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ORIGINAL RESEARCH

Prevalence and Determinants of Anxiety and Depression Among Healthcare Workers in Liaoning Province, China

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Purpose: To assess the anxiety and depression and their predictors among healthcare workers in Liaoning Province, China.

Methods: In order to explore the influencing factors and prevalence of anxiety and depression among healthcare workers, a cross-sectional research design was used to survey 500 healthcare workers using the 14-item Hospital Anxiety Depression Scale (HADS), the Rosenberg Self-Esteem Scale (RSES), the Multidimensional Scale of Perceived Social Support (MSPSS), and the Survey of Perceived Organizational Support (SPOS).

Results: About 47.12% of the healthcare workers suffered from anxiety and 71.63% suffered from depression. In our study, we found that the health status (OR: 0.540, 95% CI: 0.298–0.976), self-esteem (OR: 0.395, 95% CI: 0.251–0.619), PSS (OR: 0.621, 95% CI: 0.388–0.994), organizational support (OR: 0.533, 95% CI. 0.333–0.854) were protective factors for healthcare workers suffering from anxiety, and resistance to COVID-19 (OR: 1.703, 95% CI: 1.082–2.681) was a risk factor for healthcare workers suffering from anxiety, while good quality of life (OR: 0.385, 95% CI: 0.206–0.719) self-esteem (OR: 0.187, 95% CI: 0.110–0.317), and PSS (OR: 0.475, 95% CI: 0.267–0.847) were protective factors for healthcare workers suffering from depression, and at the age of 35–40 years (OR: 2.475, 95% CI: 1.140–5.369) and resistance to COVID-19 (OR: 2.219, 95% CI: 1.313–3.751) were risk factors for healthcare workers suffering from depression.

Conclusion: The anxiety and depression status of healthcare workers in China is poor, and hospital administrators should take positive measures to support healthcare workers and give positive expectations to alleviate negative emotions such as anxiety and depression.

Keywords: anxiety, depression, cross-sectional study, healthcare workers

Introduction

Anxiety and depression pose tough challenges for psychologists, psychiatrists, and behavioral scientists worldwide. Among all physical and mental disorders, anxiety and depression are the most prevalent.[1] Anxiety disorder typically presents with symptoms such as fatigue and palpitations, as well as fear and restlessness.[2] Depression, on the other hand, is characterized by marked and persistent pessimism, low self-esteem, and suicidal thoughts.[3] Clinical depression is often accompanied by reduced energy and concentration, feelings of worthlessness, loss of interest, depressed mood, appetite and sleep disturbances, and feelings of guilt and self-blame.[4] Doctors and nurses have a responsibility to provide health and treatment to patients as the primary point of contact. However, the unpredictable daily work conditions, demanding tasks, and caring for emergency patients create highly stressful environments for these medical professionals who may experience depression, anxiety, and other psychological problems.[5]

Epidemiologic studies around the world have shown that about 33–50% of healthcare workers have symptoms of anxiety[6,7] and nearly 26–60% of healthcare workers have symptoms of depression.[8,9] The evidence shows that mental disorders have a significant impact on individuals and healthcare organizations. Previous studies suggest that they may cause chronic conditions, such as cardiovascular disease, and physical symptoms such as fatigue, dizziness, vomiting,

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nausea, sleep disruptions, and muscle spasms.[10] Additionally, mental disorders are frequently linked with intention to quit, absenteeism, and turnover, and one or more of these psychological disorders can lead to unfavorable work attitudes, impaired judgment, poor performance, and, in severe cases, even the occurrence of occupational accidents among healthcare workers.[11] Mental health disorders in medical personnel can compromise service quality, patient satisfaction, and safety, diminish hospital productivity and clinical outcomes, and harm the institution's reputation.[12] Studies have indicated that healthcare workers face significant risks of experiencing stress, anxiety, depression, substance use disorders, and suicidal behavior.[13,14] In Egypt, a study revealed that 21% of healthcare workers reported severe anxiety, while 19.4% reported severe depression.[15] Similarly, a study conducted in Poland found that 34% of healthcare workers suffered from clinical generalized anxiety disorder, and 24% experienced depression.[16] In Vietnam, Manh Than et al discovered that anxiety was prevalent among 33.5% of healthcare workers, while 20.2% experienced depression.[17] Additionally, a study by Novilla et al demonstrated that COVID-19 exacerbated anxiety and burnout among medical staff in the United States.[18]

