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Compassion fatigue, burnout, compassion satisfaction and depression among emergency department physicians and nurses: a cross-sectional study

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ABSTRACT

Objectives Emergency department physicians and nurses are at high risk of compassion fatigue, burnout and depression. The purpose of this study was to examine the inter-relationship between compassion fatigue, burnout, compassion satisfaction and depression in emergency department physicians and nurses.

Design A cross-sectional study.

Setting This study was conducted in five tertiary hospitals in five different cities across the province of Sichuan, China, in 2021.

Participants A total of 342 emergency department physicians and nurses participated in the study.

Main outcome measures Compassion fatigue, burnout, compassion satisfaction and depression scores.

Results Among the study participants, 100% were found to have depressive symptoms, 27.8% had low compassion satisfaction, 2.3% had high burnout and 3.8% had compassion fatigue. In the final multiple linear regression model, marital status (p=0.008; 95% CI −5.205 to −0.789), history of chronic disease (p=0.003; 95% CI −6.461 to −1.386), compassion satisfaction (p<0.001; 95% CI 0.593 to 1.274), burnout (p=0.019; 95% CI 0.084 to 0.930) and compassion fatigue (p<0.001; 95% CI −1.527 to −1.053) among emergency department physicians and nurses were considered to be significant predictors of depression.

Conclusions The prevalence of depression among emergency department physicians and nurses is high in the province of Sichuan, China. Compassion fatigue, burnout and compassion satisfaction were significantly associated with depression in emergency department physicians and nurses. Hospital administrations should consider these findings to develop appropriate psychological interventions and strategies, to prevent, alleviate or treat severe depression among emergency department physicians and nurses in the province of Sichuan.

Strengths and limitations of this study

- This is a novel study conducted in the province of Sichuan, China, which describes the prevalence of compassion fatigue, burnout, compassion satisfaction and depression and the influencing factors associated with depression among emergency department physicians and nurses.
- The causal association between compassion fatigue, burnout, compassion satisfaction and depression could not be established since this was a cross-sectional study.
- Data on compassion fatigue, burnout, compassion satisfaction and depression were collected based on the participants' self-reports, which may have led to information bias.

INTRODUCTION

Emergency departments are fast-paced, high-pressure environments in which the medical staff encounter heavy workloads, violence, interpersonal conflict, high patient load, mass casualty incidents; moreover, limited resources and poor skill mix compound the problem.[1 2] Emergency department physicians and nurses who are at the frontline of a demanding healthcare system take significant responsibility for the care of emergency patients, regardless of overstretched and overburdened resources.[3] Emergency physicians and nurses who witness alarming morbidity and mortality on a daily basis can experience adverse physical and mental health problems, such as compassion fatigue, depression and burnout.[4] It has been reported that compassion fatigue, burnout and depression afflicting emergency physicians and nurses can harm individual mental health, and can cause a series of fateful consequences, including medical errors, poor-quality patient care and increased patient mortality during hospital stay.[5–7]

Compassion fatigue, which is considered as an occupational hazard in healthcare, is conceptualised as 'the natural, consequent behaviours and emotions resulting from knowing about a traumatising event

experienced by a significant other—the stress resulting from helping or wanting to help a traumatised or suffering person'.[8 9] Compassion fatigue can result in a series of physical, mental and work-related symptoms that seriously affect quality of patient care and staff-patient relationships.[10] Chu reported that compassion fatigue has a significant adverse effect on job performance and organisational citizenship behaviour.[11] A study conducted in the USA indicated that about 80% of emergency nurses had moderate to high levels of compassion fatigue.[12] Barnett *et al* noted that compassion fatigue was positively associated with emotional display.[13] Burnout is a work-related syndrome and predominantly defined as 'high emotional exhaustion, depersonalisation and a low level of personal accomplishment'.[14] The prevalence of burnout among emergency medical staff was very high and burnout can cause serious consequences.[15–17] Moukarzel *et al* noted that 34.6% emergency medical staff had severe burnout and Soltanifar *et al* found that 84.5% emergency physicians had experienced high emotional exhaustion.[15 18] The findings by Jyothindran *et al* indicated that severe burnout was highly correlated with medical error and turnover.[19] Compassion satisfaction is defined as the emotions generated and the sense of achievement derived from helping and caring for patients, whether related to direct assistance or support in improvement of patients' condition.[20]

