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Original Article

The mediating role of social support in the relationship between nurses' psychological capital and depression during public health emergencies in tertiary medical institutions

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Abstract: Objective: To explore the effect of social support in nurses who have depression during public health emergencies in tertiary medical institutions. Methods: This retrospective analysis was conducted in Wuhan from July 2021 to December 2021. We distributed a self-made demographic questionnaire, Depression Scale (CES-D 10), Social Support Rating Scale (SSRS), and Psychological Capital Questionnaire (PCQ-24) through Questionnaire Star, and conducted a questionnaire survey with nurses in multiple tertiary medical institutions during the public health emergency in Wuhan. At the same time, a questionnaire survey was conducted with the general population during the public health emergency in Wuhan through the Self-made demographic questionnaire and Social Support Rating Scale (SSRS) issued by questionnaire star. In the end, 1052 valid questionnaires were obtained, including 526 valid questionnaires for nurses and 526 valid questionnaires for the general population. The social support scores of nurses and the general population were analyzed. The association between social support and nurse depression was analyzed by multiple linear regression. The asymptotic policy was used to examine social support as a potential mediator of the association between psychological capital and depressive symptoms. Results: There were no remarkable differences in age, marital condition, monthly revenue, professional title, occupational condition, smoking, and drinking among nurses (all $P>0.05$). The impersonal social support score, support utilization score, and total support score of nurses were lower than in the general Chinese population ($P<0.05$). Both lower subjective support scores and lower objective support scores of nurses were interrelated with major depressive symptoms (β=0.257, $P<0.01$; β=-0.314, $P=0.026$). Regression analysis with psychological capital as the independent variable and social support as the control variable showed that social support was negatively correlated with depressive symptoms (β=-0.205, $P<0.01$), social support had a positive moderating effect on the relationship between psychological capital and depressive symptoms (β=0.047, $P<0.05$). Self-efficacy was taken as an independent variable in regression analysis, after social support was added as the control variable, social support was negatively interrelated with depressive symptoms (β=-0.118, $P<0.01$), and self-efficacy was negatively interrelated with depressive symptoms (β=-0.251, $P<0.01$), the effect between social support and self-efficacy was interrelated with depressive symptoms (β=0.144, $P<0.05$). Hope was taken as an independent variable in regression analysis, after social support was added as the control variable, social support was negatively interrelated with depressive symptoms (β=-0.296, $P<0.01$), and hope was negatively correlated with depressive symptoms (β=-0.157, $P<0.01$). When the social support dimension was added, the effect of psychological capital on depressive symptoms increased ($P<0.01$). Conclusions: Social support is a key external intervention factor to alleviate nurses' depressive symptoms, and psychological capital is a key internal positive psychological support resource to combat nurses' depressive symptoms. Social support can increase the influence of psychological capital on depressive symptoms.

Keywords: Tertiary medical institutions, public health emergencies, psychological capital, social support

Introduction

Depression is one of the most frequent health concerns in the world, and it reduces the quality of work efficiency [1, 2]. The mental health of nurses has been given more and more attention to by researchers thought the world [3, 4]. Depression is a kind of mental disease charac-

terized by a poor mental condition, no sense of external stimulation, guilt, and even suicidal tendencies. Nurses are professionals who are faced with high-level vocational stressors, such as heavy workloads, and increasingly high requirements from society for their professional level [5, 6]. Therefore, they are prone to depression. Psychological capital is "a positive attitude in the process of personal growth and development" [7, 8]. Research shows that psychological capital can reduce job burnout. Self-efficacy is the capability where you can accept and complete challenging tasks. Hope is a state of positive motivation, and people can achieve their goals through hard work at any time. Adaptability is a state of self-regulation, which can make people recover from difficult situations and adversity. Social support refers to social ties and major group relationships are valuable to individuals. However, the social support and mental health of nurses are seldom paid attention to. Previous studies have shown that social support mediates the association between occupational stress and depressive symptoms of nurses [9, 10]. Social support is the intermediary between the psychological condition and job burnout of Chinese nurses [11, 12]. Social support is a regulator of the filiation among emotional upset, burnout, and job satisfaction [13, 14]. Psychological capital has a significant effect on depression tendencies in nurses and plays the role of a partial mediator in the process of their occupational stress and depression tendency. Psychological capital can have a positive impact on the health of nursing staff. By increasing psychological capital, the depression tendency of nursing staff can be reduced, and the harmful effect of occupational stress on the depression tendency of nursing staff can be reduced. The working pressure of nurses in tertiary hospitals is greater than that of doctors in hospitals. To improve the filiation of social support in depression symptoms among nurses, we conducted an investigation on social support and depression symptoms among nurses in China's tertiary hospitals during public health emergencies and explored the intermediary role of social support in the filiation between psychological capital and depression. The innovation of this study lies in clarifying the relationship between psychological capital and social support for nurses during public health emergencies in tertiary medical institutions.