Positive psychology acknowledges that individuals possess an inherent potential for growth, satisfaction, and well-being. A deficit in these capacities may contribute to psychological disorders.[19] Researchers are increasingly utilizing a positive psychology perspective to address mental health issues as the field continues to advance.[20] Perceived social support (PSS) is a crucial psychological resource for managing stressful life events. Previous research indicates that healthcare workers who lack perceived social support are unable to handle stressful work events, thereby increasing their risk for anxiety and depression.[21] Yu H et al's study demonstrated that medical professionals with a strong perception of social support have a decreased probability of experiencing psychological disorders.[22] Furthermore, the study emphasized the close relationship between self-esteem, an intrinsic psychological resource, and mental well-being, which can positively impact an individual's attitudes and actions.[23] Research confirms that self-esteem has a negative association with adverse effects of stressful life events and is an essential resource for managing stress and reducing psychological distress.

Several studies have investigated the factors associated with anxiety and depression among healthcare workers. A prevalence study conducted in Turkey revealed that certain demographic characteristics, such as gender and health status, play a significant role in determining anxiety and depression levels.[24] Furthermore, age has been identified as a determinant of anxiety and depression in some studies.[25] In a study on psychological distress conducted in Shandong, China, it was found that self-esteem was negatively and significantly correlated with psychological distress.[26] Studies conducted in Jordan have demonstrated that healthcare workers who have higher levels of social support are less likely to experience symptoms of anxiety or depression, underscoring the positive impact of social support on the well-being of healthcare workers.[27] While there have been studies exploring the determinants of mental health among medical professionals, few have delved into the co-occurrence of anxiety and depression in other regions of China. Additionally, many of these studies have solely analyzed the external factors affecting doctors, such as socio-demographic characteristics and social support, rather than investigating the combined effects of both intrinsic and extrinsic psychological resources on healthcare workers' mental wellbeing. Based on prior studies and literature, it is evident that decreasing anxiety and depression among medical personnel has emerged as a pressing research matter. The aim of this study was to evaluate the prevalence of healthcare personnel in Liaoning Province, China, and to examine the determinants that affect healthcare personnel's mental wellness, including age, health condition, quality of life, conditions, self-esteem, PSS, and organizational support.

Methods

This hospital-based prevalence study was conducted in Liaoning Province, China in 2022. Previous studies have indicated a high prevalence of anxiety and depression among healthcare workers in Liaoning Province, along with unfavorable working conditions.[28,29] Taking into account these factors, as well as the significance of the research topic and data availability, we selected a tertiary hospital and randomly distributed questionnaires to 500 healthcare workers. We used the formula to calculate the sample size. $N = (Z_{1-\alpha/2}/\delta)^2 \times p \times (1 - p)$, where δ represents the tolerance error, p represents the prevalence in the population, and $Z_{1-\alpha/2}$ represents the Z-score of α. Before the formal survey, we conducted a pre-survey, which found that the hospital has more than 2000 employees, and the number and proportion of doctors and nurses have different occupational distributions, and the ratio of doctors and nurses is about 1:1.9. Through

the pre-survey, we determined that the prevalence of anxiety is about 30%, and so we took the p-value of 0.3, α of 0.05, δ of 0.05 and taking into account the 20% nonresponse rate, we calculated the minimum sample size as 387. Before completing the questionnaires, each medical professional gave informed consent. After excluding invalid responses, 416 (83.2%) healthcare workers were included in the final sample.

