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Research article

What alleviates depression among medical workers in emergency risk events? The function of subjective social status

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ABSTRACT

Medical workers often face serious family-work conflicts and are prone to depressive symptoms. The present study aimed at investigating associations between family-work conflict and depression in emergencies, and at exploring psychological processes involved in this association. A total of 1347 participants were recruited to complete questionnaires. Results showed that the positive effect of family-work conflict on depression was mediated by the basic psychological needs satisfaction, and subjective social status moderated this relationship as a buffer. For individuals with high levels of subjective social status, the direct and indirect effects of family-work conflict on depression were weaker. This study identified the mediating and moderating mechanisms of family-work conflict and depression. The implications of these findings in both theoretical and practical terms will be discussed.

1. Introduction

Emergency risk events such as pandemics typically involve substantial risk and place stress on social development, economic construction, and the family and work lives of the affected populations. How pandemics affect individual mental health is not evenly distributed, and front-line medical workers' mental health tends to be particularly severely affected [1]. Stressful working conditions, heavy workloads, long hours, limited resources, organizational change, criticism, and fear affect medical workers' mental health in routine work, and all of these factors are multiplied in emergency risk events [2]. Studies of large-scale emergency risk events have shown that medical workers experience severe psychological distress during these events [3–5].

Depression is a mood or emotional state characterised by feelings of low self-esteem or guilt and a reduced ability to enjoy life. In daily life, family-work conflict was found to be an occupational factor associated with depression among medical workers [6]. However, unlike routine work, both family-work conflict and depression increase exponentially among medical workers during emergency risk events, and the mechanism by which family-work conflict among medical personnel promotes depression in emergency risk events remains unclear. Moreover, it is not clear whether a buffer mechanism operates among medical workers who do not exhibit depressive symptoms or whose depressive symptoms are not severe in the face of high levels of family-work conflict during emergency risk events. It is therefore necessary to explore the influencing mechanisms by which family-work affects on depression in emergency situations and the reasons behind individual differences. This study aimed to clarify mediating effect of basic psychological

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needs satisfaction on the relationship between family-work conflict and depression, and moderating effect of subjective social status on the main effect and mediating effect.

1.1. Family-work conflict and depression: the mediating roles of basic psychological needs satisfaction

The concept of family-work conflict refers to conflict caused by the incompatibility between family and work demands [7]. Family roles can negatively affect work roles [8]. Previous studies have reported that serious family-work conflict is common among medical workers [9], and promotes depressive symptoms among them [10]. Medical workers facing higher levels of family-work conflict devote more of their time and energy to their work and often do not have enough time to relieve the stress of their work [11]. As a result, the constant pressure wears them down physically and mentally [12], which leads to symptoms of depression.

The work intensity of medical workers increases sharply in the context of emergency risk events [3]. Because of the substantial emotional stress caused by the specific nature of their professional tasks [13], medical workers are more likely to suffer from depression or depressive symptoms [14]. One study showed that objective work factors associated with COVID-19 did not directly predict depression among healthcare workers; rather, insecurity and unpredictability associated with COVID-19 situations at work increased depression, and also had an indirect effect on depression via stress [15].

Family-work conflict can lead some medical workers to doubt their competence in their work and family roles [16]. Moreover, family-work conflict also reduces the emotional and material support of the family for the individual, making them feel an inadequate sense of family support and belonging [17]. Such autonomy, competence, and relevance are three basic psychological needs that are critical to medical workers' integrity and well-being [18]. It has been suggested that the substantial family-work conflict caused by emergency risk events weakens basic psychological needs satisfaction [19]. Moreover, empirical studies have confirmed that basic psychological needs satisfaction improves individuals' mental health and life satisfaction [20], and has a protective effect on depressive symptoms. For example, Wei et al. (2005) found that higher satisfaction of basic psychological needs was associated with less depression [21]. This evidence indicates that the satisfaction of basic psychological needs among medical workers may influence their depressive symptoms. The job demands-resources model and conservation of resources theory suggest that work demands and family-work conflict have a strong and negative association with work resources such as basic psychological needs satisfaction [22], and that basic psychological needs satisfaction is negatively related to negative factors when individuals are under pressure [23]. Thus, we suggest that family-work conflict affects depression via basic psychological needs satisfaction.