Experimental method

General information

This retrospective study was conducted in Wuhan from July 2021 to December 2021. We distributed a Self-made demographic questionnaire, Depression Scale (CES-D 10), Social Support Rating Scale (SSRS), and Psychological Capital Questionnaire (PCQ-24) through Questionnaire Star, and conducted a questionnaire survey for nurses in multiple tertiary medical institutions during the public health emergency in Wuhan. At the same time, a questionnaire survey was conducted in the general healthy population during the same period through the Self-made demographic questionnaire and Social Support Rating Scale (SSRS) issued by the questionnaire star. Because the proportion of male nurses was less than 2%, only female nurses were included. After excluding participants with missing data, 1052 valid questionnaires were finally obtained, including 526 valid questionnaires for nurses and 526 valid questionnaires for the general healthy population. All participants included in the study gave informed consent. This study was approved by the Medical Ethics Committee of Tongren Hospital of Wuhan University (Wuhan Third Hospital) (KY2022-046).

Inclusion criteria of nurses: 1. Nurses with nurse qualifications granted by the Chinese Ministry of Health; 2. Nurses who worked as registered nurses in tertiary medical institutions in Wuhan for at least 6 months; 3. Nurses who agreed to participate voluntarily; 4. Nurses that can communicate and read in Chinese.

Exclusion criteria of nurses: 1. Nurses who were on temporary leave; 2. Nurses with serious mental or physical illness.

Inclusion criteria of the general healthy population: 1. General healthy population who have worked for more than 6 months during the public health emergencies in Wuhan; 2. People who agreed to participate voluntarily; 3. People who can communicate and read in Chinese.

Exclusion criteria of the general healthy population: 1. People with serious mental or physical illness; 2. People who worked in health system.

Investigation method

Questionnaires were distributed through questionnaire star. The questionnaire star platform is a professional questionnaire platform with a friendly interface and powerful functions. The general part includes surveys, examinations, votes, and so on. Each questionnaire has three interfaces: questionnaire design, questionnaire sending, analysis, and download, which has the functions of wizard design graphics, QR code link push, graphic data statistical analysis, summary, etc.

Investigation items

Demographic statistics: The survey included age, gender, marital condition, education level and monthly income level (low, medium, and high), employment status, and weekly working hours as well as smoking and alcohol consumption.

Measurement of depressive symptoms: Depressive symptoms were evaluated by the Center for Epidemiological Studies Depression-10 (CESD-10) Scale of epidemiological research centers [15]. The use of CESD-10 in the general population of China has been extensively verified and has demonstrated adequate validity. The scale ranges from 1 to 50. The higher the score, the more severe depressive symptoms. A cut-off value of 10 points has been suggested to indicate high depression.

Social support: Social support was tested by the Chinese Social Support Rating Scale (SSRS). This 10-item scale included 3 dimensions: objective support (3 items), subjective support (4 items), and support utilization (3 items). The questions related to objective support were as follows:

Q1 is a question of subjective support. How many friends do you have and how much support and help can they offer you?

Q2: Questions related to objective support: how have you been living in the past year?

Q3: How is the relationship with the neighbors?

Q4: How do you get along with your colleagues?

Q5: How much support and care have you received from your family?

Q6: What are your sources of financial support and what can help you solve practical problems when you encounter an emergency?

Q7: What is your comfort and concern when you encounter an emergency?

Q8 is concerned with support utilization. How do you talk about trouble?

Q9: How to ask for help when you are in trouble?

Q10: How often do you participate in activities organized by groups (such as Party organizations, religious organizations, trade unions, etc.)?