Measurements

The current study assessed the self-esteem level of medical personnel[30] by employing the Rosenberg Self-Esteem Scale (RSES). The RSES comprises 10 items, with each one requiring a response on a 4-point Likert scale ranging from 1 (very poorly) to 4 (very well). The total score ranges from 10 to 40, with higher scores indicating higher levels of self-esteem. The median total score was used as a threshold to categorize healthcare workers into high and low self-esteem groups based on their scores. The scale demonstrated good internal consistency in this study (Cronbach's α = 0.871).

Anxiety and depression were assessed via the Hospital Anxiety and Depression Scale (HADS),[31] a 14-item questionnaire divided into two subscales: a 7-item anxiety subscale and a 7-item depression subscale. Each question in this Likert-type scale is rated on a four-point scale, scored from 0 to 3, and the total score for each subscale ranges from 0 to 21, with scores of ≥8 being indicative of clinical anxiety and depression. The HADS has demonstrated psychometric validity and reliability. A cut-off value of 7 or higher on the HADS-D has been found to have the highest combined sensitivity and specificity. Similarly, cut-off values of 8 or higher exhibit comparable combined sensitivity and specificity.[32] The validity and reliability of the Chinese language version of HADS has been extensively tested and the Chinese version of HADS has been widely used in previous studies.[33] In this study, Cronbach's α was 0.875.

The current research employed the Multidimensional Scale of Perceived Social Support (MSPSS) to evaluate medical professionals' PSS.[34] The MSPSS comprises of 12 items, rated on a 7-point frequency range scale. The total score indicates the individual's perceived total social support, ranging from 12 to 84. A higher total score corresponds to a higher perceived level of social support.

In this study, Cronbach's α was 0.950.

The study assessed the degree of organizational support among healthcare workers by utilizing the Survey of Perceived Organizational Support (SPOS), which was developed by Eisenberger.[35] The SPOS contains 9 items, each rated on a 7-point Likert scale, culminating in a total score that illustrates an individual's organizational support. The score range falls between 9 and 63, with higher total scores indicating higher levels of organizational support. The median total score was used as a threshold to categorize healthcare workers into high and low organizational support groups based on their scores. In this study, Cronbach's α was 0.881.

Data Analysis

Stata was utilized for data organization and statistical inference. Mean and standard deviation expressed continuous data, while frequencies and percentages expressed categorical data. Chi-square tests were conducted to evaluate anxiety and depression differences between groups. Variables that were statistically significant in bivariate analyses were incorporated into binary logistic regressions, which were utilized to evaluate independent effects after removing confounders. Variance inflation factors were utilized to conduct covariance tests in this study. All predictor variables had a VIF <10, indicating that covariance did not pose a problem in statistical inference.

A two-tailed statistical test was carried out for all comparisons, with significance set at $p < 0.05$.

Results

Among all the participants, more than half (85.10%) of the healthcare workers were female, nearly 1/2 of the healthcare workers were 40>years old, only 16.35% of the healthcare workers were married, the vast majority of the healthcare workers were nurses (67.79%), 12.74% of the healthcare workers had a monthly income of >10,000 RMB, 76.68% of the healthcare workers had poor health, and more than 2/3 (76.68%) of healthcare workers had poor quality of life (Table 1).

Table 2 illustrates the correlation between the anxiety and depression of healthcare workers and their socio-demographic characteristics. The data reveals that anxiety is more prevalent among female healthcare workers and nurses. Additionally, the highest number of healthcare workers suffering from depression are those aged > 40 years. More

Table 1 Variables for Healthcare Workers

Variables		N	(%)
Sex	Male	62	14.90
	Female	354	85.10
Age	< 35 years	109	26.20
	35–40 years	103	24.76
	>40 years	204	49.04
Marital status	Married	68	16.35
	Single/widowed/divorced	348	83.65
Occupation	Doctor	134	32.21
	Nurse	282	67.79
Monthly Income	3000–5000	180	43.27
	5000–1000	183	43.99
	>10,000	53	12.74
Night shift	No	193	46.39
	Yes	223	53.61
Years of experience	< 12 years	213	51.20
	> 12 years	203	48.80
Weekly working hours	< 40 hours	297	71.39
	> 40 hours	119	28.61
Health condition	Poor	319	76.68
	Good	97	23.32
Quality of life	Poor	307	73.80
	Good	109	26.20
Fighting Against COVID-19	No	139	33.41
	Yes	277	66.59
Self-esteem	Low	245	58.89
	High	171	41.11
Perceived social support	Low	215	51.68
	High	201	48.32
Organizational support	Low	230	55.29
	High	186	44.71

Note: The bold value $p < 0.05$.

than two-thirds of single, widowed, or divorced healthcare workers also reported experiencing depression. Among the sociodemographic characteristics, only age demonstrated a statistically significant association with depression ($p < 0.05$).