Depression, a common and serious mental illness, is listed by WHO as one of the most important factors contributing to global disability and the main contributor to suicide deaths at all ages.[21] The most common symptoms associated with depression are persistent sadness, a loss of interest and energy, insomnia, headache, unexplained pain, gastrointestinal symptoms, hopelessness and thoughts of self-harm or suicide.[22] Severe depression can lead to many negative outcomes. For example, a recent study on emergency department nurses during the COVID-19 pandemic in China showed that depression had an adverse effect on quality of patient care and nurses' quality of life.[23] Vasconcelos *et al* found that depressive symptoms were significantly associated with burnout.[24] Emergency medical staff are exposed to all kinds of stress every day.[25] Hence, special attention should be paid to the psychological status of emergency physicians and nurses.

Although extensive studies on depression have been conducted, most of the studies have only focused on nurses.[23 24] Moreover, few studies have been carried out to explore the factors that influence the development of depression in emergency physicians and nurses.[5 25] Considering that emergency physicians and nurses have emotionally demanding tasks and work in high-pressure situations, the aim of this study was to determine the prevalence of compassion fatigue, burnout, compassion satisfaction and depression and explore the interrelationship of these among this highly vulnerable population.

METHODS

Study design and participants

A cross-sectional survey was conducted among emergency physicians and nurses across five different cities of Sichuan province, China. A convenience sample was used to recruit physicians and registered nurses working in the emergency department. The eligibility criteria were as follows: (1) being licensed physicians and registered nurses; (2) with >1 year's work experience; (3) working in emergency department; (4) provided consent to participate. The data were collected by five trained research assistants from January to February 2021. A set of questionnaires was distributed to all emergency medical staff by the five tertiary hospitals' administration. All the participants were informed that their participation was voluntary and that their data would be anonymised. A total of 350 emergency physicians and nurses filled in the questionnaires, out of which 342 questionnaires were returned (an effective response rate of 97.7%).

Measurements

The questionnaire comprised three instruments: a demographic survey, the Professional Quality of Life (ProQOLv5) scale and the Center for Epidemiologic Studies Depression (CES-D) scale. Sociodemographic data were collected with a self-designed questionnaire, including position (physician, nurse), age (<35 years, 35 years or older), gender (male, female), marital status (married, unmarried), education level (diploma, associate degree, bachelor's degree, master's degree or higher), professional title (primary, intermediate, senior), work experience (<5 years, 5–10 years, over 10 years), weekly night shifts (none, 1–2, 3–4, >4), daily work hours (<9 hours, 9–12 hours, over 12 hours), cigarette use (yes, no), alcohol use (yes, no) and history of chronic disease (yes, no). According to the level of experience of the professionals, physicians' and nurses' professional ranks in China were divided into three categories, including primary titles (physicians, nurses, nurse practitioners), intermediate titles (physicians in charge of a case, nurses-in-charge) and senior titles (assistant director physicians, director physicians, assistant director nurses, director nurses).

Professional quality of life scale

Compassion fatigue, burnout and compassion satisfaction levels were assessed using the ProQOLv5. The questionnaire includes 30 items with a Likert scale of 5 points (1=never; 5=always), 10 items for compassion satisfaction, 10 items for burnout and 10 items for compassion fatigue.[20] The level of compassion satisfaction was divided into <22 (low), 23–41 (middle) and >42 (high). For compassion fatigue and burnout, a score of 22 or less represents low levels, 23–41 represents middle levels and a score of >42 high levels. The alpha reliability coefficients for compassion satisfaction, burnout and compassion fatigue were 0.775, 0.775 and 0.807, respectively.

Depression

The CES-D is a 20-item questionnaire intended to measure the frequency of occurrence of symptoms of depression over the past week using a 5-point Likert scale (each item was scored as follows: 0=rarely or none of the time to 3=most or all of the time; total score range, 0–60).[26] The CES-D scale has four reverse-scored items (items 4, 8, 12 and 16) and covers four major symptoms of depression, including (1) depressed affect (eg, sadness, crying); (2) absence of positive affect (eg, hope, enjoyment); (3) somatic symptoms (eg, appetite problems, problems 'getting going') and (4) interpersonal relations (eg, perceiving others as unfriendly). Standard cut-off value ≥16 indicates the likely presence of depression. The Cronbach's α in the current study was 0.916.