In Q1-Q4 and Q8-Q10, respondents only choose one option, and options A, B, C, and D correspond to 1-4 points, respectively. Q5 is discrete into five sub-items. For each sub-item, "none" =1 point, "Rare" =2 points, "average" =3 points, and "full support" =4 points. For Q6 and Q7, the answer "no source" =0 points; Otherwise, each listed source gets 1 point. The higher the score, the greater the social support. In this survey, Cronbach's α coefficient of the SSRS scale was 0.80.

Measurement of psychological capital: Psychological capital was tested by the PCQ-24 [16]. Each item was scored on a Likert Scale with 6 points, of which 1 expressed great disagreement and 6 expressed great agreement. All questions were aimed at the "current feeling" of participants. A higher value represents better psychological capital. In this study, Cronbach's α values of the surveys regarding nurses' self-efficacy, expect, restoring force, optimism and psychological capital were 0.855, 0.854, 0.802, 0.793, and 0.890, respectively.

Statistical analysis

SPSS 17.0 was used to analyze the data. The social support scores between nurses and the general population were compared by t-test. The research variables were compared among different age groups, education groups and marital status groups by *t*-test and one-way ANOVA analysis as appropriate. All statistical tests were bidirectional (α=0.05). Before the

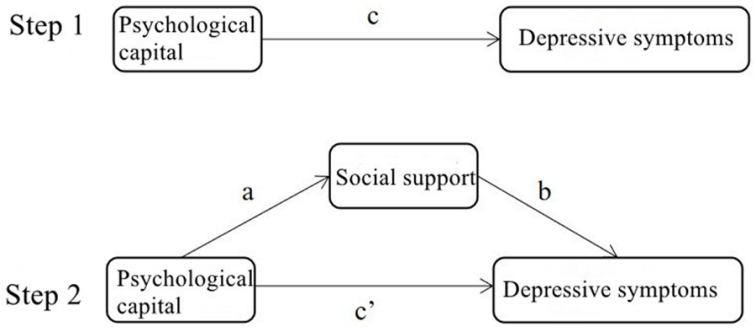

Figure 1. The theoretical pattern of social support mediating the filiation between psychological capital and depressive symptoms.

regression analysis, all the continuous variables, including the predicted variables and the adjusted variables, were concentrated to test the adjustment effect. In addition, tolerance and variance expansion factors were used to check multicollinearity. The Pearson correlation coefficient was used to check the correlation between continuous variables. Hierarchical regression analysis was used to explore the moderating role of social support in the relationship between psychological capital and depressive symptoms. In the first step of hierarchical linear regression analysis, control variables, age, marital status, and education level were used as predictive variables because they were assumed to be related to research variables. Since marital status and education level were classified variables, two variables were set as dummy variables. The marital status of "single" was set as the reference group. In terms of education, "junior college" was the reference group. In the second step, the social support scale and psychological capital were added. In the third step, social support × psychological capital was added. The asymptotic resampling strategy was used to examine social support as a potential mediator between psychological capital and depressive symptoms. Psychological capital was modeled as an independent variable, depressive symptoms as a result, social support as an intermediary (as shown in **Figure 1**), and age, marital status, and education level as covariates. The first step was to determine the relationship between psychological capital and depressive symptoms (path C), and the second step of the analysis was to examine the mediating role of social support (path a × b). If path C' path coefficient of the second step was smaller than that of the first step, or it was not significant, there might be an intermediary role of social support.

Results

Analysis of characteristics of participants

Table 1 shows the characteristics of the participants. There was no significant difference in age, marital status, monthly income, professional title, occupational status, smoking, and drinking between nurses and the general population (P>0.05) (**Table 1**).

Comparison of social support scores between nurses and the general population

The objective social support scores, support utilization scores, and total social support scores of nurses were lower than the general population in China (all P<0.05) (**Table 2**). In our research, the total score of nurses' social support was lower than the normal level of the general Chinese population (**Figure 2**).

The relationship between social support and depression

The results revealed that both low subjective support scores and low objective support scores were related to severe depression symptoms (β=-0.257, P<0.01; β=0.314, P=0.026) in nurses. There was no significant relevancy between support utilization score and depressive symptoms (P>0.05) (**Table 3**).