As presented in Table 3, the study found a minimal variance in the number of healthcare workers experiencing anxiety with and without night shifts. Over 50% of healthcare workers with poor health encountered anxiety, while over two-thirds suffered from depression. Moreover, 52.77% of healthcare workers reporting poor quality of life experienced anxiety, and 79.80% suffered from depression. Univariate analysis revealed statistically significant ($p < 0.05$) disparities in health status, quality of life, COVID-19 resilience, and mental well-being.

2/3 (60%) healthcare workers members with low self-esteem experienced anxiety, and the majority (87.76%) also suffered from depression. More than half of the healthcare workers with low perceived social support also suffered from anxiety, and 84.19% experienced depression. Univariate analysis revealed statistically significant differences in factors such as self-esteem, PSS, organizational support, and mental health (Table 4).

A multifactorial analysis of 416 healthcare workers was conducted, with whether the healthcare workers suffered from anxiety as the dependent variable, and six significant variables from the univariate analysis (health status, quality of life, resistance to COVID-19, self-esteem, PSS, and organizational support) were included in binary logistic regressions for statistical inference as the independent variables. Binary logistic regression revealed a significant effect of combating covid-19 on anxiety, compared to having good health (OR: 0.540, 95% CI: 0.298–0.766), self-esteem (OR: 0.395, 95%

Table 2 Relationship Between Socio-Demographic Characteristics and Anxiety/Depression

Variable	Anxiety		χ2/p	Depression		χ2/p
	No	Yes		No	Yes	
Sex						
Male	30 (48.39)	32(51.61)	0.421/0.516	21 (33.87)	41(66.13)	1.262/0.261
Female	190(53.67)	164(46.33)		97 (27.40)	257(72.60)	
Age						
< 35	61(55.96)	48(44.04)	2.922/ 0.232	36(33.03)	73(66.97)	**8.085/ 0.018**
35–40	47(45.63)	56(54.37)		18 (17.48)	85(82.52)	
>40	112(54.90)	92(45.10)		64(31.37)	140(68.63)	
Marital status						
Married	41(60.29)	27(39.71)	1.791/0.18	20(29.41)	48(70.59)	0.043/ 0.834
Single/widowed/divorced	179(51.44)	169(48.56)		98 (28.16)	250 (71.84)	
Occupation						
Doctor	75(55.97)	59(44.03)	0.755/0.385	42(31.34)	92(68.66)	0.862/ 0.353
Nurse	145(51.42)	137(48.58)		76(26.95)	206(73.05)	
Monthly Income						
3000–5000	95(52.78)	85(47.22)	4.68/ 0.096	51 (28.33)	129 (71.67)	2.938/ 0.230
5000–1000	90(49.18)	93(50.82)		47 (25.68)	136 (74.32)	
>10,000	35(66.04)	18(33.96)		20 (37.74)	33 (62.26)	

Note: The bold value p < 0.05.