Statistical analysis

Statistical analysis was conducted using SPSS V.22.0 (SPSS, Chicago, Illinois, USA). Continuous variables were summarised as mean with SD, while categorical variables were presented as frequencies and percentages. Independent samples t-test, and one-way analysis of variance were used to compare participants' depression by demographic characteristics. Associations between compassion satisfaction, burnout, compassion fatigue and depression among emergency physicians and nurses were analysed using Pearson's correlation analysis. A multiple linear regression model was used to estimate the effect of compassion satisfaction, burnout, compassion fatigue and other demographic variables on depression. A p value of <0.05 was considered statistically significant (two-tailed).

Patient and public involvement

Patients or members of the public were not involved in the design, reporting or dissemination plans of our research.

RESULTS

The participants' baseline characteristics are shown in table 1. The mean age was 32.59 years (SD, 8.19; age range, 20–58 years). Most participants were female (70.5%), nurses (71.1%), married (68.7.0%), held a bachelor's degree (62.9%) and had a primary professional title (57.0%).

The differences in depression scores according to the characteristics of emergency physicians and nurses are also presented in table 1. There were significant differences in depression scores based on marital status (p<0.01), professional title (p<0.05), daily work hours (p<0.05), alcohol use (p<0.05) and history of chronic disease (p<0.01).

As depicted in table 2, compassion satisfaction levels were moderate in approximately 70.8% of emergency physicians and nurses, low in 27.8% of them and high in 1.4%. Of the participants, 2.3% had a high burnout score, 66 (19.3%) had a low burnout score and 3% of the respondents had a high compassion fatigue score. The mean scores for depression, compassion satisfaction,

Table 1 Demographic characteristics of emergency department physicians and nurses (n=342)

Variables	N (%)	Depression Mean (SD)
Position		P=0.181
Physician	99 (28.9)	38.60 (11.76)
Nurse	243 (71.1)	36.86 (10.52)
Age (years)		P=0.991
<35	236 (69.0)	37.37 (10.23)
≥35	106 (31.0)	37.35 (12.32)
Gender		P=0.162
Male	101 (29.5)	38.64 (12.22)
Female	241 (70.5)	36.83 (10.28)
Marital status		P=0.002
Unmarried	107 (31.3)	40.01 (11.05)
Married	235 (68.7)	36.16 (10.64)
Education level		P=0.071
Associate degree	102 (29.8)	36.16 (9.97)
Bachelor's degree	215 (62.9)	38.33 (11.49)
Master's degree	25 (7.3)	34.00 (8.24)
Profession title		P=0.034
Primary	195 (57.0)	37.57 (10.56)
Intermediate	108 (31.6)	38.48 (11.51)
Senior	39 (11.4)	33.25 (10.18)
Work experience (years)		P=0.810
<5	94 (27.5)	37.48 (10.09)
5–10	95 (27.8)	37.88 (10.96)
>10	153 (44.7)	36.97 (11.39)
Weekly night shifts		P=0.063
0	46 (13.5)	33.60 (9.35)
1–2	148 (43.4)	37.89 (11.19)
3–4	106 (31.0)	37.46 (11.10)
>4	42 (12.3)	39.40 (10.35)
Daily work hours		P=0.017
<9	161 (47.1)	35.60 (10.29)
9–12	118 (34.5)	39.19 (11.13)
>12	163 (18.4)	38.44 (11.45)
Cigarette use		P=0.244
Yes	38 (11.1)	39.31 (12.13)
No	304 (88.9)	37.12 (10.74)
Alcohol use		P=0.019
Yes	50 (14.6)	40.70 (10.91)
No	292 (85.4)	36.79 (10.82)
History of chronic disease		P=0.001
Yes	58 (17.0)	41.79 (12.21)
No	284 (83.0)	36.46 (10.41)

Table 2 Compassion satisfaction, burnout, compassion fatigue and depression levels among emergency physicians and nurses (n=342)