The moderating effect of psychological capital and social support

Psychological capital was taken as an independent variable. After social support was added as the controlled variable, it was found that social support was negatively correlated with depressive symptoms (β=-0.205, P<0.01), while psychological capital was negatively related with depressive symptoms (β=-0.145, P<0.01). Social support played a positive role in regulating the relationship between psychological capital and depressive symptoms (β=0.047, P<0.05) (**Table 4**).

Table 1. Analysis of the characteristics of nurses and the general population participating in the survey ($\bar{x} \pm s$)

Indexes		Nurses (n, %) (n=526)	General population (n, %) (n=526)	t/χ^2 values	*P values*
Age (years)	≤30	215 (40.87)	232 (44.1)	1.023	0.093
	31-40	184 (34.99)	145 (27.6)		
	>41	127 (24.14)	149 (28.3)		
Marriage	married	420 (79.85)	415 (78.9)	0.145	0.703
	single	106 (20.15)	111 (21.1)		
Educational level	universities and colleges	172 (32.70)	177 (33.7)	0.128	0.938
	undergraduate course	149 (28.32)	145 (27.6)		
	master	205 (38.97)	204 (38.8)		
Monthly income (RMB)	<4000	123 (25.29)	126 (24.0)	0.291	0.962
	4000-7000	291 (55.32)	295 (56.1)		
	7000-10000	68 (12.93)	64 (12.2)		
	>10000	44 (8.36)	41 (7.8)		
Professional title	primary	268 (50.95)	267 (50.9)	0.057	0.972
	middle rank	151 (28.70)	149 (28.3)		
	senior	107 (20.34)	110 (20.9)		
In-service status	Formal employee	299 (56.84)	295 (56.1)	0.062	0.804
	contract worker/laborer	227 (52.66)	231 (43.9)		
Smoke	Current/Past Smoking	8 (1.52)	10 (1.9)	0.226	0.634
	No smoking	518 (98.48)	516 (98.1)		
Drink wine/alcohol	Current/past drinking	120 (22.81)	126 (24.0)	0.191	0.662
	Don't drink	406 (77.18)	400 (76.0)		
Workload (week/hour)	≤40	30 (5.70)	34 (6.5)	0.339	0.953
	41-50	163 (30.99)	164 (31.2)		
	51-60	185 (35.17)	185 (35.2)		
	>60	148 (28.13)	143 (27.2)		

Table 2. Comparison of social support scores between nurses and the general population (s)

Indexes	Nurses (n=526)	General population (n=526)	*T values*	*P values*
Subjective support scores	22.47±3.68	23.65±4.13	11.475	0.214
Objective social support scores	8.67±2.45	13.52±3.11	9.621	0.014
Support utilization scores	7.938±1.77	10.45±1.85	10.334	0.003
Total social support scores	36.43±6.52	47.32±6.27	13.285	0.026

The moderating effect of self-efficacy and social support

Self-efficacy was taken as an independent variable. After social support was added as the control variable, social support was negatively interrelated with depressive symptoms (β=-0.118, P<0.01), and self-efficacy was negatively interrelated with depressive symptoms (β=-0.251, P<0.01). Social support and self-efficacy were negatively interrelated with depressive symptoms (β=0.144, P<0.05). It showed that social support played a positive role in regulating the relationship between self-efficacy and depressive symptoms (**Table 5**).

The moderating effect of hope and social support

Hope was taken as an independent variable. After social support was added as the control variable, social support was negatively correlated with depressive symptoms (β=-0.296, P<0.01), and hope was negatively correlated