1.2. The moderating role of subjective social status

In this state of long-term stress, the family-work conflict of medical workers is particularly serious, as they are often faced with various emergency risk events. On the one hand, these emergency risk events cause substantial stress in medical work, while on the other hand having major impacts on life and family security. This in turn results in difficulties for medical personnel in balancing work and family relationships. In the context of continuously developing emergency risk events, workers' sense of control and competency over their own life and work may be severely impaired. In such circumstances, some medical workers lack sufficient internal regulation, leading their mood to become more and more depressed, and to progress from sullen to pessimistic and sad [24]. Therefore, both family-work conflict and depression increase exponentially when medical staff face emergency risk events such as pandemics. Emergency risk events cause substantial family-work conflict among medical workers, which substantially weakens their sense of autonomy, competence and relevance. To prevent severe anxiety, depression, and other negative emotional states among medical workers, it may be helpful to identify potential moderating mechanisms.

Medical work has unique characteristics, and requires medical workers to exhibit high morale in the face of emergency risk events to maintain the ability to face difficult challenges. Because it involves a strong sense of responsibility, dedication, and value, medical work is endowed with high social status, which may make medical workers more resistant to setbacks. Subjective social status is a person's assessment of their own social status in relation to others [25]. Subjective social status provides a comprehensive measure of an individual's social status and can explain several changes that objective social status indicators usually ignore [25]. Previous research has shown that subjective social status moderates negative situations and mental health [26]. In emergency risk events, when individuals identify themselves as having a higher social status, they are reported to be more able to resist negative psychological states (such as depression) and maintain more positive thoughts and behaviors than individuals with low subjective social status [27]. Therefore, when family-work conflict is prevalent among medical workers in emergency risk events, basic psychological needs satisfaction is greatly weakened, and an important factor in alleviating depression is likely to be subjective social status. On the one hand, subjective social status may play a moderating role in the direct impact of family-work conflict on depression. Previous cross-sectional studies have shown that higher status individuals tend to be happier than lower status individuals [28]. In addition, individuals with high subjective social status are able to access more scarce competing resources, including political resources, economic resources, and cultural resources [29]. Previous studies have shown that high subjective social status acts as a protective buffer for mental health in negative situations [26].

In actuality, subjective social status may moderate the indirect effect of family-work conflict on depression through basic psychological needs satisfaction. With the occurrence of emergency risk events, medical workers are faced with unknown virus mutation trends and severe pandemic prevention and control measures, and their work involves more uncertainty and unknown factors, as well as higher risks. Because individuals with high subjective social status have a greater sense of responsibility and obligation [29], medical workers with high subjective social status are likely to feel that the prevention and control of the risks and unknown factors is their duty. However, the pressure of not fully controlling the development of an emergency risk event will greatly reduce this group's

satisfaction regarding their competence, autonomy, and associated ability. As mentioned above, high subjective social status has a protective buffering effect on mental health, as individuals with high subjective social status tend to have access to more scarce resources. In negative situations in which basic psychological needs are weakened, high subjective social status would still be expected to reduce individuals' depressive symptoms.

1.3. Overview of present research

Based on the evidence mentioned above, research hypotheses were investigated as followed:

Hypothesis 1. During emergency risk events, basic psychological needs satisfaction plays a mediating role in the association between family-work conflict and depression.

Hypothesis 2. Subjective social status negatively moderates the reinforcing effect of family-work conflict on depression.

Hypothesis 3. Subjective social status negatively moderates the mediating role of basic psychological needs satisfaction on the association between family-work conflict and depression.

To test the above hypotheses, we investigated family-work conflict, depression, basic psychological needs satisfaction, and subjective social status of medical workers using four professional scales. Through this questionnaire survey, we explored the impact and underlying processes of family-work conflict on depression among medical workers. We aimed to clarify the mediating role of basic psychological needs satisfaction on the association between family-work conflict and depression, and to examine the moderating role of subjective social status on the main and mediating effects. Fig. 1 shows the hypothesized model.

2. Materials and methods

2.1. Participants

A total of 1347 volunteers were recruited to complete the questionnaire during the COVID-19 pandemic. Participants were 333 men and 1014 women with an average age of 32.33 ± 7.753 years. In the total sample, there were 374 doctors, 111 medical technicians, 740 nurses, 87 logistics administrators, and 35 other positions. Of participants, 458 were unmarried, 871 married, 17 divorced, and 1 widowed. Regarding education level, 89 had technical secondary school education or below, 584 college degrees, 596 bachelor's degrees and 78 master's degrees or above. Sensitivity analysis using G*Power 3.1 [30] showed that given an alpha of 0.05 and a conventionally assumed power of 0.80, the obtained sample size would be sufficient to detect an effect of $R^2 = 0.008$ in a multiple linear regression analysis.