Table 3 Relationship Between Working Conditions and Anxiety/Depression

Variable	Anxiety		χ2/p	Depression		χ2/p
	No	Yes		Yes	No	
Night shift			3.827/0.050			2.503/0.114
No	112 (58.03)	81 (41.97)		62(32.12)	131(67.88)	
Yes	108 (48.43)	115 (51.57)		56(25.11)	167(74.89)	
Years of experience			1.704/ 0.192			1.950/ 0.163
< 12	106(49.77)	107(50.23)		54(25.35)	159(74.65)	
> 12	114(56.16)	89(43.84)		64(31.53)	139 (68.47)	
Weekly working hours			2.972/ 0.085			3.483/0.06
< 40	165(55.56)	132(44.44)		92(30.98)	205(69.02)	
> 40	55(46.22)	64(53.78)		26 (21.85)	93(78.15)	
Health condition			**16.907/< 0.001**			**17.981/ < 0.001**
Poor	151(47.34)	168(52.66)		74(23.20)	245(76.80)	
Good	69(71.13)	28(28.87)		44(45.36)	53(54.64)	
Quality of life			**15.028/< 0.001**			**38.48/< 0.001**
Poor	145(47.23)	162(52.77)		62(20.20)	245(79.80)	
Good	75(68.81)	34(31.19)		56(51.38)	53(48.62)	
Fighting Against COVID-19			**9.104/ < 0.001**			**12.893/< 0.001**
No	88(63.31)	51 (36.69)		55(39.57)	84(60.43)	
Yes	132(47.65)	145(52.35)		63 (22.74)	214(77.26)	

Note: The bold value p< 0.05.

CI: 0.251–0.619), PSS (OR: 0.621, 95% CI: 0.388–0.994) and organizational support (OR: 0.533, 95% CI: 0.333–0.854) healthcare workers were more likely to avoid anxiety (Table 5).

A multifactorial analysis was conducted on 416 healthcare workers, with whether the healthcare workers suffered from depression as the dependent variable, and seven significant variables from the univariate analysis (age, health status,

Table 4 Relationship Between Self-Esteem, PSS, Organizational Support and Anxiety/Depression

Variable	Anxiety		χ2/p	Depression		χ2/p
	No	Yes		No	Yes	
Self-esteem			**39.711/< 0.001**			**76.226/< 0.001**
Low	98(40.00)	147(60.00)		30 (12.24)	215(87.76)	
High	122(71.35)	49(28.65)		88 (51.46)	83(48.54)	
Perceived social support						**34.499/ < 0.001**
Low	87(40.47)	128(59.53)	**27.545/< 0.001**	34 (15.81)	181(84.19)	
High	133(66.17)	68 (33.83)		84 (41.79)	117(58.21)	
Organizational support						
Low	93(40.43)	137(59.57)	**31.999/< 0.001**	42(18.26)	188(81.74)	**25.848/< 0.001**
High	127(68.28)	59(31.72)		76(40.86)	110(59.14)	

Note: The bold value p < 0.05.

Table 5 Binary Logistic Regression Analysis and Predictors of Anxiety

Variables	OR	P	95% CI	
			Lower	Upper
Health condition		**0.042**		
Poor	1			
Good	0.540		0.298	0.976
Quality of life		0.466		
Poor	1			
Good	0.807		0.454	1.435
Fighting Against COVID-19		**0.021**		
No	1			
Yes	1.703		1.082	2.681
Self-esteem		**< 0.001**		
Low	1			
High	0.395		0.251	0.619
Perceived social support		**0.047**		
Low	1			
High	0.621		0.388	0.994
Organizational support		**0.009**		
Low	1			
High	0.533		0.333	0.854

Note: The bold value p < 0.05.

quality of life, resistance to COVID-19, self-esteem PSS, and organizational support) were included in a binary logistic regression as the independent variables for statistical inference. Binary logistic regression showed a significant effect of age on and resistance to Covid 19 on depression, compared to having a good quality of life (OR: 0.385, 95% CI: 0.206–0.719), self-esteem (OR: 0.187, 95% CI: 0.110–0.317), PSS (OR: 0.475, 95% CI: 0.267–0.847) were more likely to avoid depression (Table 6).

