



Depressive symptoms in helping professions: a systematic review of prevalence rates and work-related risk factors

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Abstract

Objective The aim of this study is twofold. Our first aim is to provide an overview of the prevalence rate of depression in a wide array of helping professions. Our second aim is to identify work organization conditions that seem to be associated with this depression risk.

Methods Four databases were searched (CINAHL, PsycInfo, PubMed, and Web of Science) yielding 87,626 records in total. We were interested in identifying depression prevalence rates and work-related variables that have been found to contribute to depression in helping professions.

Results In total, this systematic review included 17,437 workers in more than 29 countries. Depression prevalence rate varied between 2.5% and 91.30%. The two most frequently reported professions were nurses and doctors with 73.83% and 30.84% of studies including nurses and doctors in their sample. Work factors contributing to depression included: skill utilization, decision authority, psychological demands, physical demands, number of hours worked, work schedule (irregular or regular), work schedule (daytime or night time), social support from coworkers, social support from supervisor and the family, job insecurity, recognition, job promotion, and bullying.

Conclusion The results of this study highlight alarmingly high rates of depression in helping professions and should serve as a reminder to pay close attention to the mental health of those workers. Investing in employees' mental health by preventing and reducing depression risk could prove to be a valuable investment from an employer's point of view, as it is likely to increase productivity and reduce absenteeism among a host of other positive outcomes.

Keywords Depression · Systematic review · Work conditions · Healthcare · Helping professions

Introduction

According to the World Health Organization (WHO), depression is a major cause of disability worldwide and a lead contributor to the global burden of disease (WHO 2020). Even though an individual could present with depressive

symptoms, he/she may not necessarily be diagnosed with Major Depressive Disorder (MDD). MDD requires that five or more of the following symptoms be present during the same 2-week period and represent a change from previous functioning: depressed mood most of the day, nearly every day; markedly diminished interest or pleasure in all or almost all activities nearly every day; significant weight loss when not dieting or weight gain; insomnia or hypersomnia nearly every day; psychomotor agitation or retardation nearly every day; fatigue or loss of energy nearly every day; feelings of worthlessness or excessive or inappropriate guilt; diminished ability to think or concentrate or indecisiveness as well as recurrent thoughts of death and suicidal ideation (APA 2013). Compared to non-depressed workers, those with depression are more likely to display poorer work performance (Parent-Lamarche et al. 2020) more absenteeism, and higher unemployment rates (Lerner and Henke 2008). In fact, depression has been linked to a loss of productivity

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amounting to \$36 billion annually in the United States (Kessler et al. 2009b). As such, work stress and the subsequent mental health problems that might result are now considered work and societal concerns (Jonge and Dormann 2017).

As for the etiology of depression, many biological, psychological, and environmental factors could contribute to the onset or maintenance of the disorder. There is now accumulating evidence that work organization conditions could also contribute to worker depressive symptoms (Parent-Lamarche and Marchand 2019; Parent-Lamarche et al. 2020; Penix et al. 2019; Saijo et al. 2016). Studies examining mental health in the working population are numerous (Monahan and Swanson 2019; Saade and Marchand 2013a, b) and so are those pertaining to the helping professions (Booker et al. 2020; Favrod et al. 2018; Saijo et al. 2014). Depressive symptoms presented by individuals working in helping professions have become a major concern due to their higher depression prevalence rates compared to the general population (Kessler et al. 2005; Letvak et al. 2012). Several theoretical models have subsequently been put forth in an attempt to explain the association between work organization conditions and workers' mental health. The most well-known models are the Demand-Control model (Karesek and Theorell 1990), the Effort–Reward Balance model (Siegrist 1996), the Multilevel model (Marchand et al. 2015) and the Job-Demands-Resources model (Demerouti et al. 2001).

The Demand-Control model (Karesek and Theorell 1990) posits that workers who are subjected to a high job strain (high work demands coupled with low job control) are at an increased risk of health problems. Demands at work are usually experienced in the form of psychological and physical stressors (e.g., high workload, exposure to dangerous substances at work), whereas job control refers to decisional latitude (a high level of skill utilization and a weak decisional authority). According to this model, social support plays an important moderating role between work demands and workers' mental health (Karesek and Theorell 1990). More specifically, a worker enjoying a high social support at work who is faced with high job demands and low job control is less likely to feel stressed compared to someone without sufficient social support (Karesek and Theorell 1990).

The second well-known theoretical framework is the Effort–Reward model (Siegrist 1996). According to this model, the gap between work demands and the rewards gained from the work could generate a negative emotional state in workers. This model is based on the following hypothesis: effort is exerted at work in exchange for rewards. Those rewards could take several forms such as monetary compensation, work security, increased self-esteem and better career opportunities. In the long term, the lack of balance between efforts exerted at work and rewards reaped, in exchange for this effort, could increase one's susceptibility to stress-induced disease (Siegrist 1996).

The third work-stress model worth mentioning is that of Marchand et al. (2015). This multilevel model adopts a more comprehensive view of work organization conditions and stress. Compared to the previous two, this model views workers' mental health in the context of larger socio-environmental structures. In addition to accounting for work organization conditions, this model includes social, economic, political and cultural systems an individual has to interact with on a daily basis. Agent personality (e.g., workers' personality traits) is also accounted for as they might impact the way an individual interprets those stressors. According to Marchand et al. (2015), the way an individual interacts with various daily structures could be a source of frustration, negatively impacting their mental health.

Lastly, the final theoretical model is the Job-Demands-Resources model (Demerouti et al. 2001). The Job-Demands-Resources model adopts a dual perspective of work organization conditions and mental health problems. In a first step, demands at work could overtax one's resources. In a second step, a lack of resources could impede one's ability to meet those demands. According to this model, the interaction between excessive job demands and a lack of resources is at the heart of mental health problems. Even though all the models previously presented have been vastly tested and validated (Marchand et al. 2015; Ylipaavalniemi et al. 2005), we relied on the Demand-Resources model for several reasons. Foremost among those reasons is our interest in work-related variables and their possible contribution to workers' mental health. Even though each profession has its own characteristics that could impact worker's mental health, one is generally able to divide those characteristics into two large categories: demands and resources (Demerouti et al. 2001). Because of its comprehensiveness, the Job-Demands-Resources model could lend itself to a number of professions without necessarily being limited to demands and resources specific to a particular job (Demerouti et al. 2001). Another reason for our choice is attributed to its emphasis on the interaction between job demands and resources (Demerouti et al. 2001). Even though demands at work are not necessarily negative, they could be perceived negatively by a worker exerting a great deal of effort in an attempt to meet those job demands (Meijman and Mulder 1998).

Examining the relationship between work variables and mental health is particularly important in helping professions. Beyond the business repercussions, a depressed individual could incur on his organization and the ones placed on him as an individual, depression is likely to affect the people he is working with. Individuals working in the helping professions play a key role in caring for other people. As such, those professionals are often at the forefront of contact with patients (Maharaj et al. 2019). Nurses suffering from depression will inevitably see the quality of care they

provide erode (Gao et al. 2012; Letvak et al. 2012; Welsh 2009). The same goes for doctors, with a number of studies linking depression to poorer quality of care and increased medical errors (Brunsberg et al. 2019; Halbesleben and Rathert 2008; West et al. 2009), potentially affecting a population's health. In a study conducted by Siebert (2004), 56% of depressed social workers reported at least one incident due to their impairment, 44% reported more than three and 61% continued working even though they were too distressed to be effective. Depressive symptoms experienced by social workers could affect their work performance which may in turn impact client safety and professional credibility (Siebert 2004).

With the rapid developments in medical sciences (Wang et al. 2014) and fast-changing technology (Lim et al. 2010; Moustaka and Constantinidis 2010; Salmond and Echevarria 2017), a number of jobs in the helping professions have become increasingly stressful (Maharaj et al. 2018; Song et al. 2017). For instance, in the nursing profession, an effort to reduce personal cost coupled with a reduction in the nursing workforce has translated into mounting work pressure (Wang et al. 2014). As such, nursing has come to be considered as a stressful and challenging occupation (Lim et al. 2010; Maharaj et al. 2018; Moustaka and Constantinidis 2010). The same can be said for doctors (Clough et al. 2017; Tomioka et al. 2011), social workers (Cho and Song 2017; Siebert 2004), psychologists (Simpson et al. 2019; Smith and Moss 2009) and many others. In such professions, depression is now being recognized as an important occupational health problem due to its high prevalence rates (Letvak et al. 2012; Tomioka et al. 2011).

Even though several studies highlighted workers' mental health concerns in the helping professions (Asaoka et al. 2013; Gu et al. 2017; Hall et al. 2018), few included a vast array of professions. Most studies have instead focused on one profession in particular (e.g., doctors and nurses). Comparing depression prevalence rates in a wide variety of helping professions could help identify the ones associated with the highest rates. The results of this study will hopefully help prevent depressive symptoms in at-risk professions. To the best of our knowledge, no study to date has conducted a systematic review pertaining to depression rates in helping professions while attempting to link work organization conditions to this disorder. With the numerous advancements in the work environment, evaluating the role work organizations play in workers' depression is important. This is even the more important given the pivotal role workers in the helping professions play. This statement has never been more true than in 2020 and 2021 when COVID-19 paralyzed the workforce and all eyes turned toward health care professionals. By identifying possible contributors to workers' depression, the hope is to inform prevention and intervention strategies in the workplace.

The aim of the present study is twofold. Our first aim is to provide an overview of depression prevalence rate in a vast array of helping professions. Our second aim is to identify work organization conditions that seem to be associated with this depression risk. Workers examined are those working in the helping professions given the high prevalence rate of depression reported in this population (Kessler et al. 2009a; Letvak et al. 2012). In the current review, helping professions examined were: doctors, nurses, social workers, psychologists, psychiatrists, midwives, occupational therapists, speech pathologists, laboratory and X-ray technicians, community health workers, physical therapists, and eldercare workers.

Methods

Search procedure

A systematic review was conducted on October 7th, 2019 to pinpoint the search terms and the databases to review.

The search terms were meant to identify work variables ("work* environment" OR workplace OR job OR occupation*) experienced by helping professionals (doctor* OR physician* OR clinician* OR nurse* OR "social worker*" OR psychologist* OR psychiatrist* OR counsellor* OR counselor* OR therapist* OR psychotherapist* OR "health care worker*" OR "health care personnel" OR "health care staff" OR "health care professional*" OR "medical personnel" OR "medical worker*" OR "medical staff" OR "helping profession*" OR "helping relationship*" OR "aid relationship*") presenting with depressive disorder or depressive symptoms (depress* OR "mood disorder*"). We limited our search to scientific articles published between 2004 and 2019.

We systematically searched the following databases: (a) PubMed, (b) PsycInfo, (c) CINAHL and (d) Web of Science. The CINAHL search yielded 9289 records, the PsycInfo search yielded 18,186 records, PubMed 25,986 and Web of Science 34,165. In total, 87,626 records were retrieved and downloaded onto Endnote than onto an Excel file. After duplicates were eliminated, we were left with 53,525 records to screen.

Inclusion criteria

To be included in the review, studies had to meet the following criteria:

- a) Peer reviewed.
- b) Published between 2004 and 2019.
- c) Written in English.
- d) Examined depression as a dependant variable.

- e) Examined depressive symptoms in individuals working in the helping professions. In the current review, such professions included doctors, nurses, social workers, psychologists, psychiatrists, midwives, occupational therapists, speech pathologists, laboratory and X-ray technicians, community health workers, physical therapists, and eldercare workers. Examined the contribution of work organization conditions to workers' mental health.

Exclusion criteria

Studies were excluded from this review if they:

- a) Pertained to a student population including medical residents. We decided to exclude medical residents from the present review due to our decision to only include individuals having completed their studies and occupying a professional position with minimal or no supervision necessary to conduct their jobs.
- b) Did not pertain to individuals not working in helping professions in the healthcare field. Those professions included but were not limited to lawyers, financial analysts, real estate agents, management consultants, accountants, spiritual leaders, teachers, clergy, professors, firefighters, etc.
- c) Relied on a qualitative design.
- d) Were descriptive and/or did not use a predictive model. More specifically, we excluded studies having only conducted correlational analysis between work organization conditions and depression risks or having solely reported descriptive statistics. Relatedly, it is important to mention here that studies that reported on both correlational and regression analysis were included. Inversely, studies that only reported descriptive findings such as descriptive statistics or correlational ones were not.
- e) Pertained to the effects of an intervention or a treatment plan on worker's mental health.
- f) Were not empirical (e.g., systematic review, meta-analysis, literature reviews, letters to editors, reports, commentaries, and points of view).
- g) Reported on depression following a situational and unique event (e.g., depression symptoms presented by doctors caring for 9/11 victims). We decided to exclude those studies since their findings were specific to a particular event and were not necessarily generalizable to other health care workers.
- h) Did not evaluate any work organization variable. More specifically, studies that reported on depression symptoms without examining work-related variables were excluded. Similarly, studies reporting on perceived stress or value incongruence between the worker's values and an aspect of the work organization were not considered

specific to the work organization but rather a subjective evaluation made by the worker of that work-related variable and that is unique to him. Examples of such variables include: perceived work satisfaction, perceived value incongruence, perceived stress. It is, however, important to mention that if a study reported on both a personal subjective variable such as perceived work satisfaction in addition to some work-related variables (e.g., physical demands at work), the study was retained.

- i) Reported on perceived stress as the only dependant variable without reporting on depression. The same goes for anxiety. Studies with depression scores being lumped with those of other disorders (i.e., no clear depression score could be computed) were also excluded.

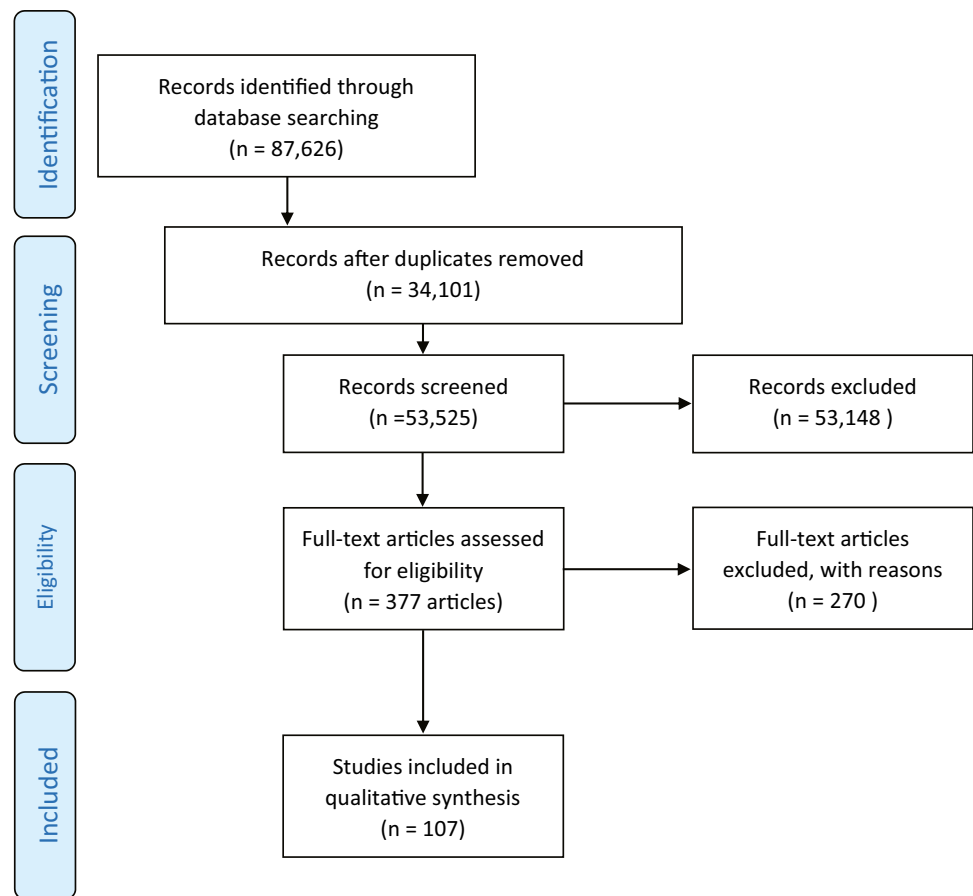
Data extraction

After all records had been retrieved, screening was conducted in a series of steps (Fig. 1). The first step consisted of screening the titles and the abstracts of records retrieved. If deemed eligible, the record was retained for a second step. In this second step, we retrieved the full-text article and read it. Given the large number of retrieved records, each study was independently screened by one rater. In case of doubt about the article's eligibility, the first and/or fourth author made the final decision. The large heterogeneity in sample sizes, methodology adopted, depression definition, measurement tool, whether the researchers evaluated depression symptoms, antidepressant use, or a clinical depression diagnosis precluded us from conducting a meta-analysis. Figure 1 illustrates the results of the search and of the screening and selection process for the inclusion of studies in our review.

The following information was extracted from each study:

- a) Country where the data were collected.
- b) Profession.
- c) Depression measurement tool.
- d) Depression prevalence rate (if reported).
- e) Work setting.
- f) Sociodemographic characteristics.
- g) Number of participants.
- h) Work-related variables.
- i) Risk of bias.

Reporting the depression prevalence rate was not always easy. We decided to report this prevalence rate when it was clearly stated in the study or when computing it was straightforward. Studies that only reported a mean score on a particular depression scale with no mention of a prevalence rate were not included in this analysis. We considered studies on depression prevalence rates such as those reporting on a 2-week prevalence rate, a 12-month prevalence rate and lifetime prevalence rate. A research

Fig. 1 PRISMA flow diagram (Moher et al. 2009)

assistant evaluated all the studies' risk of bias based on Checklist for assessing the quality of quantitative studies (Kmet et al. 2004). This evaluation tool was selected given its comprehensiveness and its inclusion of all criteria considered relevant in the evaluation of quantitative studies.

According to this quality assessment criteria, a study was considered to have low bias if:

- The question or the objective was sufficiently described.
- The design was evident and appropriate to answer the study question.
- The method of subject selection (and comparison group selection, if applicable) or source of information/input variables (e.g., for decision analysis) was described and appropriate.
- The subject (and comparison group, if applicable) characteristics or input variables/information (e.g., for decision analyses) were sufficiently described.
- The outcome and (if applicable) exposure measure(s) were well defined and robust to measurement/misclassification bias. The means of assessment were reported.
- The sample size was appropriate.
- The analysis was described and appropriate.
- Some estimate of variance (e.g., confidence intervals and standard errors) was reported for the main results/outcomes (i.e., those directly addressing the study question/objective upon which the conclusions are based).
- The authors controlled for confounding variables.
- The results were reported in sufficient detail.
- The results supported the conclusions.