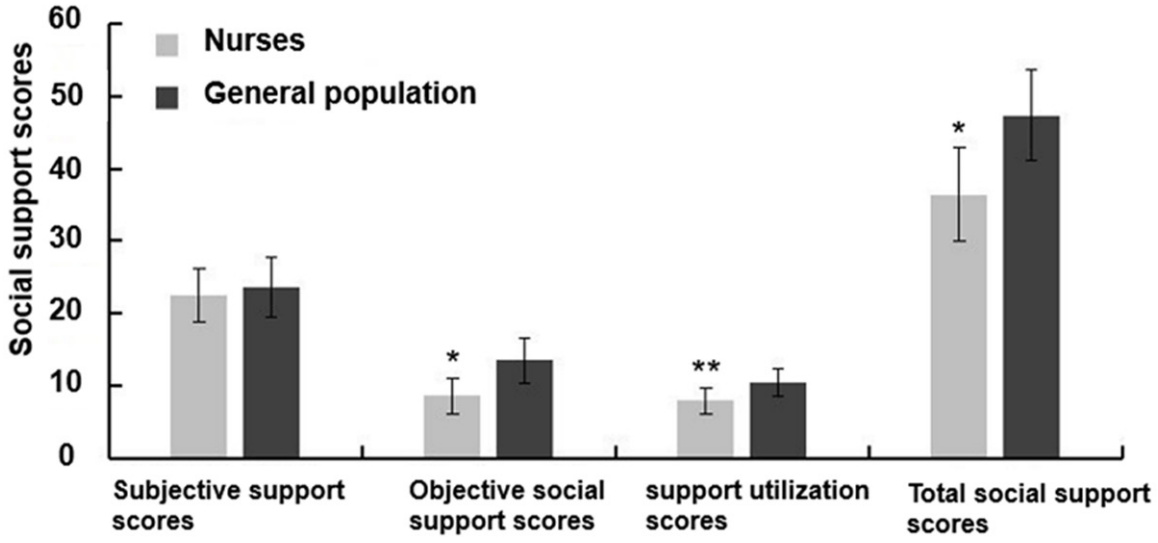

Figure 2. Comparison of social support scores between nurses and the general population. *P<0.05, **P<0.01.

Table 3. The relationship between social support and depression (s)

Indices		Beta coefficient	95% CI	*P value*
Subjective support fraction		-0.257	-0.426-0.206	<0.01
Objective social support score		-0.314	-0.527-0.015	0.026
Support utilization score		-0.435	-0.618-0.226	0.624
Marriage (refer to married)		1.426	0.047-2.417	0.027
Single				
Education level (refer to junior college)	Undergraduate course	1.435	-1.447-3.255	0.168
	Master	-2.419	-6.325-0.264	0.018
Monthly income (refer to <4000)	4000-7000	-0.143	-1.425-1.502	0.449
	7000-10000	0.014	-31.53-2.067	0.736
	>10000	-0.415	-11.647-2.405	0.224
Title (refer to junior level)	Intermediate	-1.214	-2.885-0.104	0.113
	Senior	-2.641	-3.135-1.241	0.268
On-the-job status (refer to regular employees)		-0.553	-1.267-1.025	0.918
Contract worker/laborer				
Smoking (refer to current/past smoking)		0.205	1.034-1.558	0.012
do not smoke				
Drinking (refer to current/past smoking)		-1.352	-4.925-1.033	0.085
Don't drink				
Workload (week/hour)	41-50	1.033	-0.118-2.457	0.064
	51-60	3.046	2.416-3.119	0.012
	>60	2.191	1.057-4.276	0.005
ΔF		12.547	8.435	-
R2		0.368	0.396	-
Adjusted R2		0.419	0.358	-

with depressive symptoms (β=-0.157, P<0.01). The interaction between social support and hope was correlated with depressive symptoms (β=0.173, P<0.01) (**Table 6**).

Table 4. The moderating effect of psychological capital and social support (s)

Variables	Depressive symptoms					
	Procedure 1 (β)	VIF	Procedure 2 (β)	VIF	Procedure 3 (β)	VIF
Age	-0.132**	1.688	-0.038	1.445	-0.032	1.442
Dummy_marry1	0.003	1.524	-0.049	1.306	-0.014	1.526
Dummy_education1	-0.026	1.045	-0.047*	1.246	-0.053	1.147
Dummy_education2	-0.014	1.146	-0.024	1.004	-0.036*	1.095
Social support	-	-	-0.205	1.246	0.118**	1.261
Psychological capital	-	-	-0.145**	1.058	-0.215**	1.035
Social support × psychological capital	-	-	-	-	0.047*	-
R2	0.028	-	0.217	-	0.254	-
ΔR2	0.028**	-	0.197**	-	0.003*	-

Note: Dummy_marry1 meant "single" and "married/cohabiting"; Dummy_education1 meant "high school or below" and "junior college", Dummy_education2 meant "undergraduate or above" and "junior college", Procedure 1-3 meant Hierarchical linear regression analysis, VIF meant variance inflation element, *P<0.05, **P<0.01.