Discussion

This study showed that the prevalence of anxiety was 47.12% and the prevalence of depression was 71.63% among medical personnel in Liaoning Province, China. This finding is higher than the study conducted in Jiangsu Province, China.[36] Compared to other countries, this finding was similar to the study conducted in Jordan,[27] higher than the study in Nepal,[37] but lower than the study from Bangladesh.[38] The observed difference may be attributed to variations in study

Table 6 Binary Logistic Regression Analysis and Predictors of Depression

Variables	OR	P	95% CI	
			Lower	Upper
Age				
< 35	1			
35–40	2.475	**0.022**	1.140	5.369
>40	1.438	0.236	0.788	2.623
Health condition		0.758		
Poor	1			
Good	0.902		0.468	1.737
Quality of life		**0.003**		
Poor	1			
Good	0.385		0.206	0.719
Fighting Against COVID-19		**0.003**		
No	1			
Yes	2.219		1.313	3.751
Self-esteem		**< 0.001**		
Low	1			
High	0.187		0.110	0.317
Perceived social support		**0.012**		
Low	1			
High	0.475		0.267	0.847
Organizational support		0.346		
Low	1			
High	0.759		0.429	1.34

Note: The bold value p < 0.05.

design, study area, measurement tools for anxiety and depression, as well as differences in participant demographics. Additionally, this finding suggests that psychological disorders are more prevalent among healthcare workers in the Liaoning region of China. Our research revealed that healthcare workers suffering from anxiety were more likely to be protected by good health status, self-esteem, social support, and organizational support. However, combating COVID-19 was a risk factor for anxiety among healthcare workers. Similarly, healthcare workers suffering from depression were more likely to benefit from good quality of life, self-esteem, and social support, while the age bracket of 35–40 years and combating COVID-19 were risk factors for depression among healthcare workers. Psychological disorders pose a significant challenge to the medical profession, with potential negative outcomes. It is common for medical personnel to experience psychological disorders, resulting in a critical public health concern in China.

Previous research suggests that good health may be protective against anxiety for healthcare workers.[39] This study found that healthcare workers in good health were less likely to experience anxiety. Similarly, Liao et al found that respondents who had a history of physical illness were more likely to report poor mental health.[40] This could be because healthcare workers in good health are better equipped to adapt to changes in the work environment and unexpected events, thus reducing levels of anxiety.[41] Our research indicates that increased levels of organizational support serve as protective factors against anxiety among healthcare workers. Organizational support is a crucial aspect of any successful organization, referring to the degree to which it provides individuals with the resources, encouragement, and support required to perform their duties effectively. Research has indicated that there are positive correlations between high levels of organizational support and favorable results for healthcare personnel.[42] Additionally, Bloom et al propose that high levels of organizational support can potentially mitigate the negative impacts of workplace stressors and serve as a safeguard against anxiety caused by disasters or other emerging infectious diseases,[43] which is in line with our research.

For depression, the risk of depression is 2.475 times higher for healthcare workers aged 35–40 years old, which may be due to the higher workload of healthcare workers in this age group, in addition, healthcare workers in this age group

often play important roles in the family, such as caring for family members living together,[44] and the traditional family roles have a great influence on healthcare workers in China, where workplace stress and family stress usually lead to occupational fatigue and depression.[45] Our research suggests that a good quality of life can decrease the likelihood of depression. Compared to other professions, healthcare workers often experience a poor quality of life due to limited resources, low incomes, and high patient needs. A study from Afghanistan revealed a negative correlation between quality of life and depression among health care workers. Additionally, those with a higher quality of life were less susceptible to depression.[46]

COVID-19 resilience was found to be a risk factor for developing both anxiety and depression, while self-esteem and social support were protective factors against both. The outbreak of COVID-19 disrupted the routine work and personal lives of healthcare workers.[47] Those who were at the forefront of fighting the pandemic faced an unprecedented healthcare emergency and had to grapple with an impracticable work environment which caused them considerable distress.[48] Our study revealed that healthcare workers exposed to COVID-19 face a significantly higher risk of anxiety and depression, with rates 1.703 and 2.219 times higher than those not exposed. This elevated risk is due to the substantial number of fatalities among patients and colleagues, as well as workers' personal exposure to the potentially deadly infection, and the resulting mental and physical fatigue and associated problems such as depression, anxiety, and insomnia.[49]