Given that no intervention/treatment study were included in our review, we did not score the following three items:

- If random allocation to treatment group was possible, was it described?
- If interventional and blinding of investigators to intervention was possible, was it reported?
- If interventional and blinding of subjects to intervention was possible, was it reported?

Each item was scored as follows: a score of 2 was allocated to a "Yes", a score of 1 was allocated to a "Partial yes" and a score of 0 was allocated to a "No". In total, each study was rated using this 14-item questionnaire with the exception of the three items pertaining to intervention/treatment

studies. Each study's risk of bias was, therefore, evaluated based on 11 items. A low score indicated a high risk of bias while a high score indicated a low risk of bias. The minimum bias score was 0 and the maximum was 22.

Results

In total, this systematic review included 17,437 workers in various helping professions. The number of participants ranged between 23 and 17,437 per study ($M = 1291.56$, $Mdn = 435$). Those individuals worked in more than 29 different countries in a vast array of industries and professional categories. Among those professional categories were doctors, nurses, social workers, psychologists, psychiatrists, midwives, occupational therapists, speech pathologists, laboratory and X-ray technicians, community health workers, physical therapist, and eldercare workers. In addition, the doctors sampled had different specialities including critical care doctors, surgeons, obstetricians, trauma doctors, pediatricians, palliative doctors, gerontologists, dentists, psychiatrists, and veterinarians. To facilitate reading, those different specialities were referred to as doctors in Table 1. As for their work setting, those health care professionals were working in hospice centers, hospitals, nursing homes, long-term care facilities, home health care, private clinics, health centers, medical centers, public hospitals and community clinics and some were even deployed with the military. As mentioned earlier, the data covered in this review originated from 29 countries with Japan, the US and China being the most frequently cited (14.01% of the studies collected data in Japan, 13.08% in the US and 11.21% in China).

Unsurprisingly, 73.83% and 30.84% of studies included nurses and doctors in their sample. More specifically, most studies pertained to a sample of healthcare workers including doctors and nurses as well as other health care workers (e.g., occupational therapist and X-ray technician). Studies that included both doctors and nurses were computed twice (once in the doctors' category and once in the nurses' category). 62.62% of studies reported a depression prevalence rate (Table 2). Among those studies, depression prevalence rate (when reported) varied between 2.5 and 91.30% ($M = 27.23\%$, $Mdn = 23.28\%$). Given the large variations in sample size across studies, we decided to report the depression median and the mean to avoid having studies with a large number of participants skewing the results. Those depression prevalence rates need to be interpreted with caution due to the large heterogeneity in the definition of depression, measurement tool, whether the researchers evaluated depression symptoms, antidepressant use, or a clinical depression diagnosis. In addition, worth considering is the large heterogeneity displayed in sample sizes and the methodology adopted. As for the

depression tools used, a large variability was also noted. The three most frequently used depression tools were the Center for Epidemiologic Studies Depression Scale (CES-D; 32.71%), the Hospital Anxiety and Depression Scale (HADS; 13.08%) and the Beck Depression Inventory (BDI; 11.21%).

As for work factors' contribution to depression, variables related to various demands at work and resources were highlighted (Table 2). In terms of demands, physical demands placed on a worker (e.g., inadequate physical resources for work (Asaoka et al. 2013)), short sleep duration due to one's work schedule (Chaiard et al. 2019), psychological demands (Chen et al. 2016; Zhang et al. 2017), working night shifts (De Vargas and Dias 2011), being on-call at night (Balch et al. 2010), bullying (Rodwell and Demir 2012; Yildirim 2009), workplace violence (Da Silva et al. 2015; Eriksen et al. 2006), work–family conflict (Dyrbye 2014) and work–life imbalance (Compton and Frank 2011), perception of lack of justice in the workplace (e.g., low procedural justice, low relational justice (Ylipaavalniemi et al. 2005)), negative work-to-family spillover (Franché et al. 2006), rapidly rotating shifts (Hall et al. 2018), weekly paid overtime (Hall et al. 2018), low decisional authority (Franché et al. 2006; Zhang et al. 2017), low decisional latitude (Franché et al. 2006), and lack/insufficiency of autonomy (Enns et al. 2015) were all found to be positively associated with depression risk. More details are provided in Table 2.

Inversely, a number of resources have also been identified (Table 2). Examples of such variables include: job satisfaction (Tarrant and Sabo 2010), satisfaction with one's choice of medical specialty, satisfaction with support provided in training (Berman et al. 2007), social support (Berthelsen et al. 2015; Chana et al. 2015; Saksvik-Lehouillier et al. 2016), supervisory support (Chen et al. 2016), fair leadership (Berthelsen et al. 2015), and peer support (Hsieh et al. 2016).

Lastly, risk factors frequently reported by individuals working in the helping profession and that might be more commonly noted than in other professions are: high workload (Yoshizawa et al. 2016), high emotional strain (Kubik et al. 2018; Muntaner et al. 2004) little sleep (Flo et al. 2012; Tsutsumi et al. 2011), high number of working hours (Tsutsumi et al. 2011), bullying or conflict at work (Rodwell and Martin 2013) in addition to the aforementioned work factors. One might think that the combination of those variables might interact with resources an individual has to explain their risk of suffering from depression.

Discussion

The systematic review conducted highlights the alarmingly high depression prevalence rate in the helping professions, varying between 2.5 and 91.30%. Those findings

Table 1 Synthesis of Studies Pertaining to Depression in Health-Care Professions

Author(s)	Year	Title	Country	N	Profession	Measurement + tool	Setting	Sociodemographic characteristics	Depression Prevalence Rate
Adams, Lee, Pritchard, White	2009	What stops us from healing the healers: a survey of help-seeking behavior, stigmatization and depression within the medical profession	England	1256	Doctor	Self-report based on a 62-question postal questionnaire	NR	60.7% male and 39.3% female	46.20%
Ariapooran	2019	Sleep problems and depression in Iranian nurses: the predictive role of workaholism	Iran	280	Nurse	Beck Depression Inventory (BDI)	Hospital	54.3% female and 45.7% male M age=31.03 years	17.83%
Asaoka et al.	2013	Factors associated with shift work disorder in nurses working with rapid-rotation schedules in Japan: the Nurses' Sleep Health Project	Japan	1202	Nurse	Center for Epidemiologic Studies Depression Scale (CES-D)	Hospital	M age=30 years 100% female retained for the analysis	19.97%
Assunção, Machado, Prais, de Araújo	2014	Depression among physicians working in public healthcare in Belo Horizonte, Brazil	Brazil	1981	Doctor	Self-reporting questionnaire for information about depression Report indicating medically confirmed depression	Municipal health care units	53.7% female and 46.3% male Subjects were similarly distributed within the age range, with most in the group 35–46 years (36.0%)	12%
Balch, Shanafelt, Dyrbye, Sloan, Russell, Bechamps, Freischlag	2010	Surgeon distress as calibrated by hours worked and nights on call	US	7905	Doctor	The 2-item primary care evaluation of mental disorders	Hospital	13.29% female and 86.16% male 54.52% were of age 50 years or more and 45% were less than 50 years old	8.80%
Barbe, Kimble, Rubenstein	2018	Subjective cognitive complaints, psychosocial factors and nursing work function in nurses providing direct patient care	US	96	Nurse	Patient Health Questionnaire-9 (PHQ-9)	State boards of nursing	89.53% female and 10.47% male The majority of the sample were 40 years or older (76.1%)	7%

Table 1 (continued)

Author(s)	Year	Title	Country	N	Profession	Measurement + tool	Setting	Sociodemographic characteristics	Depression Prevalence Rate
Berman, Campbell, Makin, Todd	2007	Occupational stress in palliative medicine, medical oncology and clinical oncology specialist registrars	UK	401	Doctor	Symptom Checklist for Depression (SCL-D)	Responders from the Association for Palliative Medicine and the Specialist Advisory Committee for Medical Oncology in the UK	34.2% male and 65.8% female <i>M</i> age = 32.7 years	11.30%
Berthelsen, Mona; Pallesen, Ståle; Magerøy, Nils; Tyssen, Reidar; Bjorvatn, Bjørn; Moen, Bente; Elisabeth; Knardahl, Stein	2015	Effects of psychological and social factors in shiftwork on symptoms of anxiety and depression in nurses: a 1-year follow-up	Norway	2059 nurses participated at baseline and 1582 nurses completed wave 2 of the survey	Nurse	Hospital Anxiety and Depression Scale (HADS)	Registered members of the Norwegian Nurses Organisation (NNO)	91% female and 9% male 81% of the nurses were between 21 and 39 years of age	8.4% at baseline and 8.7% at 1-year follow-up
Boya, Demiral, Ergor, Akvardar, De Witte	2008	Effects of perceived job insecurity on perceived anxiety and depression in nurses	Turkey	462	Nurse	Hospital Anxiety and Depression Scale (HADS)	Hospital	93.1% women and 6.9% male <i>M</i> age = 27.7 years	3%
Chaiard, Deeluea, Suksatit, Songkham W, Inta, Stone	2019	Sleep disturbances and related factors among nurses	Thailand	220	Nurse	Two questions screening for depression	Nursing departments	92.3% female and 7.7% male Most nurses were less than 40 years old (65.5%)	57.30%
Chana, Navtej; Kennedy, Paul; Chessell, Zoé J	2015	Nursing staffs' emotional well-being and caring behaviors	UK	102	Nurse	The Hospital Anxiety and Depression Scale (HADS)	Hospital	90% female and 10% male	25.80%
Chen, Wang, Yang, Fan	2016	Nurse practitioner job content and stress effects on anxiety and depressive symptoms, and self-perceived health status	Taiwan	161	Nurse	Beck Depression Inventory (BDI-II)	Hospital	98.8% female and 1.2% male <i>M</i> age = 37.31 years	23.60%

Table 1 (continued)

Author(s)	Year	Title	Country	N	Profession	Measurement + tool	Setting	Sociodemographic characteristics	Depression Prevalence Rate
Chiou, Chiang, Huang, Wu, Chien	2013	Health issues among nurses in Taiwanese hospitals: National survey	Taiwan	21 095	Nurse	5-point Likert-scale item inquiring about feeling depressed during the last week	Hospital medical center	1.70% male and 98.30% female 19% < 26 years old 57.4% between 26 and 35 years old 18.2% between 36 and 45 years old 4.66% between 46 and 55 years old 0.74% > 55 years old	NR
Compton, Frank	2011	Mental health concerns among Canadian physicians: results from the 2007–2008 Canadian Physician Health Study	Canada	3213	Doctor	Self-report survey developed in collaboration with the Canadian Medical Association (CMA)	NR-Nationwide sample	37% female and 63% male 8.4% were younger than 35 years, 25.6% were 35–44 years old, 30.3% were 45–54 years old, 24.2% were 55–64 years old, and 11.5% were older than 64 years	23.20%
Da Silva, Lopes, Susser, Menezes	2016	Work-related depression in primary care teams in Brazil	Brazil	2940	Primary care teams: Community health workers Nurse Doctor	Patient Health Questionnaire (PHQ-9)	Primary care	90.5% female and 9.5% male M age of participants = 36.7 years	18%
Da Silva, Peres, Lopes Cde, Schraiber, Susser, Menezes	2015	Violence at work and depressive symptoms in primary health care teams: a cross-sectional study in Brazil	Brazil	2940	Primary care teams: Doctor Nurse Community health worker	Patient Health Questionnaire (PHQ-9)	Primary care	90.5% female and 9.5% male M age = 36.7 years	6.3% presented intermediate depressive symptoms and 16% presented with probable major depression
De Cruz, Cru, Cabrera, Abellán	2019	Factors related to the probability of suffering mental health problems in emergency care professionals	Spain	235	Emergency care professionals: Nurse Doctor	General Health Questionnaire (GHQ-28)	Hospital	76.2% female and 23.8% male M age = 48.3 years	8.70%

Table 1 (continued)

Author(s)	Year	Title	Country	N	Profession	Measurement + tool	Setting	Sociodemographic characteristics	Depression Prevalence Rate
De Oliveira, Mazzaia, Marcola	2015	Symptoms of depression and intervening factors among nurses of emergency hospital services	Brazil	23	Nurse	Beck Depression Inventory (BDI) Hamilton Rating Scale for Depression (HAM-D) Montgomery-Asberg Depression Rating Scale (MADRS)	Hospital	69.6% female and 30.4% male <i>M</i> age = 35.82 years	91.30%
de Vargas, Dias	2011	Depression prevalence in Intensive Care Unit nursing workers: a study at hospitals in a northwestern city of Sao Paulo State	Brazil	67	Nurse	Beck Depression Inventory (BDI)	Hospital	55% female and 45% male <i>M</i> age = 25 years	28.40%
Dyrbye et al.	2014	A survey of US physicians and their partners regarding the impact of work-home conflict	US	891 partners 7288 physicians	Doctor	Primary care evaluation of mental disorders	Sample from U.S. Physician Masterfile (PMF)	75.2% male and 24.8% female	37.10%
Eldevik, Flo, Moen, Pallesen, Bjorvatn	2013	Insomnia, excessive sleepiness, excessive fatigue, anxiety, depression and shift work disorder in nurses having less than 11 h in-between shifts	Norway	1990	Nurse	Hospital Anxiety and Depression Scale (HADS)	Hospital Norwegian Nurses Organisation	90% female and 10% male <i>M</i> age = 33.1 years	8.60%
Elliott, Rodwell Martin	2017	Aged care nurses' job control influence satisfaction and mental health	Australia	173	Nurse	Center for Epidemiologic Studies Depression Scale (CES-D)	Private health care organization with ten aged care facilities	89% female and 11% male, 72.8% were 40 years or older	NR

Table 1 (continued)

Author(s)	Year	Title	Country	N	Profession	Measurement + tool	Setting	Sociodemographic characteristics	Depression Prevalence Rate
Enns, Currie, Wang	2015	Professional autonomy and work setting as contributing factors to depression and absenteeism in Canadian nurses	Canada	17,437	Nurse	Composite International Diagnostic Interview (CIDI)	Hospital vs. other work setting was originally coded as hospital, long-term care, community health facilities, and other settings. A preliminary analysis of depression by work settings revealed no significant variation in the prevalence of major depression across the long-term care, community health facilities, and other categories. Therefore, these settings were collapsed into a single category resulting in two categories for work setting: hospital vs. other settings	100% female	8.7% of workers in the hospital 10.2% not in the hospital
Erdur, Ergin, Turkcuer, Parlak, Ergin, Boz	2006	A study of depression and anxiety among doctors working in emergency units in Denizli, Turkey	Turkey	192	Doctor	Beck Depression Inventory (BDI)	Hospital Healthcare centers 112 emergency services	80.2% male and 19.8% female 44.3% between 20 and 35 years old 49% were between 36 and 45 years old 6.8% older than 45 years	29%

Table 1 (continued)

Author(s)	Year	Title	Country	N	Profession	Measurement + tool	Setting	Sociodemographic characteristics	Depression Prevalence Rate
Eriksen, Tambs, Knardahl	2006	Work factors and psychological distress in nurses' aides: a prospective cohort study	Norway	204	Nurse	Symptom Checklist SCL-5	NR-Nationwide sample	96% female and 4% male 6.7% younger than 30 years 20.2% between 30 and 39 years old 43.6% between 40 and 49 years old 26.1% between 50 and 59 years old 3.3% older than 59 years	NR
Fang et al.	2018	Depressive symptoms and workplace violence-related risk factors among otorhinolaryngology nurses and physicians in Northern China: a cross-sectional study	China	652	Doctor Nurse	Zung Self-Rating Depression Scale (SDS)	Hospital	63.7% female and 26.3% male 41.7% were between 30 and 39 years old	57.20%
Fang, Qiu, Xu, You	2013	A model for predicting acute and chronic fatigue in Chinese nurses	China	581	Nurse	Beck Depression Inventory (BDI)	Hospital	<i>M</i> age = 29.49 years	NR
Favrod et al.	2018	Mental health symptoms and work-related stressors in hospital midwives and NICU nurses: a mixed methods study	Switzerland	213	Nurse Midwife	Hospital Anxiety and Depression Scale (HADS)	Hospital	92.3% women, 5.5% men and 2.2% missing values 8.8% between 18 and 25 years old 26.4% between 26 and 30 years old 44% between 31 and 40 years old 19.8% > 40 years old Missing values 1.1%	15.7% for nurses and 28.6% for midwives-23.28% in the total sample
Flo, Pallesen, Magerøy, Moen, Grønli, Hilde Nordhus, Bjorvatn	2012	Shift work disorder in nurses-assessment, prevalence and related health problems	Norway	1968	Nurse	Hospital Anxiety and Depression Scale (HADS)	Registered members of the Norwegian Nurses Organisation (NNO)	90.2% female and 9.8% male <i>M</i> age = 32.8 years in those with shift work disorder, <i>M</i> age = 33.7 years in those without shift work disorder	NR

Table 1 (continued)

Author(s)	Year	Title	Country	N	Profession	Measurement + tool	Setting	Sociodemographic characteristics	Depression Prevalence Rate
Flo, Pallesen, Moen, Waage, BJORVATN	2014	Short rest periods between work shifts predict sleep and health problems in nurses at 1-year follow-up	Norway	1224	Nurse	Hospital Anxiety and Depression Scale (HADS)	Registered members of the Norwegian Nurses Organisation (NNO)	NR	7.60%
Franché, Williams, Ibrahim, Grace, Mustard, Minore, Stewart	2006	Path analysis of work conditions and work-family spillover as modifiable workplace factors associated with depressive symptomatology	Canada	218	Administrator Nurse Allied professional Technicians Support staff Doctor	Center for Epidemiologic Studies Depression Scale (CES-D)	Health care centers	M age = 39.43 years	NR
Gao, Pan, Sun, Wu, Wang, Wang	2012	Depressive symptoms among Chinese nurses: prevalence and the associated factors	China	1592	Nurse	Center for Epidemiologic Studies Depression Scale (CES-D)	Hospital	100% women M age = 35.01 years	61.70%
Gong et al.	2014	Prevalence of anxiety and depressive symptoms and related risk factors among physicians in China: a cross-sectional study	China	2641	Doctor	Zung Self-Rating Anxiety Scale (SAS) Zung Self-Rating depression Scale (SDS)	Hospital	42.06% female and 57.94% male M age = 39.76 years	28.13%
Gu, Chu, Qi, Jia	2017	Depressive symptoms and correlates among village doctors in China	China	616	Doctor	Center for Epidemiologic Studies Depression Scale (CES-D)	Rural medical and health institutions	73.62% male and 26.38% female M age = 46.2 years	27.40%
Hall, Franche, Koehoorn	2018	Examining exposure assessment in shift work research: a study on depression among nurses	Canada	11,450	Nurse	Composite International Diagnostic Interview Short Form, Major Depression section (CIDI-SFMD)	Hospital Long-term care facility Community health setting Other	94.7% female and 5.3% male 20.5% < 35 years old 27.8% 35–44 years old 34.3% 45–54 years old 17.5% 55 and over	9.10%
Hardy et al.	2020	Comparison of burnout, anxiety and depressive syndromes in hospital psychiatrists and other physicians: results from the ESTEM study	France	611	Doctor Psychiatrist	Hospital Anxiety and Depression Scale (HADS)	Hospital	61.7% female and 38.3% male 64% older than 40 years	11.10%

