	Male 655 and 1,405	62,653 %	DASS-21
Şahin	2020	Turkey	cross-sectional	Physician, Nurse and Other.	939	Male 319 and female 620	729	PHQ-9
Hong	2020	China	cross-sectional	Nurses	4692	Male 144 and female 4.548	442	PHQ-9
Khanna	2020	India	cross-sectional	Ophthalmologists and ophthalmologists-in-training.	2355	624 female and 961 male	765	PHQ-9
Khanal	2020	Nepal	cross-sectional	Masters and superiors, Nurse position,	475	Male 225 and female 250	178	HADS

				Doctor, Paramedics, Laboratory staff, Pharmacist, Public health professional				
Tan	2020	Cingapura	cross-sectional	health professionals, pharmacists, technicians	470	female 321 and male 149	42	DASS-21
Mran	2020	Pakistan	cross-sectional	postgraduate trainees (Surgery)	10178	female 5776 and male 4402	2685	PHQ-9
Suryavans hi	2020	India	cross-sectional	paraclinical, resident/intern, nurse, or physician	197	Female 101 and Male 96	44	PHQ-9
Wang	2020	China	cross-sectional	doctors, nurses, and auxiliary staff.	1049	Male 148 and Female 897	1045	HADS
Xiao	2020	China	cross-sectional	Doctors and nurses	958	Male 314 and Female 644.	549	HADS
Yang	2020	South Korea	cross-sectional	occupational therapists, physical therapists, nurses, radiographers.	54	Male 12 and Female 42	48	PHQ-9
Yang	2020	South Korea	cross-sectional	Physical therapists	65	31 female and 34 male	12	PHQ-9
AlAteeq	2020	Saudi Arabia	cross-sectional	nurses, physicians, non- physician specialists, technicians and pharmacists	502	Male 342 and Female 160	277	PHQ-9

Si	2020	China	cross-sectional	Doctor and nurse	863	Male 253 and Female 610	8.6%	DASS
Kounou	2020	Africa	cross-sectional	nurses, doctors, laboratory technicians and others	62	NA	32	PHQ-9
Elhadi	2020	Africa	cross-sectional	doctors and nurses	745	Female 387 and Male 358	420	HADS
Skoda	2020	Germany	cross-sectional	Health professionals, Physicians, Nursing staff, Paramedics, nHPs	491	Female 323 and Male 168	172	PHQ-2
Hu	2020	China	cross-sectional	Nurses	2014	1,754 female and 260 male	878	SDS
Cai	2020	China	cross-sectional	doctor, nurse, technician, pharmacist, social worker, logistics personnel.	1521	1149 female and 372 male	1,23 ± 0,40 median	SCL-90
Kang	2020	China	cross-sectional	Doctors and nurses	994	850 female and 144 male	338	PHQ-9
Sharif	2020	Africa, Asia, Europe, North America and South America	cross-sectional	Neurosurgery trainees and consultants	375	NA	53	SRQ-20
Civantos	2020	USA	cross-sectional	Otolaryngology physicians and otolaryngology residents	349	137 female and 212 male	37	PHQ-2 and PHQ-9
Dal'Bosco	2020	Brasil	cross-sectional	Nurses	88	79 female and 9 male	22	HAD

Kannampallil	2020	USA	cross-sectional	Physician trainees	393	218 female and 175 male	107	DASS-21
Guillén-Astete	2020	Spain	cross-sectional	Doctor	328	247 female and 81 male	75	EDH
Margaretha	2020	Indonesia	cross-sectional	Nurse, Doctor, Analyst, Nutritionists, Medical checker, Radiologist	682	Male 192 and Female 490	565	DASS-21
Sasaki	2020	Japan	Prospective cohort study	pharmacists, clinical laboratory technicians), Health workers.	111	male 39 and female 72	NA	BJSQ
Azoulay	2020	France	cross-sectional	Nursing assistant, Senior physician, Resident, Medical student and Other allied professionals (physiotherapists, psychologists, and nutritionists)	1058	Female 753 and Male 305	322	HADS
Cunill	2020		cross-sectional	nursing staff, medical professionals. nursing assistants from other professions (pharmacists, physical therapists, residents).	1452	Male 248 and Female 1,204	1038	PHQ-9
ÇALIŞKAN	2020	Turkey	descriptive	general practitioners,	290	Male 179 and	180	HADS

			study	emergency medicine (MS) residents, MS specialists.		Female 111		
An	2020	China	cross-sectional	Nurses.	1103	Male 529 and Female 1690	481	PHQ-9
Buselli	2020	Italy	cross-sectional	Physicians, Nurses and Healthcare assistants	265	84 males and 181 females	4.5 ± 6.4 median	PHQ-9