2.2. Procedure

This research was approved by the Committee of Protection of Subjects (ICNL IRB) of Qufu Normal University We collected data on family-work conflict, depression, basic psychological needs, and subjective social status (using the 10-level ladder scale) among medical workers in a city in China. The survey was conducted from October 14 to 24, 2020.

After providing informed consent, medical workers were asked to participate in an online survey via a questionnaire platform. The survey included the Family-Work Conflict Scale, the Patient Health Questionnaire-9 (PHQ-9), the Need-Satisfaction Scale, and the MacArthur Scale of Subjective Social Status. The original English scale items were translated into Chinese and back translated for accuracy. Upon completion of the online survey, medical workers were asked to provide demographic information.

2.3. Measures

2.3.1. Family-work Conflict (FWC)

The 5-item Family-Work Conflict Scale [31] was used to measure the extent to which participants' family life interfered with their work [31](Cronbach's $\alpha = 0.935$, Guttman split half = 0.908). Example items include "Things I want to do at work don't get done because of the demands of my family or spouse/partner." and "My home life interferes with my responsibilities at work such as getting

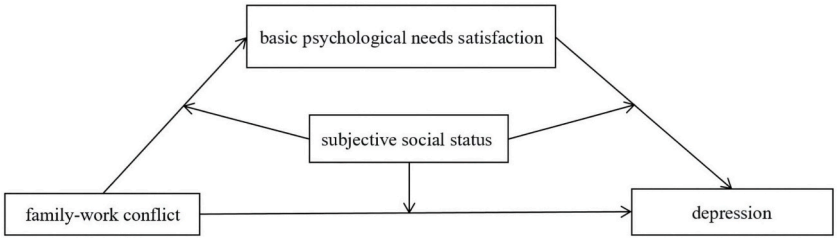

Fig. 1. The moderating-mediation model for the relationship of family-work conflict and depression.

to work on time, accomplishing daily tasks, and working overtime." Participants provided responses on a five-point scale from 1 (*strongly disagree*) to 5 (*strongly agree*). The family-work conflict index was calculated as the total score of these five items, with higher total scores indicating higher family-work conflict level.

2.3.2. Depression

The PHQ-9 [32] was developed and validated as a depression screening tool [32](Cronbach's $\alpha = 0.923$, Guttman split half = 0.833). The nine items include happy experiences, low mood, interrupted sleep, energy levels, appetite, sensory failure, difficulty concentrating, slow speech or irritability, and negative thoughts of suicide or self-injury in the past 2 weeks. Participants provided responses on a four-point scale from 0 (not at all) to 3 (nearly every day), with total scores ranging from 0 to 27.

2.3.3. Basic psychological needs satisfaction

The 9-item Need-Satisfaction Scale [33]was used to measure how well participants' basic needs are met (Cronbach's $\alpha = 0.856$, Guttman split half = 0.638). The questionnaire was divided into three dimensions: needs satisfaction of autonomy (items include "I feel free to be who I am"), needs satisfaction of competence (items include "I feel like a competent person") and needs satisfaction of relatedness (items include "I feel loved and cared about"). Participants gave responses on a seven-point scale from 1 (*strongly disagree*) to 7 (*strongly agree*). Score conversion is carried out for questions requiring reverse scoring. Total need satisfaction was assessed as the average score of the nine items, and the higher the average score, the higher the total need satisfaction level.

2.3.4. Subjective social status

A 10-level ladder scale and a situational question were used to measure subjective social status [34], as follows: "In our society, some people are at the top of the society, and some people are at the bottom of the society. At the top of the ladder are the people who are the best off, those who have the most money, the best education, and the best jobs. At the bottom are the people who are the worst off, those who have the least money, the worst education, and the worst jobs or no job. 10 points represents the top, and 1 point represents the bottom." Participants were then required to select the rung that best represents their perception of medical workers' standing relative to those of others within their communities. The higher they score, the higher the subjective perception of the social status of medical workers.

2.4. Statistical analysis

Statistical analyses, including correlation and linear regression analyses, were performed using SPSS Statistics 21.0 software. . The bootstrap method was used to further test the moderated mediation effect, and the Process Model 4 and 59 was used [35]. The mediating and the moderating effects were integrated into the same analytical framework to verify the moderated mediation model.