Table 1 (continued)

Author(s)	Year	Title	Country	N	Profession	Measurement + tool	Setting	Sociodemographic characteristics	Depression Prevalence Rate
Harris, Cumming, Campbell	2006	Stress and psychological well-being among allied health professionals	Australia	161	Social worker Psychologists Occupational therapist Speech pathologist Other allied health professionals	Depression, Anxiety, and Stress Scale (DASS21)	Hospital Community Other	88.5% female and 11.5% male <i>M</i> age = 37.8 years	NR
Hasan, Elsayed, Tumah	2018	Occupational stress, coping strategies, and psychological-related outcomes of nurses working in psychiatric hospitals	Egypt	70	Nurse	Beck Depression Inventory (BDI)	Hospital	57.1% of the sample was between 20 and 30 years old	NR
Hsieh, Chen, Wang, Chang, Ma	2016	Association among components of resilience and workplace violence-related depression among emergency department nurses in Taiwan: a cross-sectional study	Taiwan	180	Nurse	Center for Epidemiologic Studies Depression (CES-D)	Hospital	<i>M</i> age = 30–31 years	46.50%
Hsieh, Chen, Wang, Chang, Ma	2017	Predictors of depressive symptoms among psychiatric nurses who suffered from workplace violence	Taiwan	150	Nurse	Center for Epidemiological Studies Depression (CES-D)	Hospital	<i>M</i> age = 33.14 years	35%
Ibrahim, Chamisi Basha, Saquib, Zaghoul, Al-Mazrou, Saquib	2019	Sleep duration is associated with depressive symptoms among expatriate nurses	Saudi Arabia	977	Nurse	Depression Anxiety Stress Scale (DASS)	Hospital Primary health clinic	99.4% female and 0.6% male <i>M</i> age = 32 years	53.80%

Table 1 (continued)

Author(s)	Year	Title	Country	N	Profession	Measurement + tool	Setting	Sociodemographic characteristics	Depression Prevalence Rate
^a Jakobsen, Jørgensen, Thomsen, Albertsen, Greiner, Rugulies	2016	Emotion work within eldercare and depressive symptoms: a cross-sectional multi-level study assessing the association between externally observed emotion work and self-reported depressive symptoms among Danish eldercare workers	Denmark	124	Eldercare workers (social and health care assistant, social and health care helper)	Major Depression Inventory (MDI)	Eldercare homes	100% female 13% between 21 and 35 years old 40% between 36 and 50 years old 47% between 51 and 66 years old	NR
Jennings, Sinclair, Mohr	2016	Who benefits from family support? Work schedule and family differences	US	330	Nurse	Center for Epidemiologic Studies Depression Scale	Hospital and acute care setting	92% female and 8% male M age = 45.75 years	NR
^a Jolivet et al.	2010	Linking hospital workers' organizational work environment to depressive symptoms: a mediating effect of effort-reward imbalance? The ORSOSA study	France	3316	Nurse	Center for Epidemiological Studies Depression (CES-D)	Hospital	100% female M age of the final sample was 35.8 years for registered nurses and 40.5 years for nursing aids	NR
Jung, Lee	2015	Contributors to shift work tolerance in South Korean nurses working rotating shift	South Korea	660	Nurse	Patient Health Questionnaire (PHQ-9)	Hospital	98% were women and 2% male M age = 27.5 years	NR
Karanikola, Maria; Kaitte, Charis	2013	Greek-Cypriot mental health nurses' professional satisfaction and association with mild psychiatric symptoms	Cyprus	225	Nurse	Beck Depression Inventory (BDI)	Hospital Community	43.3% male and 56.7% female	18%

Table 1 (continued)

Author(s)	Year	Title	Country	N	Profession	Measurement + tool	Setting	Sociodemographic characteristics	Depression Prevalence Rate
Kikuchi, Nakaya, Ikeda, Okuzumi, Takeda, Nishi	2014	Relationship between job stress, temperament and depressive symptoms in female nurses	Japan	706	Nurse	A 5-item screener was derived from the Self-rating Depression Scale and the Hospital Anxiety and Depression Scale, using the Composite International Diagnostic Interview as the external criterion	Hospital	100% were female <i>M</i> age = 32.89 years	NR
Kikuchi, Nakaya, Ikeda, Okuzumi, Takeda, Nishi	2014	Relationship between depressive state, job stress, and sense of coherence among female nurses	Japan	348	Nurse	Kessler Screening Scale for Psychological Distress (K6)	Hospital	52.1% female and 47.9% male <i>M</i> age = 34.4 years	NR
Kubik, Jurkiewicz, Kořpa, Stepien	2018	Nurses' health in the context of depressive symptoms	Poland	147	Nurse	Patient Health Questionnaire-9 (PHQ-9)	Hospital	97.96% female and 2.04% male Majority aged between 45 and 55 years (51.02%)	21.41%
Lamy, De Gaudemaris, Lepage, Sobaszek, Caroly, Kelly-Irving, Lang	2013	The organizational work factors' effect on mental health among hospital workers is mediated by perceived effort-reward imbalance: result of a longitudinal study	France	2117	Nurse	Center for Epidemiologic Studies Depression Scale (CES-D)	Hospital	100% female	NR
Lee, Kim, Kim, Lee, Kim	2016	Association between shift work and severity of depressive symptoms among female nurses: the Korea Nurses' Health Study	South Korea	9789	Nurse	Patient Health Questionnaire (PHQ-9)	Registered members of the Korean Nurses Association	100% female Most of the study's participants were 29 years or younger (<i>n</i> = 4168; 42.6%) or were between the age of 30–39 (<i>n</i> = 4169; 42.6%)	30%

Table 1 (continued)

Author(s)	Year	Title	Country	N	Profession	Measurement + tool	Setting	Sociodemographic characteristics	Depression Prevalence Rate
Madathil, Heck, Schuldberg	2014	Burnout in psychiatric nursing: examining the interplay of autonomy, leadership style, and depressive symptoms	US	89	Nurse	Brief Symptom Inventory (BSI)	Hospital	88% female and 12% male	NR
Madsen, Diderichsen, Burr, Rugulies	2010	Person-related work and incident use of antidepressants: relations and mediating factors from the Danish work environment cohort study	Denmark	4958	Healthcare (e.g., doctors, nurses) Education (e.g., teachers, pedagogues) Social (e.g., police officers, social workers) Customer service (e.g., sales personnel, wait staff) Other person-related work	5-item mental health inventory of the 36-item short-form (SF-36) health survey	Healthcare Education Social Customer service Other	51.5% male and 48.5% female M age=40.3 years	6.90%
Momeni, Fahim, Vahidi, Nejati, Saeedi	2016	Evaluation of factors affecting psychological morbidity in emergency medicine practitioners	Iran	204	Doctor	Goldberg General Health Questionnaire (GHQ-28)	Hospital	71.6% male and 28.4% female	NR
^a Muntaner, Li, Xue, O'Campo, Chung HJ, Eaton WW	2004	Work organization, area labor-market characteristics, and depression among U.S. nursing home workers: a cross-classified multilevel analysis	US	539	Nurse	Revised Center for Epidemiologic Studies Scale (RCES-D)		Most of the sample were between 30 and 35 years old 100% female 65.1% less than 45 years old and 34.9% 45 and older	48.50%
^a Muntaner, Li, Xue, Thompson, Chung, O'Campo	2006	County and organizational predictors of depression symptoms among low-income nursing assistants in the USA	US	482	Nurse	Center for Epidemiologic Studies Depression Scale (CES-D)	Nursing homes	97.1% women and 2.9% male 53.5% were less than 45 years of age	54.20%

Table 1 (continued)

Author(s)	Year	Title	Country	N	Profession	Measurement + tool	Setting	Sociodemographic characteristics	Depression Prevalence Rate
^a Muntaner, Li, Xue, Thompson, O'Campo, Chung, Eaton	2006	County level socioeconomic position, work organization and depression disorder: a repeated measures cross-classified multilevel analysis of low-income nursing home workers	US	241	Nurse	Center for Epidemiologic Studies Depression Scale (CES-D)	Nursing home	97.1% women and 2.9% male 53.5% were less than 45 years of age	54.20%
^a Muntaner, Van Dussen, Li, Zimmerman, Chung, Benach	2006	Work organization, economic inequality, and depression among nursing assistants: a multilevel modeling approach	US	395	Nurse	Center for Epidemiologic Studies Depression Scale (CES-D)	Nursing home	95.7% women and 4.3% male <45 years old 38.0% 45 and over	60.20%
Nourry, Luc, Lefebvre, Sultan-Taïeb, Béjean	2014	Psychosocial and organizational work environment of nurse managers and self-reported depressive symptoms: cross-sectional analysis from a cohort of nurse managers	France	296	Nurse	Center for Epidemiologic Studies Depression Scale (CES-D)	Hospital	89% female and 11% male 22% <40 years old 40% between 40 and 49 years old 38% ≥50 years old	33.33%
Øyane, Pallesen, Moen, Akerstedt, Bjorvatn	2013	Associations between night work and anxiety, depression, insomnia, sleepiness and fatigue in a sample of Norwegian nurses	Norway	2059	Nurse	Hospital Anxiety and Depression Scale (HADS)	Norwegian Nurses' Organization: Hospital Nursing home Home care service Public health services Other services	91.2% female and 8.8% male with no night shift, 90.8% female and 9.2% male with current night shift, 90.2% female and 9.8% male with previous night shift M age = 32.4 years with no night shift, M age = 32.4 years, with current night shift, M age = 35.3 years with previous night shift	8.80%
Penix, Whitmer, Thomas, Wilk, Adler	2019	Behavioral health of US military veterinary personnel deployed to Afghanistan	Afghanistan	237	Military health care personnel (military veterinary and non-military veterinary)	Patient Health Questionnaire-9	Deployed/military	62% vets were male and 54% non-vets were female	6%

Table 1 (continued)

Author(s)	Year	Title	Country	N	Profession	Measurement + tool	Setting	Sociodemographic characteristics	Depression Prevalence Rate
Pomaki, Supeli, Verhoeven	2007	Role conflict and health behaviors: moderating effects on psychological distress and somatic complaints	Netherlands	226	Doctor	Symptom Checklist for Depression (SCL-D)	Hospital	71.24% male and 28.76% female M age = 44.7 years	15%
Pranjić, Maile-Bilić, Be.g.anić, Mustajbe.g.ović	2006	Mobbing, stress, and work ability index among physicians in Bosnia and Herzegovina: survey study	Bosnia and Herzegovina	511	Doctor	Mobbing Questionnaire	Hospital Health center	27.6% were between 26 and 35 years old 44.6% were between 36 and 45 years old 27.8% were older than 45 years	18.59%
Reknes, Pallesen, Magerøy, Moen, Bjorvatn, Einarsen	2014	Exposure to bullying behaviors as a predictor of mental health problems among Norwegian nurses: Results from the prospective SUSSH-survey	Norway	1582	Nurse	Hospital Anxiety and Depression Scale (HADS)	Registered members of the Norwegian Nurses Organisation (NNO)	90.2% female and 9.8% male M age = 33.09 years	NR
Rios, Barbosa, Belasco	2010	Evaluation of quality of life and depression in nursing technicians and nursing assistants	Brazil	266	Nurse	Beck Depression Inventory (BDI)	Hospital	57.1% female and 42.9% male M age = 33.6 years	NR
Rodwell, Martin	2013	The importance of the supervisor for the mental health and work attitudes of Australian aged care nurses	Australia	222	Nurse	Shortened version of the Centre for Epidemiological Studies Depression Scale (CES-D)	Healthcare organizations	94.9% female and 5.1% male 81.2% of the sample was older than 40 years	7.70%
Rodwell, Demir	2012	Psychological consequences of bullying for hospital and aged care nurses	Australia	NR	Nurse Midwife	Center for Epidemiological Studies Depression Scale (CES-D)	Healthcare organizations	99.6% female and 0.4% male 59.3% of sample was 45 or older	NR
Saijot et al.	2014	Effects of work burden, job strain and support on depressive symptoms and burnout among Japanese physicians	Japan	494	Doctor	Patient Health Questionnaire-9	Hospital	80.1% male and 19.9% female 6.6% ≤ 29 years old 20.7% 30–39 years old 40.2% 40–49 years old 32.6% ≥ 50 years old	NR

Table 1 (continued)

Author(s)	Year	Title	Country	N	Profession	Measurement + tool	Setting	Sociodemographic characteristics	Depression Prevalence Rate
Saijo, Yoshioka, Kawanishi, Nakagi, Itoh, Yoshida	2016	Relationships of job demand, job control, and social support on intention to leave and depressive symptoms in Japanese nurses	Japan	1063	Nurse	Center for Epidemiologic Studies Depression Scale (CES-D)	Hospital	93.3% female and 6.7% male 36.8% were under 29 years old, 28.6% were between 30 and 39, 19.5% were between 40 and 49, and 15.4% were above 50 years of age, 0.1% had an unknown age	46.70%
Saksvik-Lehoullier, Bjorvatn, Magerøy, Pallesen	2016	Hardiness, psychosocial factors and shift work tolerance among nurses—a 2-year follow-up study	Norway	1877 at baseline, 1228 at 1-year follow-up and 659 at 2-year follow-up	Nurse	Hospital Anxiety and Depression Scale (HADS)	Registered members of the Norwegian Nurses Organisation (NINO)	9.4% male and 90.6% female M age = 31.1 years	NR
Saqib, Zaghloul, Saqib, Alhomainan, Al-Mohaimed, Al-Mazrou	2019	Association of cumulative job dissatisfaction with depression, anxiety and stress among expatriate nurses in Saudi Arabia	Saudi Arabia	977	Nurse	Depression Anxiety Stress Scale (DASS)	Hospital	99% female and 1% male M age = 32 years	13.30%
Saqib et al		Job insecurity, fear of litigation, and mental health among expatriate nurses	Saudi Arabia	977	Nurse	Depression Anxiety Stress Scale (DASS)	Hospital	99.4% female and 0.6% male M age = 32 years	13.30%
Schmidt, Dantas, Marziale	2011	Anxiety and depression among nursing professionals who work in surgical units	Brazil	211	Nurse	Hospital Anxiety and Depression Scale (HADS)	Hospital	86.7% female and 13.3% male M age = 40.31.1 years	NR
Schmidt, Hupke, Diestel	2012	Does dispositional capacity for self-control attenuate the relation between self-control demands at work and indicators of job strain?	Germany	249	Health care workers	Beck Depression Inventory (BDI) shortened version	Eldercare homes	85.5% female and 14.5% male M age = 38.2 years	NR

Table 1 (continued)

Author(s)	Year	Title	Country	N	Profession	Measurement + tool	Setting	Sociodemographic characteristics	Depression Prevalence Rate
Siebert	2004	Depression in North Carolina social workers: implications for practice and research	US	737	Social worker	Center for Epidemiologic Studies Depression Scale (CES-D)	Members of the North Carolina Chapter of NASW members	84% female and 16% male	19%
Sliter, Sinclair, Cheung, McFadden	2014	Initial evidence for the buffering effect of physical activity on the relationship between workplace stressors and individual outcomes	US	152	Nurse	Center for Epidemiologic Studies Depression Scale (CES-D)	Registered nurses in the Pacific Northwest region of the US	93% female and 7% male M age = 46.15 years	NR
Song et al.	2017	Correlation of occupational stress with depression, anxiety, and sleep in Korean dentists: cross-sectional study	South Korea	231	Doctor	Center for Epidemiologic Studies Depression Scale (CES-D)	Hospital Clinic Other	68% male and 32% female M age = 41.77 years	24.70%
Sugawara et al.	2017	Work–family conflict as a mediator between occupational stress and psychological health among mental health nurses in Japan	Japan	180	Nurse	Center for Epidemiologic Studies Depression Scale (CES-D)	Hospital	M age = 48.6 years 22.77% male and 77.23% female	34.40%
Sui, Liu, Jia, Wang, Yang	2019	Associations of workplace violence and psychological capital with depressive symptoms and burn-out among doctors in Liaoning, China: A cross-sectional study	China	1392	Doctor	Center for Epidemiologic Studies Depression Scale (CES-D)	Hospital	56.3% female and 43.8% male M age = 38.90 years	NR
Tahghighi, Brown, Breen, Kane, He-g.ney, Rees	2019	A comparison of nurse shift workers' and non-shift workers' psychological functioning and resilience	Australia	1369	Nurse	Depression, Anxiety and Stress (DASS21) Scale	Queensland Nurses and Midwives Union (QNMU) members in: Aged care Private sectors Public sectors	91% female of shift workers and 4% male 94% female of non-shift workers and 6% male M age = 46.81 years for shift workers and 50 years for non-shift workers	NR
Takeuchi, Yamazaki	2010	Relationship between work–family conflict and a sense of coherence among Japanese registered nurses	Japan	138	Nurse	Center for Epidemiologic Studies Depression Scale (CES-D)	Hospital	100% female M age = 36.2 years	NR

Table 1 (continued)