Self-esteem is a crucial part of an individual's self-concept and an essential element of personal and professional identity. It reflects the overall evaluation and perception of self-worth.[50] Additionally, self-esteem plays a significant role in the ability to adapt to different situations and is a valuable resource for coping with stressors and maintaining mental health.[51] Studies have demonstrated that low self-esteem poses a risk factor for the development of anxiety and depression. According to our findings, healthcare professionals with high levels of self-esteem are less susceptible to anxiety and depression. This is because individuals with high self-esteem are protected from psychological distress when faced with stressful situations, whereas those with low self-esteem are at greater risk for psychological distress.[52] People with high levels of self-esteem are capable of positively adapting to stressful work environments, resulting in reduced negative emotions and increased ability to achieve work-related goals. It should also be noted that self-esteem has a direct impact on psychological distress, and moderates the relationship between negative events and emotional responses, ultimately offering protection for one's mental health.[53] People with low self-esteem often hold a negative view of themselves, which can worsen symptoms of anxiety and depression. When treating depression, it is important to focus on rebuilding and improving the patient's self-esteem. This can be achieved through cognitive behavioral therapy and psychological support.

The main effects model of social support posits that it can ameliorate negative emotions and enhance psychological health. Thus, social support may have affirmative effects. Social support may augment an individual's sense of well-being, lessen negative emotions like anxiety and depression, or indirectly assuage the adverse consequences of a stressful event on an individual.[54] Social support has been found to effectively influence the coping process for healthcare workers in dealing with workplace stressors, alleviating stressful events, and improving overall health and well-being.[55] Our study revealed that healthcare workers with high levels of social support had a lower risk of experiencing both anxiety and depression. This finding is consistent with Hou's research on the protective effect of PSS on the mental health of healthcare workers in South Korea.[56] PSS reduces the perception of situational threat and increases beliefs about resource use. This promotion leads to positive self-concept and social skills, responsibility and competence, and impulse control through different dimensions, resulting in decreased levels of psychological problems such as depression and anxiety.[57] In the treatment of anxiety and depression, it is beneficial to encourage patients to actively seek social support and strengthen their social networks. This can help improve the prognosis of the illness and enhance psychological resilience. Improving self-esteem and building a strong social support network are both important aspects of treating depression. A comprehensive approach that combines interventions such as psychotherapy, pharmacotherapy, and social support can assist patients in effectively managing and alleviating depressive symptoms.

Considering these results, this study has practical implications for reducing psychological distress among medical personnel, who work in a highly demanding and challenging environment. It is necessary to implement effective strategies to enhance the sense of belonging and social support among medical staff. Firstly, group interventions that offer psychoeducation and cognitive-behavioral therapy have proven to have a positive impact on reducing depression,

anxiety, and stress in medical staff. Secondly, creating psychological support groups, offering periodic rest days, or fostering a collaborative work environment with shared emotional experiences among team members could be tactics to aid medical personnel.[58] Finally, hospitals ought to bolster opportunities to deliver support across all levels of the organization, which could heighten staff members' capability to manage job demands and diminish the occurrence of mental distress. However, this study has limitations worth discussing. Initially, this prevalence study could not confirm a causal relationship between the variables; proof of causality necessitates future longitudinal studies. Additionally, this prevalence study was limited to Liaoning Province in China, which restricts the generalizability of the findings. Lastly, other variables might be linked to healthcare workers' anxiety/depression, aside from the variables we examined.

Conclusion

Health status, self-esteem, PSS and organisational support were identified as protective factors against anxiety in healthcare workers. On the other hand, resistance to COVID-19 was found to be a risk factor for anxiety in healthcare workers. Similarly, factors such as quality of life, self-esteem and PSS were associated with depression in healthcare workers. In addition, the age group 35–40 years and resistance to COVID-19 were identified as risk factors for depression.

Data Sharing Statement

The original contributions presented in the study are included in the article, further inquiries can be directed to the corresponding authors.

Ethics Statement

The studies involving human participants were reviewed and approved by Ethical Committee of Dalian Medical University. The participants provided their written informed consent to participate in this study. All methods in our study were conducted in accordance with the relevant guidelines and regulations (Declaration of Helsinki).

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Disclosure

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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