3. Results

3.1. Results of descriptive and correlational analyses

In the survey, 46.2% of medical workers exhibited depression to some extent. Table 1 presents the descriptive statistics and correlations between all variables. The results revealed that depression was significantly positively correlated with family-work conflict ($r = 0.340$, $p < 0.01$) and basic psychological needs satisfaction ($r = 0.644$, $p < 0.01$). Family-work conflict was negatively correlated with basic psychological needs satisfaction ($r = -0.405$, $p < 0.01$).

Table 1
Means, standard deviations, and correlation matrix among all variables.

	Mean	*SD*	1	2	3	4	5	6	7	8
1 Gender	1.75	0.432								
2 Age	32.33	7.753	−.234**							
3 Marital status	1.67	0.5	−.085**	.582**						
4 Education	2.49	0.706	−.339**	.228**	.158**					
5 Position	2.48	1.044	.480**	−.134**	−0.03	−.435**				
6 Family-Work Conflict	11.04	4.388	−.058*	.061*	0.007	0.03	−.085**			
7 Depression	4.77	4.822	−.136**	−.061*	−.096**	.078**	−.173**	.340**		
8 Basic Psychological Needs Satisfaction	4.10	0.614	.111**	0.015	0.044	−.096**	.132**	−.449**	−.472**	
9 Subjective Social Status	5.48	1.979	.056*	−0.004	0.03	−0.037	0.048	−.160**	−.218**	.222**

** $p < 0.01$,
* $p < 0.05$.

3.2. The mediating effect of basic psychological needs satisfaction

In linear regression, family-work conflict was a positive predictor of depression ($B = 0.373$, *95% CI* [0.318, 0.429], $SE = 0.028$, $t = 13.249$, $p < 0.001$). To test whether basic psychological needs satisfaction mediates the relationship between family-work conflict and depression, the Bootstrap method was applied and Process Model 4 was selected [35]. The results revealed that family-work conflict was a negative predictor of basic psychological needs satisfaction ($B = -0.062$, *95% CI* [−0.070, −0.055], $SE = 0.003$, $t = -18.255$, $p < 0.001$). Family-work conflict ($B = 0.178$, *95% CI* [0.121, 0.235], $SE = 0.029$, $t = 6.155$, $p < 0.001$) positively predicted depression, and basic psychological needs satisfaction ($B = -2.971$, *95% CI* [−3.380, −2.562], $SE = 0.208$, $t = -14.255$, $p < 0.001$) negatively predicted depression.

The Bootstrap method was further used to test the significance of mediating effect with 1000 Bootstrap samples [36]. Results showed that family-work conflict significantly affected depression indirectly through basic psychological needs satisfaction ($B = 0.184$, *95% CI* = [0.150, 0.221], SE = 0.018; see Fig. 2). Therefore, Hypothesis 1 was supported.

3.3. The moderating effect of subjective social status

The Bootstrap method was applied to further test the moderated mediation effect, and Process Model 59 was selected [35]. To test the moderated mediation model, mediating and moderating effects were integrated into the same analytical framework (see Fig. 3).

3.3.1. The moderating effect on the main effect

The interaction terms of family-work conflict and subjective social status had significant negative predictive effects on depression ($B = -0.036$, *95% CI* [−0.061, −0.011], $SE = 0.013$, $t = -2.767$, $p = 0.004$). The regression coefficients of the models are presented in Table 2.

A moderating effect diagram of subjective social status was constructed to further analyze the moderating effect of subjective social status. When participants had high subjective social status (+1 standard deviation from the mean), the main effect of family-work conflict ($B = 0.103$, *95% CI* [0.252, 0.180], $SE = 0.039$, $t = 2.600$, $p = 0.009$) was lower than that of participants with low subjective social status (−1 standard deviation from the mean) ($B = 0.245$, *95% CI* [0.171, 0.319], $SE = 0.038$, $t = 6.520$, $p < 0.001$). The results show that the positive effect of family-work conflict on depression can be buffered by high subjective social status (see Fig. 4).

3.3.2. The moderating effect on the mediating effect

The interaction terms of family-work conflict and subjective social status had significant negative predictive effects on basic psychological needs satisfaction ($B = -0.005$, *95% CI* [−0.008, −0.002], $SE = 0.002$, $t = -3.210$, $p = 0.002$). The interaction terms of basic psychological needs satisfaction and subjective social status had significant positive predictive effects on depression ($B = 0.294$, *95% CI* [0.099, 0.482], $SE = 0.096$, $t = 3.057$, $p = 0.003$). The regression coefficients of three models are presented in Table 2.