Author(s)	Year	Title	Country	N	Profession	Measurement + tool	Setting	Sociodemographic characteristics	Depression Prevalence Rate
Tang, Thomson	2019	Workplace violence in Chinese hospitals: the effects of healthcare disturbance on the psychological well-being of Chinese healthcare workers	China	418	Nurse Doctor	Zung Self-Rating Depression Scale (SDS)	Hospital	84% female and 16% male M age = 30.40 years	NR
Tarrant, Sabo	2010	Role conflict, role ambiguity, and job satisfaction in nurse executives	US	380	Nurse	Center for Epidemiologic Studies Depression Scale (CES-D)	Members The American Organization of Nurse Executives	7.1% male and 92.9% female 0.8% were between the ages of 25 and 34, 10.5% between 35 and 44, 48.9% between 45 and 54, 38.2% between 55 and 64, and 1.6% of age 65 or older	NR
Tavakkoli, Asaadi, Pakpour, Hajjaghbabaei	2015	Environmental psychology effects on mental health job satisfaction and personal well being of nurses	Iran	250	Nurse	General Health Questionnaire (GHQ)	Hospital	75.2% female and 24.8% male Age varied between 23 and 47 years	NR
Teraoka, Kyougoku	2015	Analysis of structural relationship among the occupational dysfunction on the psychological problem in health-care workers: a study using structural equation modeling	Japan	468 study 1, 1142 in study 2 and 687 in study 3	Nurse Physical therapist Occupational therapist Other health-care workers	Center for Epidemiologic Studies Depression Scale (CES-D)	Hospital	23.80% male and 76.19% female M age = 33.6 years	NR
Thun, Bjorvatn, Torsheim, Moen, Magerøy, Pallesen	2014	Night work and symptoms of anxiety and depression among nurses: a longitudinal study	Norway	1356	Nurse	Hospital Anxiety and Depression Scale (HADS)	Registered members of the Norwegian Nurses Organisation (NNO)	100% female M Age = 34.7 years	NR
Tomioaka, Morita, Saeiki, Okamoto, Kurumatani	2011	Working hours, occupational stress and depression among physicians	Japan	706	Doctor	Center for Epidemiologic Studies Depression Scale (CES-D)	Hospital	75.5% male and 24.4% female M age = 37.4 years	28%

Table 1 (continued)

Author(s)	Year	Title	Country	N	Profession	Measurement + tool	Setting	Sociodemographic characteristics	Depression Prevalence Rate
Tomljenovic, Kolaric, Stajduhar, Tesic	2014	Stress, depression and burnout among hospital physicians in Rijeka, Croatia	Croatia	286	Doctor	Beck Depression Inventory (BDI-II)	Hospital	58.4% female and 41.6% male M age = 45.9 years	12.20%
Tong, Cui, Li, Wang	2019	The effect of workplace violence on depressive symptoms and the mediating role of psychological capital in Chinese township general practitioners and nurses: a Cross-sectional study	China	1736	Nurse Doctor	Center for Epidemiologic Studies Depression Scale (CES-D)	Hospital	M age = 41.09 years Gender unspecified	49.90%
Tourigny, Baba, Wang	2010	Burnout and depression among nurses in Japan and China: the moderating effects of job satisfaction and absence	Japan China	789	Nurse	Center for Epidemiologic Studies Depression Scale (CES-D)	NR	Japanese sample: Majority of female with only three male M age = 35 years Chinese sample: 100% female M age = 32 years 64.5% female and 25.5% male M age = 42.64 years	NR
Tsaras, Papathanasiou, Vus, Panagiotopoulou, Katsou, Kelesi, Fradelos	2018	Predicting factors of depression and anxiety in mental health nurses: a quantitative cross-sectional study	Greece	110	Nurse	The Patient Health Questionnaire-2 (PHQ-2)	Hospital		52.70%
Tsutsumi, Kawanami, Horie	2011	Effort-reward imbalance and depression among private practice physicians	Japan	406	Doctor	Center for Epidemiologic Studies Depression Scale (CES-D)	Private practice	50.7% female and 49.3% male M age = 40.1 years	30.7%
Wada et al.	2011	Association of depression and suicidal ideation with unreasonable patient demands and complaints among Japanese physicians: a national cross-sectional survey	Japan	3864	Doctor	Quick Inventory of Depressive Symptomatology (QIDS)	Hospital	78.33% men and 21.67% female The age of male respondents ranged from 40 to 59 years, and that of female respondents ranged from 30 to 49 years were dominant	9.85%

Table 1 (continued)

Author(s)	Year	Title	Country	N	Profession	Measurement + tool	Setting	Sociodemographic characteristics	Depression Prevalence Rate
Wada et al. (2010)	2010	National survey of the association of depressive symptoms with the number of off duty and on-call, and sleep hours among physicians working in Japanese hospitals: a cross-sectional study	Japan	3864	Doctor	Quick Inventory of Depressive Symptomatology	Hospital	78.33% male and 21.67% female 1.3% men and 6.1% female were 24–29 years old 13.7% men and 35.8% female 30–39 years old 29.0% and 32.3% female 40–49 years old 32.0% and 16.8% female 50–59 years old 15.3% and 6.6% female 60–69 years old 8.7% and 2.4% female 70 or more	9.85%
Wang, Sun, Chi Wu, Wang	2010	Prevalence and associated factors of depressive symptoms among Chinese doctors: a cross-sectional survey	China	1890	Doctor	Center for Epidemiologic Studies Depression Scale (CES-D)	Hospital	57.6% female and 42.4% male M age = 37.18 years	65.30%
Wang, Lai, Chang, Huang, Zauszniewski, Yu	2014	The relationships among work stress, resourcefulness, and depression level in psychiatric nurses	Taiwan	154	Nurse	Taiwanese Depression Questionnaire (TDQ)	Medical center	7.1% male and 92.9% female M age = 32.1 years	15.60%
Weigl, Matthias; Stab, Nicole; Herms, Isabel; Angerer, Peter; Hacker, Winfried; Glaser, Jürgen	2016	The associations of supervisor support and work overload with burnout and depression: a cross-sectional study in two nursing settings	Germany	202	Nurse	Spielberger's state-trait depression scales (Form X-1)	Hospital Day care home	Hospital nurses: Gender: Survey 1: Female in 86.5% female in survey 1 and 13.5% male M age = 40.41 years Survey 2: 93.1% female and 6.9% male M age = 46.1 years 100% female M age = 38 years	NR 35%
Welsh	2009	Predictors of depressive symptoms in female medical-surgical hospital nurses	Japan	150	Doctor	Quick inventory of depressive symptomatology	Hospital		

Table 1 (continued)

Author(s)	Year	Title	Country	N	Profession	Measurement + tool	Setting	Sociodemographic characteristics	Depression Prevalence Rate
Wu, Ge, Sun, Wang, Wang	2011	Depressive symptoms and occupational stress among Chinese female nurses: the mediating effects of social support and rational coping	China	1986	Nurse	Center for Epidemiologic Studies Depression Scale (CES-D)	Hospital	100% female M age = 34.5 years	NR
Yang	2014	Be mindful of what you impose on your colleagues: implications of social burden for burdenees' well-being, attitudes and counterproductive work behavior	China	273	Nurse Doctor	Center for Epidemiologic Studies Depression Scale (CES-D)	Hospital	M age = 41.09 years Those who returned both self-report surveys were 79% female and 21% male The 160 Time 1 participants with matched coworker surveys were 61% female and 39% male	NR
Yates, Benson, Harris, Baron	2012	An investigation of factors supporting the psychological health of staff in a UK emergency department	UK	273	Doctor Nurse Administrative staff	Hospital Anxiety and Depression Scale (HADS)16: depression (HADS-D)	Hospital	NR	NR
Yildirim	2009	Bullying among nurses and its effects	Turkey	286	Nurse	Beck Depression Inventory (BDI)	Hospital	100% female Mean age = 28.66 years	45%
Ylipaavalniemi, Kivimäki, Elovainio, Virtanen, Keltikangas-Järvinen, Vahtera	2005	Psychosocial work characteristics and incidence of newly diagnosed depression: a prospective cohort study of three different models	Finland	4815	Doctor Nurse Other professionals Laboratory and X-ray staff Administrative staff Maintenance and cleaning	Doctor-diagnosed depression	Hospital	89% male and 84% female M age = 42.9 years	4.67%
Yoshizawa et al.	2016	Relationship between occupational stress and depression among psychiatric nurses in Japan	Japan	238	Nurse	Center for Epidemiologic Studies Depression Scale (CES-D)	Hospital	27.73% male and 72.27% female M age = 45.8 years	24.26%

Table 1 (continued)

Author(s)	Year	Title	Country	N	Profession	Measurement + tool	Setting	Sociodemographic characteristics	Depression Prevalence Rate
Zhang, Duffy, De Castillero, Duffy, De Castillero, Ronan	2017	Do sleep disturbances mediate the association between work-family conflict and depressive symptoms among nurses? A cross-sectional study	US	397	Nurse	Center for Epidemiologic Studies Depression Scale (CES-D)	Hospital	95.2% female and 4.8% male M age=43.15 years	24.40%
Zhao et al.	2018	Prevalence of workplace violence against Chinese nurses and its association with mental health: a cross-sectional survey	China	886	Nurse	Self-Rating Depression Scale (SDS)	8 hospitals	2.5% male and 97.5% female 58.1% < 30 years old 25.8% between 31 and 40 years old 13.4% between 41 and 50 years old 2.6% > 51 years old	NR

^aRefers to studies where a multilevel analysis was performed

raise concerns for the professionals themselves as well as for their patients. Depression in the helping profession is very likely to erode the quality of care offered to patients and potentially put them at risk (Brunsberg et al. 2019). The results presented are consistent with existing literature on the impact of work organization conditions on depression risk. This relationship can be explained by the Job-Demands-Resources model. According to this model, demanding jobs could exert pressure on the worker, potentially depleting them of physical and mental resources, resulting in health problems (e.g., depression). Demands at work frequently associated with depression risk in helping professionals include: physical demands, psychological demands, job insecurity, irregular work schedule, lack of sleep, lack of decision authority, and latitude. Inversely, resources frequently identified as being negatively associated with depression risk in helping professions include support (supervisor, family, and coworkers), perception of work justice, and fair leadership.

The results of our review extend previous findings by aggregating the results of previous studies. Whereas most previous studies focused on a limited number of helping professions (e.g., doctors and nurses), this systematic review included doctors, nurses as well as other professions (social workers, psychologists, psychiatrists, midwives, occupational therapists, speech pathologists, laboratory and X-ray technicians, community health workers, physical therapist, and eldercare workers and many others) working in more than 29 countries. Relatedly, the scope of this review is also worth noting. The screening of 4 different databases allowed us to retrieve 87,626 records. The number of records screened and retained is quite large. Whereas most systematic reviews had mainly reported on the helping professionals' burnout rates (Adam et al. 2018; Rotenstein et al. 2018), or on depression's prevalence rates (Mata et al. 2015), this study attempted to explore depression prevalence rate as well as work organization variables. To the best of our knowledge, this is the first systematic review to be this comprehensive and of this magnitude. It is also the first study to comprehensively assess prevalence rate in a large array of helping professions while simultaneously examining what work organization conditions could be linked to it.

Those results point to the important role employers could play in preventing and intervening on such mental health problems. Prevention and intervention efforts are more likely to be effective if they were to be implemented at both the organizational and individual level. In the past, most preventative interventions focused on individual characteristics. The evidence for the effectiveness of organizational intervention, although weak, is now mounting (Myette 2008). Based on this systematic review, organizations and workplaces should direct their efforts on

Table 2 Work-Related Variables Associated with Depression in Health-Care Professions and Studies' Risk of Bias

Author(s)	Year	Title	Work-related variables	Risk of bias score
Adams, Lee, Pritchard, White	2009	What stops us from healing the healers: a survey of help-seeking behavior, stigmatization and depression within the medical profession	Part-time work was associated with higher rates of reported depression (OR = 1.38, 95% CI 1.10–1.72). This association was present for male doctors (OR = 1.46, 95% CI 1.04–2.04) but not for female doctors (OR = 0.89, 95% CI 0.60–1.34). General practitioners did not have rates significantly higher than psychiatrists. There was no association with number of years working as a doctor.	17
Ariapooran	2019	Sleep problems and depression in Iranian nurses: the predictive role of workaholism	<i>Workaholism</i> was positively correlated with depression ($r = 0.13, p < .04$). <i>Job experience</i> was a significant predictor of depression ($F = 7.19, p < .009$). Difference in <i>education level</i> was not related to depression ($t = 1.182, p = .24$). <i>Occupational ward</i> was related to depression, with those in emergency ward more likely to have depression symptoms compared to those in nonemergency ward ($t = 1.99, p = .05$). Depression was not significantly correlated with <i>working excessively</i> ($r = .10, p < .12$). Depression was significantly correlated with <i>working compulsively</i> ($r = .15, p < .02$), <i>workaholism</i> ($r = .13, p < .04$), <i>age</i> ($r = .25, p < .001$), and <i>job experience</i> ($r = .16, p < .01$).	17
Asaoka et al.	2013	Factors associated with shift work disorder in nurses working with rapid-rotation schedules in Japan: the Nurses' Sleep Health Project	Shift work disorder in <i>shift work</i> nurses showed higher depressive symptoms compared with nurses without shift work disorder ($p < .001$).	21
Assunção, Machado, Prais, de Araújo	2014	Depression among physicians working in public healthcare in Belo Horizonte, Brazil	Poor working conditions (15.2%); inadequate physical resources for work (12.9%); a poor or inadequate relation between demands and available resources (21.2%); high rates of domestic overload (18.2%); had higher prevalence of depression. Unsatisfaction with the work in general (14.9%) and with relationships at work (35.0%); regular (19.1%) or poor or very poor (16.7%) ability to work (19.1%) had higher prevalence of depression. Physicians that were excessively committed to work (18.2%), whose job was passive (30.8%); with low social support from peers and superiors (14.8%) also had higher prevalence of depression. The work-related aspects positively associated with depression were dissatisfaction with relationships, excessive commitment to work, and passive work (RP = 2.28, $p < 0.05$). Passive work remained significantly associated with depression (RP = 4.52, $p = .017$).	18
Balch, Shanafelt, Dyrbye, Sloan, Russell, Bechamps, Freischlag	2010	Surgeon distress as calibrated by hours worked and nights on call	<i>Hours of work</i> correlated strongly with screening positive for depression ($p < .0001$). <i>Nights on call</i> correlated strongly with screening positive for depression ($p < .0001$). Surgeons who worked <i>80 h/week</i> had a higher prevalence of a positive depression screen (39%) compared with those who worked < 60 h/week (25%; $p < 0.0001$). Surgeons who had > 2 <i>night calls/week</i> had a higher prevalence of a positive depression screen (34.5%) compared with those who had ≤ 1 night calls/week (22.2%; $p < 0.0001$).	17
Barbe, Kimble, Rubenstein	2018	Subjective cognitive complaints, psychosocial factors and nursing work function in nurses providing direct patient care	<i>Nurse function</i> was not associated with depression.	20
Berman, Campbell, Makin, Todd	2007	Occupational stress in palliative medicine, medical oncology and clinical oncology specialist registrars	<i>Satisfaction</i> score with choice of specialty (adjusted OR = 0.54, $p < 0.001$). <i>Satisfaction</i> score with support in training (adjusted OR = 0.90, $p < 0.001$). Effect of <i>stress</i> on personal/family life (adjusted OR = 1.46, $p < 0.001$). <i>Feeling under-utilized</i> (adjusted OR = 1.28, $p < 0.001$).	19

Table 2 (continued)

Author(s)	Year	Title	Work-related variables	Risk of bias score
Berthelsen, Mona; Pallesen, Ståle; Magerøy, Nils; Tysen, Reidar; Bjorvatn, Bjørn; Moen, Bente Elisabeth; Knardahl, Stein	2015	Effects of psychological and social factors in shiftwork on symptoms of anxiety and depression in nurses: a 1-year follow-up	<p><i>Working in the home care service</i> as opposed to working at somatic hospital/clinical increased the odds for “caseness” depression (OR = 2.28; 95% CI 1.12–4.63, $p < .05$)</p> <p><i>Role clarity</i> was significantly correlated with symptoms of depression ($r = -.16$, $p < .001$)</p> <p><i>Role conflict</i> was significantly correlated with symptoms of depression ($r = .21$, $p < .001$)</p> <p><i>Fair leadership</i> was significantly correlated with symptoms of depression ($r = -.15$, $p < .001$)</p> <p><i>Job demands</i> was significantly correlated with symptoms of depression ($r = .15$, $p < .001$)</p> <p><i>Decision authority</i> was significantly correlated with symptoms of depression ($r = -.08$, $p < .01$)</p> <p><i>Social support</i> was significantly correlated with symptoms of depression ($r = -.25$, $p < .001$)</p> <p><i>Job demands</i> predicted symptoms of depression ($B = .07$, $p < .01$)</p> <p>There were no significant associations between <i>day work</i>, <i>night work or rotating shiftwork</i>, and “caseness” depression</p>	21
Boya, Demiral, Ergor, Akvardar, De Witte	2008	Effects of perceived job insecurity on perceived anxiety and depression in nurses	<p><i>Job insecurity</i> (qualitative and quantitative perceived job insecurity) were significantly associated with depression ($p < .001$)</p> <p>Perceived depression were more common among nurses with <i>high iso-strain</i> (ratio of strain and social support) ($p < .001$)</p> <p><i>Work duration of less than 1 year</i> was more likely to be depressed than work duration of more than 1 year ($p = .03$)</p> <p><i>Union membership</i> ($p = .42$), <i>night work</i> ($p = .49$), and <i>overtime work</i> ($p = .98$) were not associated with depression</p>	21
Chaiard, Deeluea, Suksatit, Songkham W, Inta, Stone	2019	Sleep disturbances and related factors among nurses	<p>After excluding males, <i>short sleep duration</i> was significantly related to risk for depression (OR = 2.06, 95% CI 1.01–4.18, $p < .05$)</p>	20
Chana, Navtej; Kennedy, Paul; Chessell, Zoë J	2015	Nursing staffs’ emotional well-being and caring behaviors	<p>Job stressors: The work stressor “inadequate preparation to deal with the emotional needs of patients and their families” was positively correlated with depression in nurses ($r^2(99) = .259$, $p < .01$)</p> <p>The work stressor “lack of staff support” was positively correlated with depression in nurses [$R^2(99) = .407$, $p < .001$]</p> <p>The work stressor “work load” was positively correlated with depression in nurses [$R^2(99) = .363$, $p < .001$]</p> <p>The work stressor “total nursing stress score” was positively correlated with depression in nurses [$R^2(97) = .311$, $p < .01$]</p> <p>Social support: the number of social supporters nurses had was negatively correlated with depression [$R^2(97) = -.328$, $p < .01$]</p> <p>Nurse’s satisfaction with the social support was negatively correlated with depression [$R^2(97) = -.364$, $p < .001$]</p> <p>Resources: self-efficacy to cope with occupational burden was negatively correlated with depression [$R^2(99) = -.313$, $p < .01$]</p> <p>Job demands: the caring behavior of “assurance of human presence” was negatively correlated with depression [$R^2(99) = -.286$, $p < .01$]</p> <p>The caring behavior of “positive connectedness” was negatively correlated with depression [$R^2(97) = -.261$, $p < .01$]</p> <p>The caring behaviors total score was negatively correlated with depression [$R^2(91) = -.337$, $p < .01$]</p>	18