Dimensions	N (%)	Mean	SD
Depression		37.36	10.91
Compassion satisfaction		26.70	6.36
Low	95 (27.8)	–	–
Medium	242 (70.8)	–	–
High	5 (1.4)	–	–
Burnout		27.74	6.19
Low	66 (19.3)	–	–
Medium	268 (78.4)	–	–
High	8 (2.3)	–	–
Compassion fatigue		30.19	6.59
Low	43 (12.6)	–	–
Medium	286 (83.6)	–	–
High	13 (3.8)	–	–

burnout and compassion fatigue were 37.36 (SD, 10.91), 26.70 (SD, 6.36), 27.74 (SD, 6.19) and 30.19 (SD, 6.59), respectively.

Both compassion satisfaction and burnout were significantly correlated with three depression metrics: depressed affect, somatic symptoms and interpersonal relations. Apart from positive affect, there was no relationship between the other subscales of depression and compassion fatigue (table 3).

Depression was computed as outcome variable, and the independent variables comprised the demographic characteristics and the three dimensions of compassion fatigue. Table 4 shows that marital status, history of chronic disease, compassion satisfaction, burnout and compassion fatigue collectively accounted for 39.6% of the variance in depression (F=28.952, p<0.001, R^2=0.410, adjusted R^2=0.396).

DISCUSSION

The findings of the current study regarding the frequency and distribution of depression among emergency physicians and nurses show that the following characteristics were significantly associated with higher levels of depression—marital status: unmarried; intermediate professional title; consumption of alcohol; daily worktime between 9 and 12 hours and a history of chronic disease. Similar to our study, a statistically significant difference was observed in the levels of depression among frontline doctors combating the COVID-19 pandemic in India with regard to marital status.[27] One reason for this could be that spousal support is beneficial for maintaining good mental health.[28] Our findings concur with those of Xiao *et al*, who found that depression levels were different among different professional titles and that an intermediate title was an independent influencing factor.[29] This could be explained by the fact that compared with medical staff with an intermediate title, physicians and nurses with a senior title have a richer work experience, a higher income and a lower family burden.[30] The findings of this study are in accordance with those of two previous studies that reported that working excessively long hours on a daily basis was significantly associated with the frequency of depressive symptoms.[31 32] Emergency physicians and nurses endure a heavy burden of work imposed on them on a daily basis and most often without a day of safety rest. Work overload and chronic sleep deprivation can increase the risk for depression.[33] A study conducted by Sørensen *et al* among 1943 Danish physicians noted that the emergency department had the highest proportion of risky alcohol use.[34] Besides, the study by Silva and Marcolan reported that the prevalence of depressive symptoms among emergency nurses in Brazil is 95.24%.[35] Emergency physicians and nurses who had severe depressive symptoms were more likely to be drinking alcohol to regulate these emotional states.[36] Our results are also similar to those reported in a study by Ngasa *et al* that found that the presence of a chronic disease was independently associated with depression.[37]

Our study found a considerably high prevalence of depressive symptoms among emergency physicians and nurses, and the prevalence of depressive symptoms reached up to 100%, which is much higher than the previous study.[38] The high level of depression may be associated with factors, such as excessive workload, overcrowding and resource shortages in the emergency department.[39 40] The COVID-19 pandemic has added to the heavy workload and the life-threatening emergencies that medical staff, especially physicians and nurses, were facing, thereby aggravating the psychological pressure; this is one of the neglected important reasons causing the high levels of depression.[41] The prevalence rates of burnout, compassion satisfaction and compassion fatigue in our study were much lower than those in nurses in a study conducted in an adult emergency and urgent care

Table 3 Correlation between dimensions of compassion satisfaction, burnout, compassion fatigue and depression (n=342)

	Depression	Depressed affect	Somatic	Positive affect	Interpersonal
Compassion satisfaction	0.282**	0.319**	0.317**	0.003	0.311**
Burnout	0.171**	0.214**	0.239**	–0.163**	0.247**
Compassion fatigue	–0.178**	–0.092	–0.021	–0.430**	0.001

**P<0.01.

Table 4 Multiple linear regression analysis of depression (n=342)