To further analyze the moderating effect of subjective social status on the mediating effect, a moderating effect diagram of subjective social status was constructed. When participants had high subjective social status (+1 standard deviation from the mean), the mediating effect of basic psychological needs satisfaction ($B = 0.172$, *95% CI* [0.123, 0.222], $SE = 0.026$) was lower than that of participants with low subjective social status (−1 standard deviation from the mean) ($B = 0.179$, *95% CI* [0.127, 0.239], $SE = 0.029$). The results revealed that the mediating effect of basic psychological needs satisfaction in family-work conflict on depression was buffered by high subjective social status. High subjective social status buffered the development of depression when work-family conflict increased (see Figs. 5 and 6).

4. Discussion

This study examined the effect of family-work conflict on depression among medical workers after an emergency risk event, and further examined the mediating effect of basic psychological needs satisfaction and the moderating effect of subjective social status. In the context of emergency situations, high family-work conflict can reduce basic psychological needs satisfaction in medical workers, leading to a subsequent increase in depression. The positive effect of family-work conflict on depression was weaker for people with high subjective social status. The present study focused on the mechanisms of depression among medical workers and the mechanisms of individual differences in depression.

In addition to directly resisting the strengthening effect of family-work conflict on depression, medical workers with high subjective

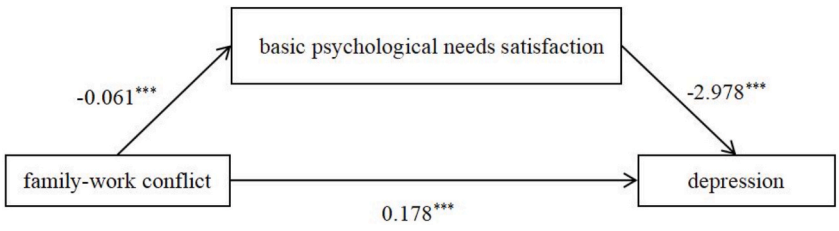

Fig. 2. The mediating effect of basic psychological needs satisfaction. ***p < 0.001.

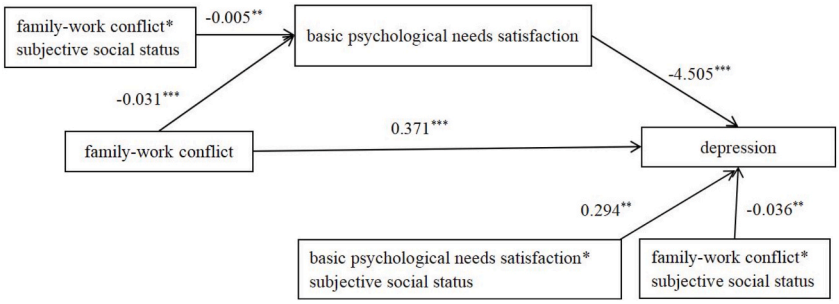

Fig. 3. The moderating effect of subjective social status on the mediating effect of basic psychological needs satisfaction. **p < 0.01, ***p < 0.001.

Table 2
Model for the moderated-mediation hypothesis.

model	Dependent variable	Independent variable	R^2	*B*	*p*	*SE*	*t*	*95%CI*	
								Lower	*Upper*
1	M	X	0.246	−0.031***	0.001	0.009	−3.325	−0.050	−0.013
		W		0.102***	0.000	0.019	5.344	0.064	0.139
		X*W		−0.005**	0.002	0.002	−3.210	−0.008	−0.002
		Gender		0.074	0.062	0.040	1.870	−0.004	0.152
		Age		0.034	0.139	0.023	1.480	−0.011	0.079
		Marital status		0.039	0.278	0.0355	1.085	−0.312	0.108
		Education		−0.044	0.063	0.0236	−1.863	−0.090	0.002
		Position		0.029	0.085	0.0169	1.725	−0.004	0.062
2	Y	X	0.290	0.371***	0.000	0.076	4.911	0.223	0.519
		M		−4.505***	0.000	0.565	−7.9703	−5.614	−3.396
		W		−1.049*	0.026	0.472	−2.222	−1.975	−0.123
		X*W		−0.036**	0.006	0.013	−2.767	−0.061	−0.011
		M*W		0.294**	0.002	0.096	3.057	0.099	0.482
		Gender		−0.560	0.065	0.303	−1.845	−1.156	0.036
		Age		−0.282	0.109	0.176	−1.602	−0.627	0.063
		Marital status		−0.601	0.027	0.272	−2.210	−1.134	−0.067
		Education		0.030	0.867	0.181	0.167	−0.324	0.385
		Position		−0.390**	0.003	0.129	−2.980	−0.639	−0.132

M = basic psychological needs satisfaction; X = family-work conflict; Y = depression; W = subjective social status.
* p < 0.05,
** p < 0.01,
*** p < 0.001.