Table 2 (continued)

Author(s)	Year	Title	Work-related variables	Risk of bias score
Chen, Wang, Yang, Fan	2016	Nurse practitioner job content and stress effects on anxiety and depressive symptoms, and self-perceived health status	<p><i>Unlicensed</i> nurse practitioners had higher depressive symptoms than those who were licensed ($\text{Chi}^2(2) = 5.99; p = .050$)</p> <p><i>Job stress</i> was positively correlated with depression ($r = .62, p < .01$)</p> <p><i>Job control</i> was negatively correlated with depression ($r = .030, p < .01$)</p> <p><i>Psychological demands</i> was positively correlated with depression ($r = .22, p < .01$)</p> <p><i>Supervisor support</i> was negatively correlated with depression ($r = .24, p < .01$)</p> <p><i>Coworker support</i> was non-significantly correlated with depression</p> <p>A greater <i>personal response</i> ($B = 2.25, p < .001$) and higher frequency of incompleteness of <i>personal arrangements</i> ($B = 1.16, p = .003$) were associated with higher depression levels after adjusting for other covariates</p>	18
Chiou, Chiang, Huang, Wu, Chien	2013	Health issues among nurses in Taiwanese hospitals: national survey	<p><i>Outpatient</i> ($M = 2.61, SD = .02$) and <i>administrative</i> ($M = 2.69, SD = .04$) nurses scored lower on depression compared to operation room/delivery room nurses, ($M = 2.75, SD = .02$), <i>ward nurses</i> ($M = 2.87, SD = .01$), and <i>emergency room or intensive care unit nurses</i> ($M = 2.81, SD = .01$)</p>	21
Compton, Frank	2011	Mental health concerns among Canadian physicians: results from the 2007–2008 Canadian Physician Health Study	<p><i>Specialty</i>: 26.0% of general practitioners/family physicians reported depression, compared with 20.3% of those in other specialties ($p < .001$)</p> <p>General practitioners/family physicians were more likely to report depression (26.0%) than did psychiatrists (21.2%), anesthesiologists (21.8%), or physicians of other specialties (19.9%; $p = .002$)</p> <p>A <i>work–life imbalance</i> was significantly associated with depression ($p < .001$)</p>	17
Da Silva, Lopes, Susser, Menezes	2016	Work-related depression in primary care teams in Brazil	<p><i>Community health workers</i> had a higher prevalence of probable major depression (18%, $p < .001$) and were more likely to have depressive symptoms and probable major depression than physicians, nurses, or nursing assistants</p> <p>Having a <i>passive, active, or high-strain job</i> ($p < .001$) and receiving <i>low social support</i> ($p < .001$) were significantly associated with depressive symptoms and probable major depression</p> <p>Those with <i>low social support</i> [adjusted odds ratio (AOR) = 3.01; 95% CI 2.20, 4.12] and those with an <i>active</i> (AOR = 5.13; 95% CI 3.46, 7.59) or a <i>high-strain job</i> (AOR = 6.70; 95% CI 4.60, 9.73) had stronger associations with probable major depression</p> <p>Workers who had been <i>working for 2 years or more in the family health program</i> had higher ORs for depressive symptoms and probable major depression than those who had been working for less time (trend $p < .001$)</p> <p>Performance feedback: participants who reported not receiving feedback from their supervisor were more likely to have depressive symptoms (AOR = 1.40; 95% CI 1.13, 1.73) and probable major depression (AOR = 1.90; 95% CI 1.44, 2.51)</p>	20
Da Silva, Peres, Lopes Cde, Schraiber, Susser, Menezes	2015	Violence at work and depressive symptoms in primary health care teams: a cross-sectional study in Brazil	<p><i>Job violence</i>: workers exposed to one type of community violence had an odds ratio for presenting intermediate depressive symptoms of 1.67 (95% CI 1.36, 2.04)</p> <p>Workers exposed to all four types of <i>community violence</i> had an odds ratio for presenting intermediate depressive symptoms of 5.10 (95% CI 1.31, 19.76)</p> <p>Workers exposed to one type of community violence had an odds ratio for probable major depression of 1.84 (95% CI 1.32, 2.56)</p> <p>Workers exposed to all four types of community violence had an odds ratio for probable major depression of 14.34 (95% CI 3.86, 53.17)</p>	22

Table 2 (continued)

Author(s)	Year	Title	Work-related variables	Risk of bias score
De Cruz, Cru, Cabrera, Abellán	2019	Factors related to the probability of suffering mental health problems in emergency care professionals	<i>Number of patients</i> was related to depression ($r = .2$, $p < .001$) The medical staff in relation to nursing professional was related to depression (difference of depression score = 1.2; $p < .001$) <i>Being a physician</i> was related to depression	20
De Oliveira, Mazzaia, Marcola	2015	Symptoms of depression and intervening factors among nurses of emergency hospital services	<i>Work overload, excessive workload, exhaustion, concern with work (30.2%), unsatisfactory salary (13.2%), professional devaluation and lack of recognition (11.3%), lack of conditions for work (9.4%), unprepared team and team rotation (7.6%), job insecurity (5.7%), professional harassment (3.8%), lack of professional commitment from colleagues (3.8%), frustration (3.8%), dissatisfied team (1.8%), and lack of autonomy for the nurse (12.5%)</i> were factors reported by nurses as related to the current emotional state or the development of depressive symptomatology	13
de Vargas, Dias	2011	Depression prevalence in Intensive Care Unit nursing workers: a study at hospitals in a northwestern city of Sao Paulo State	<i>Working night shift</i> (compared to day) significantly increased chance of depression (OR = 1.459, CI 1.42–1.78, $p = .028$) <i>Working two jobs</i> (compared to one) significantly increased chance of depression (OR = 2.119, CI 1.70–2.64, $p = .032$)	18
Dyrbye et al.	2014	A survey of U.S. physicians and their partners regarding the impact of work–home conflict	<i>Physicians with a recent work–home conflict</i> were more likely to screen positive for depression compared to physicians with no recent work–home conflict ($p < .001$) <i>Physician recent work–home conflicts</i> was strongly associated with depression (50.4%) as compared to no recent work–home conflict (26.6%; $p < .0001$)	19
Eldevik, Flo, Moen, Pallesen, Bjorvatn	2013	Insomnia, excessive sleepiness, excessive fatigue, anxiety, depression and shift work disorder in nurses having less than 11 h in-between shifts	<i>Working quick returns</i> (less than 11 h off work between work shifts) was not related to depression	20
Elliott, Rodwell Martin	2017	Aged care nurses' job control influence satisfaction and mental health	<i>Job demands</i> ($r = .21$) was significantly correlated with depression ($p < .01$) <i>Job control</i> ($r = -.36$) was significantly correlated with depression ($p < .01$). Job control was a significant predictor of lower depression <i>Supervisor support</i> ($r = -.30$) was significantly correlated with depression ($p < .01$) <i>Coworker support</i> ($r = -.21$) was significantly correlated with depression ($p < .01$). Coworker support squared was a predictor of depression <i>Procedural justice</i> ($r = -.38$) was significantly correlated with depression ($p < .01$) <i>Distributive justice</i> ($r = -.20$) was significantly correlated with depression ($p < .01$) <i>Interpersonal justice</i> ($r = -.33$) was significantly correlated with depression ($p < .01$) <i>Informational justice</i> ($r = -.42$) was significantly correlated with depression ($p < .01$). Informational justice was a predictor of depression <i>Job satisfaction</i> ($r = -.51$) was significantly correlated with depression ($p < .01$) <i>Outside work support</i> was not significantly correlated with depression <i>Interactions: control x coworker support</i> was a significant predictor of lower depression <i>Demand x supervisor support</i> was a significant predictor of depression	18

Table 2 (continued)

Author(s)	Year	Title	Work-related variables	Risk of bias score
Enns, Currie, Wang	2015	Professional autonomy and work setting as contributing factors to depression and absenteeism in Canadian nurses	Professionals in a <i>non-hospital setting</i> were more likely to exhibit major depressive symptoms compared to professionals in hospital settings ($t=2.02, p<.01$) <i>Job strain</i> was a significant predictor of major depression (OR = 2.20, CI 1.61–3.00, $p<.001$) <i>Autonomy</i> was a significant predictor of major depression (OR = .93, CI .90–.97, $p<.001$) <i>Control over practice</i> was a significant predictor of depression (OR = 0.95, CI 0.93–0.98, $p<.001$) Working in “other” setting vs. hospital was a significant predictor of depression (OR = 1.48, CI 1.22–1.80, $p<.001$)	19
Erdur, Ergin, Turkcu, Parlak, Ergin, Boz	2006	A study of depression and anxiety among doctors working in emergency units in Denizli, Turkey	Years in medicine (> 10 vs. 0–5) was not significantly different in terms of depressive symptoms ($p=.17$) Work type (normal shift vs. 24-h shift vs. day or night shift vs. normal and 24-h shift) was not significantly different in terms of depressive symptoms ($p=.2$) Work hours (per month) (less than 160 vs. more than 180) was not significantly different in terms of depressive symptoms ($p=.6$) Monthly income (< 1000 Turkish lira v 1000–2000 Turkish lira) was predictive of depression symptoms (B = 2.205, $p=.007$) Number of years work in emergency room was predictive of depression (B = .165, $p=.03$)	19
Eriksen, Tambs, Knardahl	2006	Work factors and psychological distress in nurses’ aides: a prospective cohort study	Exposure to role conflicts at work significantly predicted depression (B = .043, $p=.003$) Exposure to threats and violence at work significantly predicted depression (B = .35, $p=.014$) Change in work or work tasks that resulted in lower support and encouragement significantly predicted depression (B = .034, $p=.014$) Change in work or work tasks that resulted in lower work pace significantly predicted depression (B = –.054, $p<.001$)	18
Fang et al.	2018	Depressive symptoms and workplace violence-related risk factors among otorhinolaryngology nurses and physicians in Northern China: a cross-sectional study	Compared to having a senior title, having an intermediate title (OR = 0.37, CI 0.16–0.85, $p=.02$), a primary title (OR = 0.35, CI 0.17–0.73, $p=.01$), and no title (OR = .48, CI .23–.99, $p=.04$) was associated with depression The presence of <i>physical violence at work</i> was associated with increased risk for depression (OR = 1.82, CI 1.06–3.12, $p=.03$)	20
Fang, Qiu, Xu, You	2013	A model for predicting acute and chronic fatigue in Chinese nurses	<i>Job dissatisfaction</i> had a significant direct effect on depression (DE = .13, $t=3.97, p<.001$) <i>Shift work</i> had a significant indirect effect on depression (IE = .09, $t=4.54, p<.001$) Exposure to hazards in work environments had a significant indirect effect on depression (IE = .22, $t=7.74, p<.001$) <i>Job demands</i> had a significant indirect effect on depression (IE = .29, $t=9.75, p<.001$)	18
Favrod et al.	2018	Mental health symptoms and work-related stressors in hospital midwives and NICU nurses: a mixed methods study	Midwives scored higher on scale of depression compared to NICU nurses ($p<.05$) Years of work experience significantly predicted depression (B = .031, $p<.05$) Work participation significantly predicted depression (B = .175, $p<.05$)	19
Flo, Pallesen, Magerøy, Moen, Grønli, Hilde Nordhus, Bjorvatn	2012	Shift work disorder in nurses-assessment, prevalence and related health problems	<i>Shift work disorder</i> was significantly related to depressive symptoms (OR = 1.26; $p<.001$) This was no longer true when other variables (sleep disorders) were considered in the analysis, but remained true when insomnia and sleepiness were added in the analysis	22

Table 2 (continued)

Author(s)	Year	Title	Work-related variables	Risk of bias score
Flo, Pallesen, Moen, Waage, Bjorvatn	2014	Short rest periods between work shifts predict sleep and health problems in nurses at 1-year follow-up	<p>Increased quick returns to work (morning shift following a night shift, for example), significantly predicted depression after 1 year (OR = 2.16, CI 1.15–4.09, $p < .05$)</p> <p>Reduced night shifts, increased night shifts, reduced quick returns, annual number of night shifts, and annual number of quick returns were all not significantly predictive of depression</p> <p>After conducting an adjusted logistic regression, none of the variables significantly predicted depression following 1 year</p>	20
Franche, Williams, Ibrahim, Grace, Mustard, Minore, Stewart	2006	Path analysis of work conditions and work–family spillover as modifiable workplace factors associated with depressive symptomatology	<p>None of the <i>work conditions</i> was significantly associated with depressive symptomatology</p> <p>There was no significant relationship between <i>strain</i> and depressive symptomatology</p> <p><i>Effort–reward ratio</i> had both a direct (.187; $p < .01$) and indirect (.127, $p < .001$) effect on depressive symptoms</p> <p><i>Work social support</i> had an indirect effect on depressive symptoms (–.179, $p < .001$)</p> <p>Positive <i>family-to-work spillover</i> had a direct effect on depressive symptoms (–.190, $p < .01$)</p> <p>Negative <i>work-to-family spillover</i> had a direct effect on depressive symptoms (.225; $p < .001$)</p> <p>An indirect effect of <i>high effort–reward imbalance</i> on depressive symptoms was mediated by increased negative work-to-family spillover</p>	18
Gao, Pan, Sun, Wu, Wang, Wang	2012	Depressive symptoms among Chinese nurses: prevalence and the associated factors	<p>Basic nurses were more likely to experience depression compared to head nurses ($p < .001$)</p> <p>Working night shift was not associated with depression ($p < .994$)</p> <p>A lower monthly salary was associated with higher rate of depressive symptoms ($p < .001$)</p> <p>Nurses who were “neutral” as opposed to satisfied or dissatisfied were more likely to endorse depressive symptoms ($p < .001$)</p> <p>Turnover intention was associated with higher rate of depression symptoms</p> <p>Low decision authority was associated with more endorsement of depressive symptoms ($p < .001$)</p> <p>Low decision latitude was associated with more endorsement of depressive symptoms ($p < .001$)</p> <p>High psychological job demands were related to more endorsement of depression symptoms ($p = .004$)</p> <p>Low supervisor support was related to higher endorsement of depression symptoms ($p < .001$)</p> <p>Low coworker support was related to higher endorsement of depression symptoms ($p < .001$)</p> <p>High overcommitment to job was related to higher endorsement of depression symptoms ($p < .001$)</p> <p>Job rank (basic nurse vs. head nurse) was significantly predictive of depression (OR = 3.118, CI 1.833–5.306, $p = .000$)</p> <p>Over-commitment to job (high vs. low) was significantly predictive of depression (OR = 2.455, CI 1.79–3.356, $p = .000$)</p> <p>Nurse–patient relationship (serious vs. mild) was predictive of depression symptoms (OR = 1.630, CI 1.160–2.290, $p = .005$)</p> <p>Job satisfaction (satisfied vs. dissatisfied) was significantly related to depression (OR = .706, CI .587–0.849, $p = .000$)</p>	20

Table 2 (continued)

Author(s)	Year	Title	Work-related variables	Risk of bias score
Gong et al.	2014	Prevalence of anxiety and depressive symptoms and related risk factors among physicians in China: a cross-sectional study	<p>Compared with male physicians, female physicians had higher odds for depressive symptoms (OR = 1.57, 95% CI 1.21–2.03)</p> <p>Compared with “very good” self-perceived health status, “fair” (OR = 2.52, CI 1.39–4.57) and “bad/very bad” (OR = 7.44, CI 3.95–14.04) self-perceived health status had higher odds for depressive symptoms</p> <p>“Sometimes” (OR = 1.73, CI 1.29–2.32) and “often” (OR = 3.95, CI 2.69–5.82) occurring workplace violence had higher odds for depressive symptoms than no workplace violence</p> <p>Working more than 59 h/week had higher odds for depressive symptoms (60–69 h; OR = 1.56, CI 1.14–2.13) (> 70 h; OR = 1.90, CI 1.31–2.77)</p> <p>More than 2 shift works/week had higher odd depressive symptoms (OR = 1.40, CI 1.02–1.93)</p> <p>Individuals who did not engage in physical exercise (OR = 1.39; CI 1.03–1.86) and who smoked (OR = 1.57, CI 1.18–2.09) had higher odds depressive symptoms</p>	20
Gu, Chu, Qi, Jia	2017	Depressive symptoms and correlates among village doctors in China	<p><i>No social support</i> was related to greater depressive symptoms ($t = 3.17, p = .002$)</p> <p><i>Number of years working</i> was not related to depression ($t = -.33, p = .744$)</p> <p>No specific work-related variables</p> <p><i>Coping style, education level, physical health status, and physical exercise</i> were related to depression symptoms</p>	20
Hall, Franche, Koe-hoorn	2018	Examining exposure assessment in shift work research: a study on depression among nurses	<p>For the low- and moderate-precision work schedule exposure groupings, no relationship was observed with depression</p> <p><i>Work schedule</i> was strongly associated with depression in the high-precision work schedule grouping:</p> <p>Rapidly rotating shift workers had increased odds (AOR = 1.51, 95% CI 0.91–2.51)</p> <p>Undefined rotating shift workers had increased odds (AOR = 1.67, 95% CI 0.92–3.02)</p> <p>Slow rotating shift workers had decreased odds for depression (AOR = 0.79, 95% CI 0.57–1.08)</p> <p>Those with shorter shift duration (8 h or less) had increased odds (AOR = 1.29, 95% CI 0.98–1.69)</p> <p>Those working some weekly paid overtime had increased odds (AOR = 1.20, 95% CI 0.95–1.52)</p> <p>Those reporting no scheduling flexibility had increased odds (AOR = 1.19, 95% CI 0.92–1.53)</p>	22
Hardy et al.	2020	Comparison of burnout, anxiety and depressive syndromes in hospital psychiatrists and other physicians: results from the ESTEM study	<p><i>Work intensity and time</i> resulted in higher odds for depression for psychiatrists (OR = 2.82, CI 1.30–6.09) and non-psychiatrist physicians (OR = 2.14, CI 1.14–4.03)</p> <p><i>Emotional demands</i> were significant predictors of depression for psychiatrists (OR = 4.14, CI 1.72–9.96), but NS for non-psychiatrist physicians</p> <p>Lack/insufficiency of autonomy was associated with higher odd of depression for psychiatrists (OR = 3.79, CI 1.16–12.40) and non-psychiatrist physicians (OR = 4.52, CI 1.50–13.66)</p> <p><i>Bad quality in social relation at work</i> was NS for both psychiatrists and non-psychiatrists</p> <p><i>Insecurity at work</i> was NS for both psychiatrists and non-psychiatrists</p>	18
Harris, Cumming, Campbell	2006	Stress and psychological well-being among allied health professionals	<p><i>Work stress</i> ($r = .22, p < .05$) was significantly correlated with depression symptoms</p> <p><i>Work stress related to colleagues</i> ($r = .22, p < .05$), and <i>work stress related to clients</i> ($r = .21, p < .05$) were significantly correlated with depression</p> <p><i>Years in the profession</i> were not significantly correlated with depression scores</p>	21