Dependent variables	Independent variables	Unstandardised coefficient		Standardised coefficient			95% CI	
		B	SE	Beta	t-test	P value	Lower bound	Upper bound
Depression	Marital status	–2.997	1.123	–0.128	–2.670	0.008	–5.205	–0.789
	History of chronic disease	–3.924	1.290	–0.135	–3.052	0.003	–6.461	–1.386
	Compassion satisfaction	0.934	0.173	0.545	5.388	<0.001	0.593	1.274
	Burnout	0.507	0.215	0.288	2.359	0.019	0.084	0.930
	Compassion fatigue	–1.290	0.120	–0.779	–10.707	<0.001	–1.527	–1.053

department.[8] However, these differences may be due to the small sample size (87 nurses), which consisted of emergency nurses only in the Portuguese study. However, in this study, the results indicated an average to high level of compassion fatigue and burnout among emergency nurses, which was much higher than that of a previous study.[42]

We found that compassion satisfaction, burnout and compassion fatigue had a statistically significant correlation with depression. The current study shows that compassion satisfaction has a significant positive correlation with depression and compassion fatigue has a significant negative correlation with depression, which is not consistent with other recent studies. Jo *et al* and Hegney *et al* both found an opposite association, that is, compassion satisfaction was negatively associated with depression and compassion fatigue was positively correlated with depression.[43 44] The reason for this may include differences in measurement tools. Interestingly, an association analysis showed that burnout was significantly related to depression, a finding similar to that of a survey of emergency physicians.[45]

Limitations

Our study has a few limitations. First, our study sample was drawn from a single Chinese region with predominantly emergency physicians and nurses and adopted the method of convenient sampling, which may have caused the uncommonly high scores of depression and limits the generalisability of the findings to other professional groups. Second, most of the instruments used in this research were based on the respondents' self-reports, which is prone to information bias. Therefore, more robust methods of assessment and better tools should be used in future studies. Third, the causal association between compassion satisfaction, burnout, compassion fatigue and depression is not clear, due to the cross-sectional study nature of our study. Hence, we recommend that future research should examine the interaction between compassion fatigue, burnout, compassion satisfaction and depression and evaluate their potential impact rather than focusing on these phenomena separately. Lastly, compassion fatigue, in our study, merely contributed to (did not cause) increase in depression.

Conclusion

The prevalence of depression among emergency physicians and nurses in the province of Sichuan was shown to be extremely high. Marital status and the presence of a chronic disease among the staff affected their depression levels. We also examined the relationship between compassion satisfaction, burnout, compassion fatigue and depression among emergency physicians and nurses in Sichuan province and found a significant association between these. Moreover, it was also determined that independent variables, such as compassion satisfaction, burnout and compassion fatigue strongly predict depression levels among emergency physicians and nurses. Consequently, reducing the level of burnout and compassion fatigue and increasing compassion satisfaction could be a key factor in addressing depression in emergency department physicians and nurses. The findings of our study have the potential to provide new directions and perspectives for future research. However, further studies are needed to derive more specific details through indepth interviews with physicians and nurses to clarify the underlying causes of the high prevalence of depression among emergency physicians and nurses.

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Contributors HM wrote the manuscript and conducted the statistical analysis and interpretation; BW was in charge of the study concept and design; SQH and YZ were in charge of data acquisition. All authors revised and approved the final manuscript. Guarantor: BW.

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Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval The study was approved by the Institutional Review Board of Xiangya Nursing School (approval number E202062), Central South University, China.