Table 5. The moderating effect of self-efficacy and social support (s)

Variables	Depressive symptoms					
	Procedure 1 (β)	VIF	Procedure 2 (β)	VIF	Procedure 3 (β)	VIF
Age	-0.132**	1.688	-0.068	1.668	-0.058	1.225
Dummy_marry1	0.003	1.524	-0.025	1.259	-0.032	1.583
Dummy_education1	-0.026	1.045	-0.024	1.345	-0.011*	1.774
Dummy_education2	-0.014	1.146	-0.105*	1.027	-0.057*	1.025
Social support			-0.118**	1.005	-0.357**	1.044
Self-efficacy			-0.251**	1.436	-0.216**	1.219
Social support × Self-efficacy					0.144*	1.524
R^2	0.028		0.126		0.185	
ΔR2	0.028**		0.115**		0.022**	

Note: Dummy_marry1 meant "single" and "married/cohabiting"; Dummy_education1 meant "high school or below" and "junior college", Dummy_education2 meant "undergraduate or above" and "junior college", Procedure 1-3 meant Hierarchical linear regression analysis, VIF meant variance inflation element, *P<0.05, **P<0.01.

Table 6. The moderating effect of hope and social support (s)

Variables	Depressive symptoms					
	Procedure 1 (β)	VIF	Procedure 2 (β)	VIF	Procedure 3 (β)	VIF
Age	-0.132**	1.688	-0.041	1.443	-0.021	1.924
Dummy_marry1	0.003	1.524	-0.035	1.294	-0.047	1.885
Dummy_education1	-0.026	1.045	-0.072	1.753	-0.061*	1.254
Dummy_education2	-0.014	1.146	-0.116*	1.886	-0.083*	1.603
Social support	-	-	-0.296**	1.245	-0.325**	1.419
hope	-	-	-0.157**	1.803	-0.168**	1.253
Social support × hope	-	-	-	-	0.173*	1.776
R2	0.028	-	0.119	-	0.125	-
ΔR2	0.028**	-	0.138**	-	0.013**	-

Note: Dummy_marry1 meant "single" and "married/cohabiting"; Dummy_education1 meant "high school or below" and "junior college", Dummy_education2 meant "undergraduate or above" and "junior college", Procedure 1-3 meant Hierarchical linear regression analysis, VIF meant variance inflation element, *P<0.05, **P<0.01.

Table 7. The intermediary role of social support (s)

Variables	Depressive symptoms							
	Procedure 1 (β)	VIF	Procedure 2 (β)	VIF	Procedure 3 (β)			
					Procedure 1 (β)	VIF	Procedure 2 (β)	VIF
Age	-0.132**	1.688	-0.113	1.558	-0.025	1.483	-0.027	1.664
Dummy_marry1	0.003	1.524	0.027	1.459	-0.019	1.467	-0.019	1.693
Dummy_education1	-0.026	1.045	-0.025	1.635	-0.034	1.205	-0.025	1.204
Dummy_education2	-0.014	1.146	-0.338	1.024	0.052	1.043	-0.041	1.035
Social support	-	-	-0.116**	1.137	-0.281**	2.185	-0.206**	-
Self-efficacy	-	-	-	-	0.017	1.856	-	-
hope	-	-	-	-	-0.115**	1.529	-	-
Adaptability	-	-	-	-	-0.023	1.685	-	-
Optimistic	-	-	-	-	-0.014**	1.532	-	-
Psychological capital	-	-	-	-		-	-0.417**	1.186
R2	0.028	-	0.109	-	0.301	-	0.295	-
ΔR2	0.028**	-	0.169**	-	0.087**	-	0.114**	-

Note: Dummy_marry1 meant "single" and "married/cohabiting"; Dummy_education1 meant "high school or below" and "junior college", Dummy_education2 meant "undergraduate or above" and "junior college", Procedure 1-3 meant Hierarchical linear regression analysis, VIF meant variance inflation element, *P<0.05, **P<0.01.