Table 2 (continued)

Author(s)	Year	Title	Work-related variables	Risk of bias score
Hasan, Elsayed, Tumah	2018	Occupational stress, coping strategies, and psychological-related outcomes of nurses working in psychiatric hospitals	<i>Work stress</i> ($r = .71, p < .01$) was correlated with depression In a stepwise multiple regression, <i>shift</i> ($F = 4.261, p < .05$) and <i>occupation hours/week</i> ($F = .662, p = .05$) predicted depression symptoms <i>Occupation hours/week</i> ($F = .335, p = .717$) and years of experiences ($F = 3.630, p = .218$) did not predict depression	18
Hsieh, Chen, Wang, Chang, Ma	2016	Association among components of resilience and workplace violence-related depression among emergency department nurses in Taiwan: a cross-sectional study	<i>Peer support</i> was significantly correlated with a depressive tendency ($r = -0.26, p < .001$) <i>Greater peer support and religious belief</i> predicted lower scores in depressive tendency	21
Hsieh, Chen, Wang, Chang, Ma	2017	Predictors of depressive symptoms among psychiatric nurses who suffered from workplace violence	<i>Peer support</i> was significantly different between depressive and non-depressive nurses ($t = 2.41, p = .017$) <i>Peer support</i> was not significantly correlated with depressive symptoms <i>Family support</i> was negatively correlated with depressive symptoms ($r = .180, p = .003$) <i>Levels of education</i> ($B = 2.02$ SE = 0.31 $p = .025$) was significantly related to depressive symptoms Family support ($B = .91$ SE = .04 $p = .017$) was significantly related to depressive symptoms <i>Assaulted workplace violence</i> nurses with higher family support had significantly lower odds of having high depressive symptoms, compared with those with lower family support ($.91; p = .016; 95\% \text{ CI } 0.8-1.0$)	17
Ibrahim, Chamsi Basha, Saquib, Zaghloul, Al-Mazrou, Saquib	2019	Sleep duration is associated with depressive symptoms among expatriate nurses	Nurses with 6–7 h of <i>sleep per day</i> had 61% higher risk of having depression symptoms (OR = 1.61; 95% CI 1.17–2.22) Nurses with less than 5 h of sleep per day had a 110% higher risk of having depression symptoms (OR = 2.10; 95% CI 1.36–3.25) The odds of having symptoms of depression were 61% higher for nurses with 6–7 h of sleep per day (OR = 1.61; 95% CI 1.17–2.22) and 110% higher for nurses with ≤ 5 h (OR = 2.10; 95% CI 1.36–3.25) (fully adjusted model; reference ≥ 8 h)	22
Jakobsen, Jorgensen, Thomsen, Albertsen, Greiner, Rugulies	2016	Emotion work within eldercare and depressive symptoms: a cross-sectional multi-level study assessing the association between externally observed emotion work and self-reported depressive symptoms among Danish eldercare workers	None of the hypotheses in this study was confirmed: professional caregivers who reported <i>high barriers to providing emotional care</i> did not report higher depressive symptoms. Caregivers who reported <i>more taxing and aggressive work events</i> did not report higher depression symptoms <i>High amount of social interactions</i> between professional caregivers and residents were, contrary to expectations, related to higher levels of depressive symptoms at both the individual level and the work unit averaged level ($p = .018$)	20
Jennings, Sinclair, Mohr	2016	Who benefits from family support? Work schedule and family differences	<i>Family-supportive organization perceptions</i> was negatively correlated with depression ($r = .19, p < .01$) Increases in family-supportive organization perceptions were associated with lower depression symptoms ($B = .12, p < .01$) <i>The relationship between family-supportive organization perceptions</i> and depression was dependent on the number of children the worker had ($B = .07, p < .05; R^2 = .02$). <i>Family-supportive organization perceptions</i> was negatively related to depression for workers with dependent children (except those with two children in relation to depression), whereas the relationship was not significant for workers without dependent children	20

Table 2 (continued)

Author(s)	Year	Title	Work-related variables	Risk of bias score
Jolivet et al.	2010	Linking hospital workers' organizational work environment to depressive symptoms: a mediating effect of effort–reward imbalance? The ORSOSA study	<p><i>Working during the daytime</i> in the nursing aids subgroup was associated with higher depression score ($p < .05$)</p> <p><i>High effort–reward imbalance</i> was associated with a higher depression score ($p < .01$–$p < .001$)</p> <p><i>High overcommitment</i> was associated with a higher depression score ($p < .001$)</p> <p><i>Low level of communication</i> in the work unit was associated with a higher depression score ($p < .01$–$p < .001$)</p> <p><i>Lack of support</i> from the senior nurse was associated with a higher depression score ($p < .01$–$p < .05$)</p> <p><i>Staffing inadequacy</i> to perform work was associated with a higher depression score ($p < .05$)</p> <p><i>Bad relationships between workers</i> was associated with a higher depression score ($p < .01$)</p> <p><i>Non-respect of planned days off and vacations</i> was associated with a higher depression score ($p < .05$)</p> <p>Interactions: low level of communication between workers within work units was strongly associated with individual perceptions of effort–reward imbalance and indirectly associated with depressive symptoms</p> <p>High effort–reward imbalance and high overcommitment were both related to higher levels of depression</p>	19
Jung, Lee	2015	Contributors to shift work tolerance in South Korean nurses working rotating shift	<p><i>Job stress</i> showed a significant positive relation to depression ($B = .21, p < .001$)</p> <p><i>Number of night shifts, working hours, and social support</i> were not related to depression</p>	18
Karanikola, Maria; Kaite, Charis	2013	Greek-Cypriot mental health nurses' professional satisfaction and association with mild psychiatric symptoms	<p>Overall <i>professional satisfaction</i> was associated with depressive symptoms ($r = -.246, p < .0001$)</p> <p>Satisfaction from autonomy was negatively correlated with depressive symptoms ($r = -.311, p < .0001$)</p> <p>Satisfaction from organizational policies was negatively correlated with depressive symptoms ($r = .236, p < .0001$)</p> <p>Satisfaction from nurse-to-physician interaction was negatively correlated with depressive symptoms ($r = .145, p = .004$)</p> <p>Satisfaction from nurse-to-nurse interaction was negatively correlated with depressive symptoms ($r = .152, p = .003$)</p> <p>Satisfaction from professional status was negatively correlated with depressive symptoms ($r = .179, p < .0001$)</p> <p>Professional satisfaction was significantly predicted by depression ($B = 0.323, p < .0001$)</p>	19
Kikuchi, Nakaya, Ikeda, Okuzumi, Takeda, Nishi	2014	Relationship between job stress, temperament and depressive symptoms in female nurses	<p>Job stress was modestly correlated with depressive symptoms ($r = -0.23$–0.30)</p> <p>Overtime work, job control as well as depressive and cyclothymic types of temperament were significantly correlated with depressive symptoms ($\beta = .15, p < .05$; $\beta = .19, p < .01$; $\beta = .26, p < .001$; $\beta = .32, p < .001$, respectively)</p> <p>Depressive and cyclothymic types of temperament influenced depressive symptoms both directly ($\beta = .67, p < .001$) and indirectly via job stress ($\beta = .35, p < .001$ from temperament to job stress; $\beta = .20, p < .05$ from job stress to depressive symptoms)</p> <p>Overtime work directly contributed to depressive symptoms ($\beta = .11, p < .05$)</p>	18
Kikuchi, Nakaya, Ikeda, Okuzumi, Takeda, Nishi	2014	Relationship between depressive state, job stress, and sense of coherence among female nurses	<p><i>Sense of coherence</i> was significantly correlated with depressive state ($\beta = -.46, p < .001$)</p> <p><i>Over-commitment</i> was significantly correlated with depressive state ($\beta = .27, p < .001$)</p> <p><i>Effort–esteem ratio</i> was significantly correlated with depressive state ($\beta = .16, p < .001$)</p>	15

Table 2 (continued)

Author(s)	Year	Title	Work-related variables	Risk of bias score
Kubik, Jurkiewicz, Kołpa, Stepień	2018	Nurses' health in the context of depressive symptoms	<p>Long-lasting mental and physical load ($n=79$; 27.15%) contributed to depression based on nurses' reports</p> <p>Long-term stress ($n=70$; 24.05%) contributed to depression based on nurses' reports</p> <p>High level of requirements set at work ($n=39$; 13.40%) contributed to depression based on nurse's reports</p> <p>Problems and conflict with coworkers ($n=37$; 12.71%) contributed to depression based on nurses' reports</p> <p>Disproportionate demanding attitude of patients and their families ($n=35$; 12.03%) contributed to depression based on nurses' reports</p> <p>A lot of responsibility for human life and health ($n=31$; 10.65%) contributed to depression based on nurses' reports</p>	17
Lamy, De Gaudemaris, Lepage, Sobaszek, Caroly, Kelly-Irving, Lang	2013	The organizational work factors' effect on mental health among hospital workers is mediated by perceived effort–reward imbalance: result of a longitudinal study	<p>Poor relationships with hierarchical superiors within the health care team was a significant direct predictor of depression in registered nurses ($B = .165, p < .01$) and nursing assistants ($B = .120, p < .01$)</p> <p>Effort–reward imbalance ratio was a significant direct predictor of depression in registered nurses ($B = .329, p < .0001$) and nursing assistants ($B = .330, p < .0001$)</p> <p>High overcommitment was a significant direct predictor of depression in registered nurses ($B = .075, p < .05$) and nursing assistants ($B = .096, p < .01$)</p> <p>Frequent interruptions during nursing tasks increased registered nurses' depressive symptoms through an increased effort–reward imbalance ratio [.066 (.014) .043; .097]. 67% of this effect was mediated through the increase of the effort–reward imbalance ratio</p> <p>Workers in understaffed units were less likely to report depressive symptoms [$(-.124 (.036) (-.194; -.053)$]</p>	19
Lee, Kim, Kim, Lee, Kim	2016	Association between shift work and severity of depressive symptoms among female nurses: the Korea Nurses' Health Study	Nurses who worked shifts had 1.519 time the odds of experiencing a higher severity of depressive symptoms ($OR = 1.519, CI 1.380–1.674, p < .001$)	22
Madathil, Heck, Schuldberg	2014	Burnout in psychiatric nursing: examining the interplay of autonomy, leadership style, and depressive symptoms	Depressive symptoms were negatively associated with perceived transformational leadership style ($B = -.240; p = .049$)	17
Madsen, Diderichsen, Burr, Rugulies		Person-related work and incident use of antidepressants: relations and mediating factors from the Danish work environment cohort study	<p>High emotional demands were related to increased use of antidepressants, with an OR of 1.51 (95% CI 1.18–1.94)</p> <p>High demands for hiding emotions were also associated with the use of antidepressants, although not statistically significant, with an OR of 1.26 (95% CI 1.00–1.59)</p> <p>There was no increased use of antidepressants among those exposed to threats or violence</p> <p>In the final mediational model, emotional demands ($OR = 1.43$) predicted the use of antidepressants, but demands for hiding emotions ($OR = 1.07$) did not</p>	22
Momeni, Fahim, Vahidi, Nejati, Saeedi	2016	Evaluation of factors affecting psychological morbidity in emergency medicine practitioners	<p>Levels of depression did not differ in doctors who worked 100, 100–200, 200–300, and > 300 h per month ($p = .6$)</p> <p>Participants with a history of previous mental health problem, were more exposed to depression than ones without ($p = .002$). On the other hand the former group's total score was significantly more than the latter ($p = .02$)</p>	16

Table 2 (continued)

Author(s)	Year	Title	Work-related variables	Risk of bias score
Muntaner, Li, Xue, O'Campo, Chung HJ, Eaton WW	2004	Work organization, area labor-market characteristics, and depression among U.S. nursing home workers: a cross-classified multilevel analysis	<p>In the first model: <i>Context of nursing home</i> was marginally significant in predicting baseline risk [random intercept (.32), standard error (.19)]</p> <p>In the second model (emotional strain added): Emotional strain had a marginally significant fixed effect [.533(.284), $p < .1$] There was minimal random effect of <i>emotional strain</i> between nursing homes There was no reduction of variation in baseline risks from the context of nursing homes (.320 vs. .322)</p> <p>In the third model (ownership type, management style, and seniority wage increase were added): <i>Emotional strain</i> still had a marginally significant fixed effect [.680(.358), $p < .1$] <i>Ownership type</i> was significantly related to depressive disorder [1.497(.468), $p < .05$] <i>Seniority wage</i> increase was significantly related to depressive disorder [.869(.406), $p < .05$] <i>Managerial pressure</i> was not significantly related to depressive disorder Nursing assistants with higher emotional strain have higher odds of depressive disorder than those with lower strain (AOR = 1.97; 95% CI 0.98–3.98) Nursing assistants in for-profit nursing homes have significantly higher odds of having depressive disorder than those in nonprofit nursing homes (AOR = 4.47; 95% CI 1.79–11.18) Nursing assistants in nursing homes not providing seniority-based wage increases have significantly higher odds of having depressive disorder than those in nursing homes providing seniority wage increases (AOR = 2.38; 95% CI 1.08–5.28) Nursing assistants in nursing homes with bureaucratic management styles have significantly higher odds of having depressive disorder than those in nursing homes with non-bureaucratic management style (AOR = 1.86; 95% CI 0.82–4.18)</p>	21
Muntaner, Li, Xue, Thompson, Chung, O'Campo	2006	County and organizational predictors of depression symptoms among low-income nursing assistants in the USA	<p><i>Emotional strain</i> has a statistically significant association with depression symptoms with a coefficient estimate of .31 (.14, $p < .05$), even when controlling for subject age, race, marital status, and organizational and county-level variables <i>Nursing home ownership</i> has a statistically significant association with depression symptoms with a coefficient estimate of .36 (.16, $p < .05$), controlling for subject age, race, marital status, and baseline emotional demands When controlling for county-level variables of poverty, the organizational-level variables used were no longer statistically significant predictors of depression symptoms</p>	18
Muntaner, Li, Xue, Thompson, O'Campo, Chung, Eaton	2006	County level socioeconomic position, work organization and depression disorder: a repeated measures cross-classified multilevel analysis of low-income nursing home workers	<p><i>Emotional demands</i> has a statistically significant association with depression symptoms with a coefficient estimate of 6.43 (3.13, $p < .05$), controlling for subjects' age, marriage status and race <i>Nursing home ownership type</i> was statistically significant in its relationship with depression, with an estimated coefficient of 8.00 (3.69) <i>Seniority wage benefit</i> was marginally statistically significant in its relationship with depression, with an estimated coefficient of 6.31 (3.34) The effect of <i>emotional demands</i> on depression remained with statistical significance 6.42 (3.09) controlling for nursing home level variables When controlling for county-level socioeconomic variables, neither workplace nor organizational-level variables were found to be associated with depressive disorder</p>	16

Table 2 (continued)

Author(s)	Year	Title	Work-related variables	Risk of bias score
Muntaner, Van Dusen, Li, Zimmerman, Chung, Benach	2006	Work organization, economic inequality, and depression among nursing assistants: a multilevel modeling approach	Workplace emotional strain is associated with increased odds of depression Nursing assistants with high workplace emotional demand have 2.7 times higher odds of depressive disorder than nursing assistants with lower workplace emotional demand, adjusted for age, race and marital status, and independent of nursing home characteristics Nursing assistants with high workplace emotional demand have 4.6 times higher odds of depressive symptoms than nursing assistants with lower workplace emotional demand, adjusted for age, race and marital status, and independent of nursing home characteristics	21
Nourry, Luc, Lefebvre, Sultan-Taïeb, Béjean	2014	Psychosocial and organizational work environment of nurse managers and self-reported depressive symptoms: cross-sectional analysis from a cohort of nurse managers	<i>Effort-reward imbalance</i> was significantly associated with depressive symptoms (OR = 10.81, 95% CI 5.1–23, $p < .001$)	22
Øyane, Pallesen, Moen, Akerstedt, Bjorvatn	2013	Associations between night work and anxiety, depression, insomnia, sleepiness and fatigue in a sample of Norwegian nurses	<i>Night work</i> was not associated with depression	21
Penix, Whitmer, Thomas, Wilk, Adler	2019	Behavioral health of US military veterinary personnel deployed to Afghanistan	<i>Veterinary (10%) and nonveterinary (2%)</i> personnel were similarly at risk for major depressive disorder (Fisher exact test, $p = .12$) Partial correlations found relationship between depression symptoms and <i>team support</i> ($r = -.35, p < .001$) and perceived leadership ($r = -.45, p < .001$)	18
Pomaki, Supeli, Verhoeven	2007	Role conflict and health behaviors: moderating effects on psychological distress and somatic complaints	Role conflict predicted depressive symptoms ($B = .26, p < .001$) health-promoting behaviors predicted depressive symptoms ($B = -.28, p < .001$) The interaction between role conflict and health-promoting behaviors significantly explained 2% of depressive symptoms ($p < .05$) health-promoting behaviors seemed to buffer the deleterious effects of high role conflict on depressive symptoms The same significant relationships were significant controlling for number of work hours, years employed at the same hospital, and years working at current position	20
Pranjić, Male-Bilić, Be.g.anlić, Mustajbegović	2006	Mobbing, stress, and workability index among physicians in Bosnia and Herzegovina: survey study	In physicians who experienced isolation/exclusion behavior, <i>lack of support from colleagues</i> was significantly related to depression ($B = .772, p = .002$; OR = 1.022; 95% CI .509, 1.535) In physicians who experienced isolation/exclusion behavior, <i>lack of support from superior</i> was significantly related to depression ($B = .066, p = .002$; OR = 1.683; 95% CI 1.250, 2.116) <i>Threat to professional status</i> predicted depressiveness ($B = -.179, p < .001$)	18
Reknes, Pallesen, Magerøy, Moen, Bjorvatn, Einarsen	2014	Exposure to bullying behaviors as a predictor of mental health problems among Norwegian nurses: results from the prospective SUSSSH-survey	Exposure to bullying at T1 did not predict an increase in depressive symptoms at T2 However, symptoms of depression at T1 predicted an increase in subsequent reports of exposure to bullying behaviors at T2 ($B = .12, p < .01$)	21
Rios, Barbosa, Belasco	2010	Evaluation of quality of life and depression in nursing technicians and nursing assistants	<i>Night-shift</i> workers had higher scores of depression <i>Being a car owner</i> was important to reduce the rate of depression ($B = -2.52, p = .004$)	20
Rodwell, Martin	2013	The importance of the supervisor for the mental health and work attitudes of Australian aged care nurses	Job demands were related to depression ($B = .21, p < .05$) Job control was related to depression ($B = .15, p < .01$) Supervisor support ($B = -.06$), coworker support ($B = -.08$), and outside work support ($B = -.09$) were not related to depression (ns)	19
Rodwell, Demir	2012	Psychological consequences of bullying for hospital and aged care nurses	<i>Bullying</i> had a significant main effect for depression [$F(1, 183) = 4.29, p = .040, 95\% \text{ CI } 5.20\text{--}0.54$] conducted with bullying, tenure and negative affectivity co-varied for the aged care nurses	21