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REFERENCES

1 Johnston A, Abraham L, Greenslade J, *et al*. Review article: staff perception of the emergency department working environment: integrative review of the literature. *Emerg Med Australas* 2016;28:7–26.
2 Rasmus P, Marcinkowska W, Cieleban N, *et al*. [Workload and coping with stress and the health status of emergency medical staff in the context of work-life balance]. *Med Pr* 2020;71:587–93.
3 Elder EG, Johnston A, Wallis M, *et al*. Work-based strategies/interventions to ameliorate stressors and foster coping for clinical staff working in emergency departments: a scoping review of the literature. *Australas Emerg Care* 2020;23:181–92.
4 Sawe HR, Murray B, Jamieson J. Compassion fatigue in emergency providers: experiences from sub-Saharan Africa. *Emerg Med Australas* 2016;28:109–11.
5 Guillén-Astete C, Penedo-Alonso R, Gallego-Rodríguez P. Levels of anxiety and depression among emergency physicians in Madrid during the SARS-CoV-2 pandemic. Niveles de ansiedad Y depresión en médicos de urgencias de Madrid durante La pandemia POR El virus SARS-CoV-2. *Emergencias* 2020;32:369–71.
6 O'Callaghan EL, Lam L, Cant R, *et al*. Compassion satisfaction and compassion fatigue in Australian emergency nurses: a descriptive cross-sectional study. *Int Emerg Nurs* 2020;48:100785.
7 Stehman CR, Testo Z, Gershaw RS, *et al*. Burnout, drop out, suicide: physician loss in emergency medicine, part I. *West J Emerg Med* 2019;20:485–94.
8 Borges EMdasN, Fonseca CINdaS, Baptista PCP, *et al*. Compassion fatigue among nurses working on an adult emergency and urgent care unit. *Rev Lat Am Enfermagem* 2019;27:e3175.
9 Deering D. Compassion fatigue: coping with secondary traumatic stress disorder in those who treat the traumatized. *J Psychosoc Nurs Ment Health Serv* 1996;34:52.
10 Sorenson C, Bolick B, Wright K, *et al*. Understanding compassion fatigue in healthcare providers: a review of current literature. *J Nurs Scholarsh* 2016;48:456–65.
11 Chu L-C. The influence of compassion fatigue on job performance and organizational citizenship behaviors: the moderating effect of Person-Job fit. *J Nurs Scholarsh* 2021;53:500–10.
12 Hooper C, Craig J, Janvrin DR, *et al*. Compassion satisfaction, burnout, and compassion fatigue among emergency nurses compared with nurses in other selected inpatient specialties. *J Emerg Nurs* 2010;36:420–7.
13 Barnett MD, Hays KN, Cantu C. Compassion fatigue, emotional labor, and emotional display among hospice nurses. *Death Stud* 2022;46:1–7.
14 Maslach C, Schaufeli WB, Leiter MP. Job burnout. *Annu Rev Psychol* 2001;52:397–422.
15 Moukarzel A, Michelet P, Durand A-C, *et al*. Burnout syndrome among emergency department staff: prevalence and associated factors. *Biomed Res Int* 2019;2019:6462472
16 Ilić IM, MŽ A, Jovanović JM. Relationships of work-related psychosocial risks, stress, individual factors and burnout - Questionnaire survey among emergency physicians and nurses. Relationships of work-related psychosocial risks, stress, individual factors and burnout – Questionnaire survey among emergency physicians and nurses. *Med Pr* 2017;68:167–78.
17 Civita M, Laurita E, Di Stefano C, *et al*. Physicians and nurses' burnout in the emergency departments of North West of Italy. *Intern Emerg Med* 2021;16:1381–5.
18 Soltanifar A, Pishbin E, Attaran Mashhadi N, *et al*. Burnout among female emergency medicine physicians: a nationwide study. *Emerg Med Australas* 2018;30:517–22.
19 Jyothindran R, d'Etienne JP, Marcum K, *et al*. Fulfillment, burnout and resilience in emergency medicine-Correlations and effects on patient and provider outcomes. *PLoS One* 2020;15:e0240934.
20 InStamm B. *The concise ProQOL manual*. 2nd edn. Pocatello ID: ProQOL.org, 2010.
21 World Health Organization. Depression and other common mental disorders: global health estimates, 2017. Available: https://www.who.int/publications/i/item/depression-global-health-estimates [Accessed 3 Jan 2017].
22 Priyadarshini J. Depression-let's talk, 2017. Available: http://www.who.int/campaigns/world-health-day/2017/handouts-depression/what-you-should-know-01.pdf?ua=1.pdf [Accessed 7 Apr 2017].