The intermediary role of social support

Social support was negatively correlated with depressive symptoms (β=-0.116, P<0.01). The dimensions of psychological capital (hope, optimism) were negatively interrelated with depressive symptoms (β=-0.115; β=-0.014, P<0.01). The psychological capital was negatively correlated with depressive symptoms (β=-0.417, P<0.01). Therefore, the results showed that social support may play a partial regulatory role in the relationship between psychological capital and depressive symptoms (**Table 7**).

Discussion

In this study, the incidence of depression among nurses was 43.91%, and the high incidence may be related to many factors. Firstly, Chinese nurses have lower incomes and heavier workloads [17, 18] as compared with those in developed countries, so it can be said that there is a mismatch between workload and income [19, 20]. In this research, more than 50% of nurses earned less than 7,000 yuan per month, and 333 (63.30%) nurses worked more than 50 hours per week, of which 148 (28.13%) nurses worked more than 60 hours. Lower revenue may lead to an increase in depressive symptoms among Chinese nurses. Secondly, medical staff work in tense situations [21, 22]. Thirdly, the social status of nurses in China is significantly different from that in developed countries. In the past few years, negative news has been reported regarding the clinical practice of nursing [23-25]. Other influencing factors for the high incidence of depressive symptoms in nurses during health emergencies in tertiary medical institutions deserve further study. Our results found that the total score of nurses' social support was lower than the general population in China. Generally, nurses work long hours and spend little time engaging in social exercise. Support utilization rates indicate the utilization degree of available social support. Nurses are often reluctant to seek help because of overconfidence. Besides, nurses often work too long hours and have few holidays. Therefore, they spent less time in social interaction.

Our results found that social support was negatively correlated with depression symptoms of Chinese nurses. Nurses tend to accept a higher level of subjective social support. A higher subjective support score implies a better comprehension of self-monitoring physique condition, which may have an active influence on reducing depression symptoms in nurses. Objective social support can help nurses cushion the impact of heavy workloads. A higher impersonal social support score constantly means that they may get more support from the local community and non-governmental society. In this

study, the results found that nurses with higher impersonal social support scores had lighter depressive symptoms. In addition, a kind social surrounding is correlated with the better mental health of personal. A poor work environment was significantly associated with depressive symptoms. Another explanation is that high social support will promote effective performance at work. It follows that social support may affect the quality of work. Intervention needs be taken to increase nurses' social support and alleviate their depressive symptoms.

As a positive resource, psychological capital can reduce work tension and help offset depression symptoms. In this study, it was shown that psychological capital was negatively correlated with depressive symptoms of Chinese female nurses. This indicated that psychological capital had an impact on depressive symptoms in this population. This study explored the mediation effect and adjustment of social support on psychological capital and depressive symptoms of nurses in tertiary medical institutions during public health emergencies. For female nurses, our research showed that social support mediated the association between psychological conditions and depressive symptoms. This indicated that social support may be beneficial to psychological capital and increase nurses' psychological capital level. As for psychological capital components, hope and optimism can ease the influence of depressive symptoms to some extent. This result indicated that social support may be beneficial to hope and optimism and may also reduce the incidence of depression among nurses. As a product of psychological ability, psychological capital had an impact on depressive symptoms. The results showed the synergic effect of psychological capital components.

This study can be mutually confirmed by the research of An M and Liu Y et al., that is, compared with increasing social support for nurses, it is more effective and feasible for general hospitals to develop resources to increase nurses' psychological capital level [26, 27]. For nurses with high psychological capital levels, depression symptoms decreased with the raise of social support. Among the psychological capital components, self-efficacy and expectations play a positive role in regulating the relationship between social support and depressive symptoms. The results showed that self-efficacy and the hope of psychological capital played a pivotal role in this relationship. At the same time, managers can assist nurses to achieve their goals through a variety of methods. To improve optimism, managers can encourage nurses to confront failure and improve their ability to seek various opportunities.

To sum up, our results suggest that, social support is a key external intervention factor to alleviate nurses' depressive symptoms, and psychological capital is a key internal positive psychological support resource to combat nurses' depressive symptoms. Social support, as an intermediary, will increase the influence of psychological capital on depressive symptoms. The limitations of this study include it having a small sample size, with geographical limitations, and limited research subjects in regard to all nurses. The sample size will be further increased in subsequent studies to improve the accuracy and reference value of the conclusions.

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Disclosure of conflict of interest

None.

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