Table 2 (continued)

Author(s)	Year	Title	Work-related variables	Risk of bias score
Saijo et al.	2014	Effects of work burden, job strain and support on depressive symptoms and burnout among Japanese physicians	<p>Employees with 1 or no <i>days off per month</i> were more likely to experience depressive symptoms (OR = 2.90; CI 1.37–6.10, $p < .005$)</p> <p>2–4 or 5–7 days off per month were not more likely to experience depression compared to 8 or more days off a month</p> <p>Compared with 1 <i>night duty shift per month</i>, 2–3 night shifts (OR = 1.64, CI 1.01–2.64, $p = .045$) and 4–5 night duty shifts (OR = 2.03, CI 1.19–3.49, $p = .010$) were more likely to experience depressive symptoms. 6 or more night shifts per month were not more likely to experience depression symptoms (OR = 1.64, CI 0.87–3.10, $p = .130$)</p> <p>On call shifts were not related to depression</p> <p>Compared to working 0–39 h/week, working 60–79 h/week (OR = 2.22, CI 1.29–3.81, $p = .004$) and 80 or more hours/week (OR = 1.95, CI 1.07–3.26, $p = .03$) were more likely to experience depression</p> <p>Compared to low <i>job strain</i>, medium job strain (OR = 2.47, CI 1.34–4.55, $p < .004$) and high job strain (OR = 3.84, CI 2.05–7.20, $p < .001$) were more likely to experience depression</p> <p>Support from coworkers was also related to depression (OR = .88, CI 0.82–0.96, $p = .003$)</p> <p>The results described were part of a crude odds ratio model, in an adjusted odds ratio model, all of the variables above became non-significant with the exception of support from coworkers (OR = 0.88, CI 0.79–0.97, $p = .011$) and support from supervisors became significant (OR = .90, CI .82–.99, $p = .035$)</p>	20
Saijo, Yoshioka, Kawanishi, Nakagi, Itoh, Yoshida	2016	Relationships of job demand, job control, and social support on intention to leave and depressive symptoms in Japanese nurses	<p>Job demand was found to be significantly related to depressive symptoms (OR = 1.40; 95% CI 1.16, 1.70, $p = .001$)</p> <p>Job control was found to be significantly related to depressive symptoms (OR = 0.58; 95% CI 0.48, 0.70, $p < .001$)</p> <p>Support from supervisors was found to be significantly related to depressive symptoms (OR = 0.79; 95% CI 0.64, 0.97, $p = .024$)</p> <p>Support from family/friends was found to be significantly related to depressive symptoms (OR = 0.63; 95% CI 0.53, 0.76, $p < .001$)</p> <p>Support from coworkers did not have any statistical significance</p>	20
Saksvik-Lehouillier, Bjorvatn, Magerøy, Pallesen	2016	Hardiness, psychosocial factors and shift work tolerance among nurses—a 2-year follow-up study	<p><i>Children at home</i> correlated negatively with depression ($r = -.07$, $p < .01$)</p> <p><i>Hardiness</i> correlated negatively with depression ($r = -.44$, $p < .01$)</p> <p><i>Commitment</i> correlated negatively with depression ($r = -.52$, $p < .01$)</p> <p><i>Control</i> correlated negatively with depression ($r = -.22$, $p < .01$)</p> <p><i>Challenge</i> correlated negatively with depression ($r = -.20$, $p < .01$)</p> <p><i>Role conflict</i> correlated negatively with depression ($r = .23$, $p < .01$)</p> <p>Social support correlated negatively with depression ($r = -.28$, $p < .01$)</p> <p><i>Fair leadership</i> correlated negatively with depression ($r = -.21$, $p < .01$)</p> <p>Demographic variables, hardiness, role conflict, social support and fair leadership explained 14% of the variance in depression ($F = (9,1733) 67.95$, $p < .001$)</p> <p>Role conflict predicted depression ($B = .11$, $p < .01$)</p> <p>Social support predicted depression ($B = -.09$, $p < .01$)</p> <p>Fair leadership predicted depression ($B = -.07$, $p < .05$)</p> <p>Social support interacted with hardiness in predicting depression ($B = .10$, $p < .01$)</p>	18

Table 2 (continued)

Author(s)	Year	Title	Work-related variables	Risk of bias score
Saqib, Zaghoul, Saqib, Alhomidan, Al Mohaimeed, Al-Mazrou	2019	Association of cumulative job dissatisfaction with depression, anxiety and stress among expatriate nurses in Saudi Arabia	Dissatisfaction with workload and teamwork was significantly associated with both mild/moderate and severe depression. Nurses who were dissatisfied with workload and teamwork were, respectively, two and three times more likely to be severely depressed (OR = 2.02; CI 1.04, 3.91 and OR = 2.91, CI 1.47, 5.732). Adjusted analysis showed that there was a significant dose–response relationship between the number of domains (salary, workload, and teamwork) and depression. For example, nurses who were dissatisfied with all three domains were more likely to be depressed (OR = 3.4 for mild to moderate, OR = 3.6 for severe) than nurses who were not dissatisfied with any of these domains	22
Saqib et al.		Job insecurity, fear of litigation, and mental health among expatriate nurses	<p>Feelings of job insecurity “usually” (OR = 1.9, CI 1.0–3.6, $p < .05$) and “sometimes” (OR = 1.5, CI 1.0–2.2, $p < .05$) increased the chances of mild to moderate depression</p> <p>Feelings of job insecurity “usually” (OR = 2.4, CI 1.0–5.6, $p < .05$) and “always” (OR = 2.3, CI 1.0–5.1, $p < .05$) increased the chances of severe to extremely severe depression. Fear of litigation “usually” (OR = 2.5, CI 1.4–4.5, $p < .01$) and “sometimes” (OR = 2.0, CI 1.4–2.8, $p < .001$) increased the chances of mild to moderate depression</p> <p>Fear of litigation “always” (OR = 4.3, CI 1.9–9.7, $p < .001$) “usually” (OR = 5.9, CI 2.6–13.2, $p < .001$) and “sometimes” (OR = 2.2, CI 1.2–3.9, $p < .001$) increased the chances of severe to extremely severe depression</p>	22
Schmidt, Dantas, Marziale	2011	Anxiety and depression among nursing professionals who work in surgical units	<p>Type of institution (public or private) was not related to depression ($p = .801$)</p> <p>Weekly hour load (up to 40 h vs. more than 40 h) was not related to depression ($p = .134$)</p> <p>A double-work contract (was not defined by authors) (vs. no double-work contract) was related to depression ($p = .010$)</p>	17
Schmidt, Hupke, Diestel	2012	Does dispositional capacity for self-control attenuate the relation between self-control demands at work and indicators of job strain?	<p>Self-control demands were positively correlated with depressive symptoms ($r = .41$, $p < .01$)</p> <p>Self-control capacity was negatively correlated with depressive symptoms ($r = -.44$, $p < .01$)</p> <p>Self-control demands and self-control capacity had significant interaction effects resulting in higher proportions of explained variance in depressive symptoms (5% of variance explained)</p>	21

Table 2 (continued)

Author(s)	Year	Title	Work-related variables	Risk of bias score
Siebert	2004	Depression in North Carolina social workers: implications for practice and research	<p><i>Vacation days</i> correlated negatively with depression ($r = -.16, p < .0001$)</p> <p>% <i>Paperwork</i> correlated positively with depression ($r = .13, p < .001$)</p> <p><i>Social work experience</i> correlated negatively with depression ($r = -.19, p < .00001$)</p> <p><i>Social work designation</i> correlated negatively with depression ($r = -.18, p < .00001$)</p> <p><i>Supervisor support</i> correlated negatively with depression ($r = -.20, p < .00001$)</p> <p><i>Material resources</i> correlated negatively with depression ($r = -.18, p < .00001$)</p> <p><i>Coworker support</i> correlated negatively with depression ($r = -.23, p < .00001$)</p> <p>% <i>Stressful clients</i> correlated positively with depression ($r = .20, p < .00001$)</p> <p><i>Facing ethical compromises</i> correlated positively with depression ($r = .19, p < .00001$)</p> <p><i>Stressful workplace</i> correlated positively with depression ($r = .28, p < .00001$)</p> <p><i>Feeling successful at work</i> correlated negatively with depression ($r = -.30, p < .00001$)</p> <p><i>Facing ethical compromises</i> positively predicted depression ($B = .08, p < .05$)</p> <p><i>Stressful workplace</i> positively predicted depression ($B = -.23, p < .01$)</p> <p><i>Coworker support</i> negatively predicted depression ($B = -.13, p < .001$)</p> <p><i>Feeling successful at work</i> was the strongest negative predictor of depression ($B = -.22, p < .001$)</p>	18
Sliter, Sinclair, Cheung, McFadden	2014	Initial evidence for the buffering effect of physical activity on the relationship between workplace stressors and individual outcomes	<p><i>Patient stressors</i> was significantly correlated with depression ($r = .27, p < .01$)</p> <p><i>Staff demands</i> was significantly correlated with depression ($r = .21, p < .01$)</p> <p><i>Workload</i> was not significantly related to depression</p> <p>The positive relationships between staff demands, patient-related stressors, and depression were weaker for those high in physical activity versus those low in physical activity</p>	21
Song et al.	2017	Correlation of occupational stress with depression, anxiety, and sleep in Korean dentists: cross-sectional study	<p>Occupational status (private outpatient clinic practitioner, professor, resident, hospital dentist, clinic employed dentist, or other) was not related to depression ($p = 0.1544$)</p> <p>Working time per day was significantly related to depression with those working 10 or more hours ($M = 17.95$) scoring higher on scale of depression compared to 8–10 h ($M = 15.91$) and 4–8 h ($M = 14.12$), $p < 0.05$</p> <p>Participants who were “unsatisfied” at their job were more likely to score higher on depression scale compared to those who said “not bad” and those who were “satisfied” $p < 0.0001$</p>	22
Sugawara et al.	2017	Work–family conflict as a mediator between occupational stress and psychological health among mental health nurses in Japan	<p><i>Work interference</i> with family was correlated with depression ($r = .50, p < .001$)</p> <p><i>Family interference</i> with work was correlated with depression ($r = .45, p < .001$)</p> <p><i>Quantitative workload</i> was correlated with depression ($r = .38, p < .001$)</p> <p>Variance in workload was correlated with depression ($r = .40, p < .001$)</p> <p><i>Mental demands</i> was correlated with depression ($r = .17, p < .05$)</p> <p><i>Professional efficacy</i> was correlated with depression ($r = -.21, p < .01$)</p> <p>When work–family conflict was added, variance in workload was no longer related to depressive symptoms</p>	19

Table 2 (continued)

Author(s)	Year	Title	Work-related variables	Risk of bias score
Sui, Liu, Jia, Wang, Yang	2019	Associations of workplace violence and psychological capital with depressive symptoms and burnout among doctors in Liaoning, China: a cross-sectional study	40 or more hours per week was associated with higher mean level of depression ($p < 0.05$) Shift work was associated with higher mean level of depression ($p < 0.05$) Night shift was associated with higher mean level of depression ($p < 0.05$) Division of internal medicine was associated with higher level of depression ($p < 0.05$) Lower income was associated with higher mean level of depression ($p < 0.05$) Workplace violence was associated with mean higher level of depression ($p < 0.05$) In a hierarchical regression model, workplace violence predicted depression ($B = 11$, $CI .06$ to $.16$)	20
Tahghighi, Brown, Breen, Kane, He, g.ney, Rees	2019	A comparison of nurse shift workers' and non-shift workers' psychological functioning and resilience	<i>Shift work</i> had no significant differences between groups on depression	20
Takeuchi, Yamazaki	2010	Relationship between work–family conflict and a sense of coherence among Japanese registered nurses	In the first model: <i>Low job control</i> ($B = -.211$, $p < .05$) significantly increased depression among the nurses <i>Having nobody to help with housework and child care</i> significantly increased depression ($B = -.238$, $p < .05$) Night duty ($B = .142$, $p < .05$) significantly increased depression among the nurses <i>A low degree of family-friendly organizational culture development</i> ($B = -.264$, $p < .01$) significantly increased depression among the nurses In the second model (work-to-family conflict was added): <i>A low degree of family-friendly organizational culture development</i> ($B = -.239$, $p < .05$) significantly increased depression among the nurses Having nobody to help with housework and child care significantly increased depression ($B = -.161$, $p < .05$) Work-to-family conflict significantly increased depression ($B = .563$, $p < .001$) Work-to-family conflict had a larger influence on cumulative fatigue and depression than the work- and family-related variables In the third model (sense of coherence was added): <i>A low degree of family-friendly organizational culture development</i> ($B = -.211$, $p < .05$) significantly increased depression among the nurses Work-to-family conflict significantly increased depression ($B = .563$, $p < .001$) <i>Sense of coherence</i> significantly decreased depression ($B = -.525$, $p < .001$) In the fourth model (work-to-family conflict and sense of coherence interaction): <i>A low degree of family-friendly organizational culture development</i> ($B = -.197$, $p < .05$) significantly increased depression among the nurses <i>Work-to-family conflict</i> significantly increased depression ($B = .535$, $p < .001$) <i>Sense of coherence</i> significantly decreased depression ($B = -.517$, $p < .001$) <i>Work-to-family conflict and sense of coherence</i> interaction predicted depression ($B = .214$, $p < .05$) Sense of coherence provided a buffering effect against the degree of depression resulting from work-to-family conflict in the nurses ($F = 2.084$, $p < .05$)	16

Table 2 (continued)

Author(s)	Year	Title	Work-related variables	Risk of bias score
Tang, Thomson	2019	Workplace violence in Chinese hospitals: the effects of healthcare disturbance on the psychological well-being of Chinese healthcare workers	Job role was significantly negatively correlated with depressive symptoms ($r = -0.225, p < 0.001$) Years of employment was significantly negatively correlated with depressive symptoms ($r = -0.099, p < 0.05$) Hours of work per week were significantly correlated with depression symptoms ($r = 0.163, p < 0.001$) In a hierarchical regression analysis, job role predicted depressive symptoms ($B = -4.29, CI = -5.93, -2.65, p < 0.001$), this indicates that compared to physicians, nurses showed higher levels of depression symptoms Work hours also predicted depressive symptoms ($B = 0.20, CI 0.10, 0.29, p < 0.001$)	20
Tarrant, Sabo	2010	Role conflict, role ambiguity, and job satisfaction in nurse executives	<i>Role conflict</i> was moderately correlated with depression ($r = .45, p < .01$) <i>Role ambiguity</i> was moderately correlated with depression ($r = .46, p < .01$) <i>Job satisfaction</i> was correlated with depression ($r = -.53, p < .01$) Those planning to <i>remain in their position</i> for the next 2 years had lower depression scores than those not planning to remain in their position ($F = 4.869, p < .05$)	15
Tavakkoli, Asaadi, Pakpour, Hajjaghbabaei	2015	Environmental psychology effects on mental health job satisfaction and personal well being of nurses	Nurses working in an environment with no interior design were more likely to experience depressive symptoms compared to nurses working in an environment with a natural outlook ($p = 0.014$) Nurses working in an environment with no interior design, but with a limited view of a simulated garden ($p = 0.011$)	16
Teraoka, Kyougoku	2015	Analysis of structural relationship among the occupational dysfunction on the psychological problem in healthcare workers: a study using structural equation modeling	<i>Occupational imbalance</i> ($r = .342, p < .01$), <i>occupational deprivation</i> ($r = .415, p < .01$), <i>occupational alienation</i> ($r = .438, p < .01$), and <i>occupational marginalization</i> ($r = .529, p < .01$) were correlated with depression (and anxiety) <i>Occupational imbalance</i> ($r = .400, p < .01$), <i>occupational deprivation</i> ($r = .392, p < .01$), <i>occupational alienation</i> ($r = .476, p < .01$), <i>non-shared occupational marginalization</i> ($r = .408, p < .01$), and <i>shared occupational marginalization</i> ($r = .251, p < .01$) were correlated with depressed affect The hypothesis model results suggest that the classification of occupational dysfunction had good fit on depression (RMSEA = 0.060, CFI = 0.922, TLI = 0.917)	19
Thun, Bjorvatn, Torsheim, Moen, Magerøy, Pallesen	2014	Night work and symptoms of anxiety and depression among nurses: a longitudinal study	<i>Night workers and nurses</i> who changed from day work to night work during the study period did not differ from day workers either in terms of baseline symptoms of depression Nurses who changed from night work to day work reported a significant decrease in symptoms of depression over time compared to day workers ($B = -.39, p < .05$) <i>Languidity</i> was related to higher depression ($B = -.22, p < .001$) <i>Hardiness</i> was related to lower depression ($B = .20, p < .001$)	20
Tomioka, Morita, Saeki, Okamoto, Kurumatani	2011	Working hours, occupational stress and depression among physicians	<i>Long working hours group</i> (> 70 h/week) had a higher odds ratio for depression 1.8 (95% CI 1.1–2.8) compared with the short working hours group (< 54 h/week), adjusted for basic attributes In the upper <i>effort-reward ratio</i> tertile versus the lower ERR tertile, the adjusted ORs of depression were 0.6 (0.2–1.8) in the short working hours group, 8.5 (3.0–24.0) in the middle working hours group and 9.9 (3.8–25.7) in the long working hours group <i>Working hours</i> was not associated with depression when participants were stratified according to the effort-reward odds ratio	21

Table 2 (continued)