23 An Y, Yang Y, Wang A, *et al*. Prevalence of depression and its impact on quality of life among frontline nurses in emergency departments during the COVID-19 outbreak. *J Affect Disord* 2020;276:312–5.
24 Vasconcelos EMde, Martino MMFD, França SPdeS. Burnout and depressive symptoms in intensive care nurses: relationship analysis. *Rev Bras Enferm* 2018;71:135–41.
25 Crilly J, Greenslade J, Lincoln C, *et al*. Measuring the impact of the working environment on emergency department nurses: a cross-sectional pilot study. *Int Emerg Nurs* 2017;31:9–14.
26 Radloff LS. The CES-D scale: a self-report depression scale for research in the general population. *Appl Psychol Meas* 1977;1:385–401.
27 Das A, Sil A, Jaiswal S, *et al*. A study to evaluate depression and perceived stress among frontline Indian doctors combating the COVID-19 pandemic. *Prim Care Companion CNS Disord* 2020;22:20m02716.
28 Leong OS, Ghazali S, Hussin EOD, *et al*. Depression among older adults in Malaysian daycare centres. *Br J Community Nurs* 2020;25:84–90.
29 Xiao X, Zhu X, Fu S, *et al*. Psychological impact of healthcare workers in China during COVID-19 pneumonia epidemic: a multi-center cross-sectional survey investigation. *J Affect Disord* 2020;274:405–10.
30 Wang Y, Wang P. Perceived stress and psychological distress among Chinese physicians: the mediating role of coping style. *Medicine* 2019;98:e15950.
31 Alva-Diaz C, Nieto-Gutierrez W, Taype-Rondan A, *et al*. Association between daily working hours and depressive symptoms in resident physicians in Peru. *Rev Colomb Psiquiatr* 2021;50:22–8.
32 Ogawa R, Seo E, Maeno T, *et al*. The relationship between long working hours and depression among first-year residents in Japan. *BMC Med Educ* 2018;18:50.
33 Marzouk M, Ouanes-Besbes L, Ouanes I, *et al*. Prevalence of anxiety and depressive symptoms among medical residents in Tunisia: a cross-sectional survey. *BMJ Open* 2018;8:e020655.
34 Sørensen JK, Pedersen AF, Bruun NH, *et al*. Alcohol and drug use among Danish physicians. A nationwide cross-sectional study in 2014. *Dan Med J* 2015;62:A5132.
35 Silva MRG, Marcolan JF. Working conditions and depression in hospital emergency service nurses. *Rev Bras Enferm* 2020;73:e20180952.
36 Tran TD, Hammarberg K, Kirkman M, *et al*. Alcohol use and mental health status during the first months of COVID-19 pandemic in Australia. *J Affect Disord* 2020;277:810–3.
37 Ngasa SN, Sama C-B, Dzekem BS, *et al*. Prevalence and factors associated with depression among medical students in Cameroon: a cross-sectional study. *BMC Psychiatry* 2017;17:216.
38 Song X, Fu W, Liu X, *et al*. Mental health status of medical staff in emergency departments during the coronavirus disease 2019 epidemic in China. *Brain Behav Immun* 2020;88:60–5.
39 Ruiz-Fernández MD, Ramos-Pichardo JD, Ibáñez-Masero O, *et al*. Compassion fatigue, burnout, compassion satisfaction and perceived stress in healthcare professionals during the COVID-19 health crisis in Spain. *J Clin Nurs* 2020;29:4321–30.
40 Xu HG, Johnston ANB, Greenslade JH, *et al*. Stressors and coping strategies of emergency department nurses and doctors: a cross-sectional study. *Australas Emerg Care* 2019;22:180–6.
41 Lu W, Wang H, Lin Y, *et al*. Psychological status of medical workforce during the COVID-19 pandemic: a cross-sectional study. *Psychiatry Res* 2020;288:112936.
42 Hunsaker S, Chen H-C, Maughan D, *et al*. Factors that influence the development of compassion fatigue, burnout, and compassion satisfaction in emergency department nurses. *J Nurs Scholarsh* 2015;47:186–94.
43 Jo M, Na H, Jung Y-E. Mediation effects of compassion satisfaction and compassion fatigue in the relationships between resilience and anxiety or depression among hospice volunteers. *J Hosp Palliat Nurs* 2020;22:246–53.
44 Hegney DG, Craigie M, Hemsworth D, *et al*. Compassion satisfaction, compassion fatigue, anxiety, depression and stress in registered nurses in Australia: study 1 results. *J Nurs Manag* 2014;22:506–18.
45 de Wit K. Burnout and depression among Canadian emergency physicians. *CJEM* 2020;22:559–60.