Author(s)	Year	Title	Work-related variables	Risk of bias score
Tomljenovic, Kolaric, Stajduhar, Tesic	2014	Stress, depression and burnout among hospital physicians in Rijeka, Croatia	There was no statistical difference in surgical, nonsurgical and diagnostic groups in depression <i>Organization of work and financial issues</i> ($\rho = .33$, $p < .001$), public criticism ($\rho = .32$, $p < .001$), hazards at the workplace ($\rho = .19$, $p = .002$), interpersonal conflicts at the workplace ($\rho = .36$, $p < .001$), shift work ($\rho = .37$, $p < .001$), and professional and intellectual demands ($\rho = .37$, $p < .001$) were correlated with depression <i>Total stressors at work</i> was correlated with depression ($\rho = .43$, $p < .001$) <i>Organization of work and financial issues</i> (OR = 1.04, 95% CI 1.02–1.06), <i>public criticism</i> (OR = 1.03, 95% CI 1.01–1.05), <i>interpersonal conflicts at the workplace</i> (OR = 1.03, 95% CI 1.01–1.05), <i>shift work</i> (OR = 1.02, 95% CI 1.01–1.03), and <i>professional and intellectual demands</i> (OR = 1.06, 95% CI 1.03–1.09) were predictors of depression	20
Tong, Cui, Li, Wang	2019	The effect of workplace violence on depressive symptoms and the mediating role of psychological capital in Chinese township general practitioners and nurses: a cross-sectional study	Lower monthly income was related to higher ratings of depression symptoms ($p = .002$) Occupation (being a doctor or nurse) was not related to ratings of depression symptoms ($p = .566$) Workplace violence was significantly correlated with depression symptoms ($r = .40$, $p < .01$) Workplace violence was a significant predictor of depressive symptoms ($B = .399$, $p < .01$)	21
Tourigny, Baba, Wang	2010	Burnout and depression among nurses in Japan and China: the moderating effects of job satisfaction and absence	<i>Emotional exhaustion</i> is positively related to depression in Japanese ($r = .57$, $p < .01$) and Chinese ($r = .43$, $p < .01$) nurses <i>Depersonalization</i> is positively related to depression in Japanese ($r = .40$, $p < .01$) and Chinese ($r = .39$, $p < .01$) nurses <i>Diminished personal accomplishment</i> is also positively related to depression in Japanese ($r = .20$, $p < .01$) and Chinese ($r = .30$, $p < .01$) nurses <i>Job satisfaction</i> was negatively related to depression in Japanese ($r = -.48$, $p < .01$) and Chinese ($r = -.30$, $p < .01$) <i>Absenteeism</i> was not related to depression in Japanese nurses but was related to depression in Chinese nurses ($r = .14$, $p < .01$) Emotional exhaustion was a predictor of depression in Japanese (DR2 = .37, $p < .001$; B = .43, $p < .001$) and Chinese (DR2 = .24, $p < .001$; B = .38, $p < .001$) nurses <i>Job satisfaction</i> was a predictor of depression in Japanese (DR2 = .37, $p < .001$; B = -.30, $p < .001$) and Chinese (DR2 = .24, $p < .001$; B = -.18, $p < .001$) nurses There was a three-way interaction among emotional exhaustion, job satisfaction and absenteeism in predicting depression (DR2 = .03, $p < .01$; B = -3.90, $p < .01$) in Japanese nurses Emotional exhaustion interacts with job satisfaction in predicting depression (DR2 = .02, $p < .01$; B = 2.79, $p < .01$) in Chinese nurses There was a three-way interaction effect among emotional exhaustion, job satisfaction, and absenteeism in predicting depression (DR2 = .02, $p < .05$; B = 24.17, $p < .05$)	17
Tsaras, Papathanasiou, Vus, Panagiotopoulou, Katsou, Kelesi, Fradelos	2018	Predicting factors of depression and anxiety in mental health nurses: a quantitative cross-sectional study	<i>More working experience (in years)</i> was related to higher chance of experiencing depression (AOR = 1.16, CI 1.02, 1.32, $p < .05$) <i>Work position</i> (as a nurse as opposed to nurse assistant or head of department) was related to higher chance of experiencing depression (AOR = 2.93, CI 1.03, 1.32, $p < .05$) <i>Shift (rotated or morning)</i> was not related to experiencing depression (COR = 1.03, CI 0.35, 3.06)	18

Table 2 (continued)

Author(s)	Year	Title	Work-related variables	Risk of bias score
Tsutsumi, Kawanami, Horie	2011	Effort–reward imbalance and depression among private practice physicians	Working more than 60 h/week was associated with increased risk of depression (AOR = 1.24, CI .81–1.92, $p < .05$) Sleeping for less than 5 h/day was related to increased risk for depression (AOR = 1.41, CI .90–2.22, $p < .05$)	19
Wada et al.	2011	Association of depression and suicidal ideation with unreasonable patient demands and complaints among Japanese physicians: a national cross-sectional survey	<i>The number of unreasonable patient demands and complaints in the previous 6 months</i> was significantly associated with depressive symptoms for both men and women ($p < 0.01$) Reports of one to three times (AOR = 1.90; 95% CI 1.40–2.57 for men and AOR = 1.98; 95% CI 1.20–3.26 for women), and four times or more (AOR = 5.45; 95% CI 3.58–8.31 for men and AOR = 4.64; CI 1.92–11.2 for women) unreasonable demands or complaints were significantly associated with depression	22
Wada et al. (2010)	2010	National survey of the association of depressive symptoms with the number of off duty and on-call, and sleep hours among physicians working in Japanese hospitals: a cross-sectional study	For both men and women, depressive state was significantly associated with <i>no days off-duty per month</i> (odds ratio 1.62, 95% confidence interval 1.05–2.52 for men; 2.39, 1.10–5.19 for women), and sleep an average of less than 5 h per night for days not doing overnight work (2.70, 1.82–4.03 for men and 2.38, 1.11–5.10 for women) For men, depressive state was associated with being on-call for 5–7 days per month (1.75, 1.15–2.64), and 8 days or more per month (1.77, 1.24–2.52), and being off-duty 8 days or more per month (0.53, 0.31–0.90). For women, depressive state was weakly associated with being on-call for 8 days or more per month (1.80, 0.98–3.28)	20
Wang, Sun, Chi Wu, Wang	2010	Prevalence and associated factors of depressive symptoms among Chinese doctors: a cross-sectional survey	High role insufficiency (a poor fit between individual training, education, skills, and work requirements) (OR = 2.15, CI 1.66–2.78, $p < .05$), role boundary (incompatible requests from two or more people) (OR = 1.54, CI 1.21–2.00, $p < .05$), and role overload (an increasing unreasonable, and unsupported work load) (OR = 1.42, CI 1.11–1.81, $p < .05$) were more likely to result in depression symptoms	22
Wang, Lai, Chang, Huang, Zauszniewski, Yu	2014	The relationships among work stress, resourcefulness, and depression level in psychiatric nurses	<i>Nurses working in acute units</i> had significantly higher depression levels than those working in non-acute units ($t = 5.79$, $p < .001$) Working in shift had significantly higher depression levels than not ($t = 2.50$, $p < .05$) <i>Work stress</i> and depression level in the psychiatric nurses were significantly and positively related ($r = .70$, $p < .001$) <i>Total resourcefulness</i> correlation with depression levels approached significance ($r = -.15$, $p = .05$) <i>Personal resourcefulness</i> was significantly and negatively correlated with depression level ($r = -.17$, $p < .05$) <i>Work stress</i> ($B = .10$, $\beta = .68$, $t = 11.49$, $p < .001$) and <i>work unit</i> ($B = 5.45$, $\beta = .24$, $t = 2.73$, $p < .01$) were predictors of depression while controlling for marital status and <i>working shift</i> ; 51% of variance has been accounted for depression (adjusted $R^2 = .51$, $F = 40.37$, $p < .001$)	19

Table 2 (continued)

Author(s)	Year	Title	Work-related variables	Risk of bias score
Weigl, Matthias; Stab, Nicole; Herms, Isabel; Angerer, Peter; Hacker, Winfried; Glaser, Jürgen	2016	The associations of supervisor support and work overload with burnout and depression: a cross-sectional study in two nursing settings	<p><i>Emotional exhaustion</i> was highly associated to depressive state symptoms (survey 1: $r = .50, p < .01$; survey 2: $r = .49, p < .01$)</p> <p><i>Emotional exhaustion</i> was strongly associated with depressive state (survey 1: $b = .35, p < .01$; survey 2: $b = .29, p < .01$)</p> <p><i>Work overload</i> was positively associated with depressive state ($r = .29, p < .01$; $r = .27, p < .01$)</p> <p>Supervisor support was negatively related to depressive state ($r = -.29, p < .01$; $r = .21, p < .01$)</p> <p>Supervisor support did not directly predict nurses' depressive state when emotional exhaustion was taken into account</p> <p>The cross-product term of emotional exhaustion and work overload predicted depressive state only in survey 1 ($b = .18, p < .05$)</p> <p>Emotional exhaustion and supervisor support had a significant interaction on depressive state ($b = -.17, p < .05$)</p>	22
Welsh	2009	Predictors of depressive symptoms in female medical-surgical hospital nurses	<p>Depressive symptoms were positively correlated with <i>somatic symptoms</i> ($r = .55, p < .01$), <i>major life events</i> ($r = .41, p < .01$), and <i>occupational stress</i> ($r = .29, p < .01$)</p> <p><i>Years employed in the hospital setting</i> ($r = -.22, p < .01$) and <i>household income</i> ($r = -.18, p < .05$) were inversely related to depressive symptoms</p> <p>Hierarchical multiple regression was used to identify predictors of nurses' depressive symptoms. Somatic symptoms ($\beta = .39, p < .01$), occupational stress ($\beta = .18, p < .05$), major life events ($\beta = .18, p < .05$), and income ($\beta = -.15, p < .05$) accounted for 34% of the variance in nurses' depressive symptom scores</p>	17
Wu, Ge, Sun, Wang, Wang	2011	Depressive symptoms and occupational stress among Chinese female nurses: the mediating effects of social support and rational coping	<p><i>Role overload</i> was positively correlated with depressive symptoms ($r = .20, p < .01$)</p> <p><i>Role insufficiency</i> was positively correlated with depressive symptoms ($r = .19, p < .01$)</p> <p><i>Role boundary</i> was positively correlated with depressive symptoms ($r = .13, p < .01$)</p> <p><i>Social support</i> was negatively correlated with depressive symptoms ($r = -.17, p < .01$)</p> <p>Rational coping was negatively correlated with depressive symptoms ($r = -.10, p < .01$)</p> <p><i>Role overload</i> ($B = .20, p < .05$), <i>role insufficiency</i> ($B = .19, p < .05$), and <i>role boundary</i> ($B = .13, p < .05$) predicted depressive symptoms</p> <p><i>Social support</i> ($B = -.17, p < .05$) and <i>rational coping</i> ($B = -.11, p < .05$) predicted depressive symptoms</p> <p>Social support mediated the effects of <i>role insufficiency</i>, <i>role ambiguity</i>, and <i>role boundary</i> on depressive symptoms ($z = 8.45, p < .001$; $z = 9.08, p < .001$; and $z = 7.94, p < .001$, respectively)</p> <p>Rational coping mediated the effects of <i>role overload</i>, <i>role insufficiency</i>, <i>role ambiguity</i>, and <i>responsibility</i> on depressive symptoms ($z = 4.07, p < .001$; $z = 8.38, p < .001$; $z = 9.28, p < .001$; and $z = 2.71, p = .007$, respectively)</p>	18
Yang	2014	Be mindful of what you impose on your colleagues: implications of social burden for burdenees' well-being, attitudes and counterproductive work behavior	<p>Job satisfaction was negatively correlated with depressive mood ($r = -.19, p < .01$)</p> <p>The number of hours worked per week significantly predicted depression ($B = -.00, CI = -.02-.00, p < .05$)</p>	17
Yates, Benson, Harris, Baron	2012	An investigation of factors supporting the psychological health of staff in a UK emergency department	<i>Social support</i> was associated with less ratings on depression scale ($r = -.499, p < .001$)	10
Yildirim	2009	Bullying among nurses and its effects	<p>Bullying behavior was positively correlated with nurses' depression ($p < .00$)</p> <p>Bullying behavior and excessive workload predicted nurses' depression status ($B = .54, F = 56.61, p < .00$)</p>	18

Table 2 (continued)

Author(s)	Year	Title	Work-related variables	Risk of bias score
Ylipaavalniemi, Kivimäki, Elovainio, Virtanen, Keltikangas-Järvinen, Vahtera	2005	Psychosocial work characteristics and incidence of newly diagnosed depression: a prospective cohort study of three different models	<i>Job demands, job control, and job strain</i> did not predict new depression <i>Low team climate</i> predicted new depression (AOR = 1.75, CI 1.13–2.72, $p < 0.05$) <i>Low procedural justice</i> predicted new depression (AOR = 1.14, CI .74–1.77, $p < 0.05$) <i>Low relational justice</i> predicted new depression (AOR = 1.24, CI .80–1.92, $p < 0.05$) <i>Low job control</i> predicted new depression (AOR = 1.01, CI .70–1.46, $p < 0.05$) <i>High job demands</i> predicted new depression (AOR = 1.13, CI .80–1.58, $p < 0.05$) <i>High job strain</i> predicted new depression (AOR = 1.27, CI .92–1.76, $p < 0.05$)	20
Yoshizawa et al.	2016	Relationship between occupational stress and depression among psychiatric nurses in Japan	<i>High job control</i> (compared to low) resulted in less depression in nurses (AOR = .36, CI .13–.97, $p < .05$) <i>High social support from a supervisor</i> (compared to low) resulted in less depression (AOR = .18, CI .05–.65, $p < .01$) <i>High quantitative workload</i> (compared to low) resulted in more depression (AOR = 5.18, CI 1.34–9.997, $p < .05$)	20
Zhang, Duffy, De Castillero, Duffy, De Castillero, Ronan	2017	Do sleep disturbances mediate the association between work-family conflict and depressive symptoms among nurses? A cross-sectional study	<i>Sleep disturbances</i> [Rho(387) = .51, $p < .001$] was significantly correlated with depression <i>Work-family conflict</i> [Rho(388) = .38, $p < .001$] was significantly correlated with depression <i>Physical demands</i> [Rho(387) = .23, $p < .001$] was significantly correlated with depression <i>Psychological demands</i> [Rho(384) = 0.25, $p < .001$] was significantly correlated with depression <i>Decision authority</i> [Rho(382) = -.17, $p = .001$] was significantly correlated with depression <i>Social support</i> [Rho(378) = -.15, $p = .004$] was significantly correlated with depression <i>Work-family conflict</i> was significantly associated with depressive symptoms [$R^2 = .21$, $F(11, 342) = 8.09$, $\beta = 2.22$, $p < .001$] among nurses <i>Sleep disturbances</i> partially mediated this association by 40.54%	20
Zhao et al.	2018	Prevalence of workplace violence against Chinese nurses and its association with mental health: a cross-sectional survey	<i>Workplace violence</i> was correlated positively with nurses' depression ($r = .131$, $p < .01$) after eliminating the effects of the demographic variables Gender ($r = .135$, $p < .01$) played a moderating role in the association between workplace violence and depression	21

work-related risk factors that are associated with depression (e.g., reducing the workload, reducing the emotional strain, reducing the impact of work schedule on a worker's sleep, decreasing the number of work hours, and trying to avoid bullying and conflict at work). Standardized risk and protective factors assessment at the organizational level could be one way of going about it. An evaluation of the demands placed on a worker coupled with the resources available could also be pertinent. Given that depression is a multifactorial disorder with some of its risk factors being individually based, employers could screen for possible depression symptoms. In doing so, one might need to pay particular attention to avoid possible discrimination and stigmatization. Keeping those records confidential and possibly web-based could be an option (Myette 2008).

Limitations

This study presented with a number of limitations that are worth mentioning. The important heterogeneity in terms of depression definition, measurement tool, sample obtained, and methodology adopted complicated the comparison process. This lack of consensus in terms of number of symptoms necessary to warrant a depression disorder or a cutoff score used across studies to report on participants' depression precludes us from deriving a consistent prevalence rate. The same problem is also noted with regards to work organization conditions that are labeled differently and hence measured differently across studies. We also decided to limit the scope of this review mainly to demands and resources that are work-related. In doing so, we excluded personality traits and predisposing variables that could explain some of the obtained results.

Some articles could not be retrieved online. The results of such studies were, therefore, not reported. Our decision to exclude certain professions and students could have biased our results. In our review, we wanted to focus on individuals having graduated, with no or minimal supervision, and therefore, occupying professional roles as opposed to that of a resident or a trainee. Even though we decided to use the term “risk” to refer to depression risk, several studies were cross-sectional. Caution, therefore, needs to be taken when interpreting the results of such studies. Lastly, we only included studies written in English.

Conclusion

Future researchers are encouraged to expand the pool of studies reviewed to non-English ones as well as to medical residents and trainees who will eventually be on the job market. Identifying risk factors in residents and trainees could be worth the effort and may serve as a preventive measure before those individuals start working with vulnerable populations. Relatedly, conducting a meta-analysis could help shed further light on the impact of work organization variables on depressive symptoms. Lastly, examining the influence of non-work-related variables such as workers’ personality traits and predisposing variables on worker’s depression could also be pertinent.

Despite those limitations, our results should serve as an important reminder to pay attention to the mental health of workers in helping profession. Investing in employees’ mental health by preventing and reducing depression risk could prove to be a valuable investment from an employer’s point of view (Myette 2008) as it is likely to increase productivity and reduce absenteeism (Oliveira Santana and Barros 2019; Rost et al. 2004). The work organization variables highlighted in this review could be one way of going about it. Individuals working in the helping professions are encouraged to recognize early signs of depression in themselves as well as in their colleagues. Early detection will hopefully help prevent the development of depressive symptoms. Similarly, vulnerable employees are encouraged to carefully evaluate potential employment places based on variables identified in this review. Health care professionals already working in stressful environments should be made more aware of the association between certain job characteristics (e.g., high number of hours) on their risk of suffering from depression. Better awareness of those risk factors’ negative repercussions will hopefully serve to mitigate the risk of employee depression. Healthcare organizations are encouraged to put in place work organization conditions and human resource practices targeting the risk factors identified in this review. Supervisors and managers alike should make every effort to reduce those risk factors while amplifying

the protective role resources could play in workers’ mental health (Siebert 2004). Relatedly, employees at risk should be encouraged to seek help (Siebert 2004). It is also worth reiterating that individuals working in helping professions have an ethical responsibility toward themselves and to their patients (Siebert 2004). Clients served by individuals in health care services are often in vulnerable situations. The negative repercussions from workers’ depression symptoms should be prevented before being endured by their patients.

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