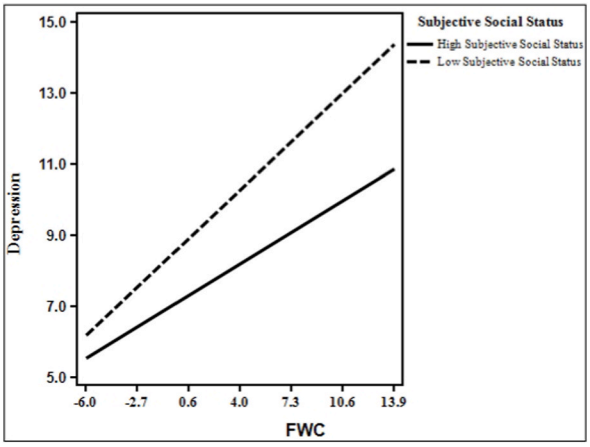

Fig. 4. The moderating effect of subjective social status on family-work conflict to depression.

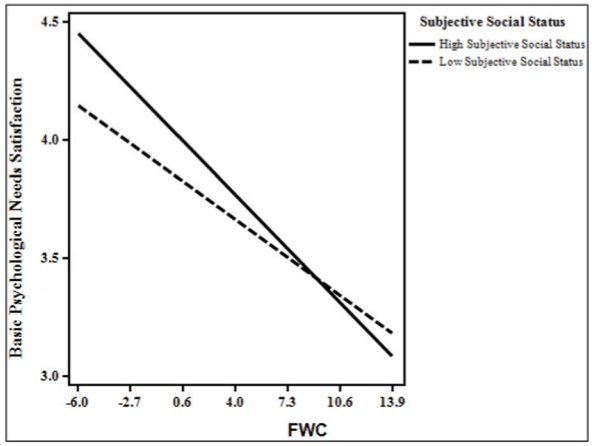

Fig. 5. The moderating effect of subjective social status on family-work conflict to basic psychological needs satisfaction.

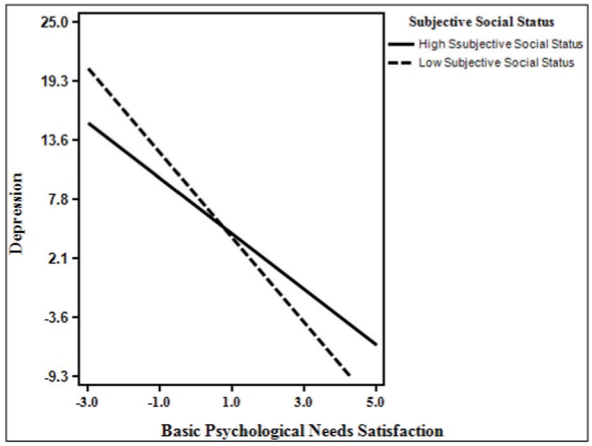

Fig. 6. The moderating effect of subjective social status on basic psychological needs satisfaction to depression.

social status can also reduce depression indirectly. This finding is in line with previous research that high subjective social status can be effective in the reduction of depression levels [27]. High subjective social status groups have a higher sense of responsibility and obligation [29], and emergency risk events will greatly reduce this group's satisfaction of competence, autonomy and associated ability. Meanwhile, high subjective social status groups have higher income, higher education level and better jobs, as well as access to scarce competitive resources [29]. In addition, people with a high subjective social status tend to develop more positive attitudes and beliefs because of the advantages that their status confers on them [37]. Moreover, high subjective social status groups tend to adopt more socially adaptive defenses [38], and have a greater ability to maintain a high level of mental health [39].

The current study revealed the positive effect and mediating processes of family-work conflict on depression. The results revealed that he positive effects of family-work conflict on depression were mediated by the satisfaction of basic psychological needs. This conclusion is in line with the logic of self-determination theory, and individual's basic psychological needs satisfaction may be thwarted by some environmental factors [18]. In addition, a reduction in basic psychological needs satisfaction can increase depressive symptoms [21]. Medical workers must always be prepared to deal with emergencies during emergency risk events. In such situations, many medical workers are unable to take care of their families and maintain adequate interaction with family members [9]. Family-work conflict can cause medical workers to feel that they are not competent in their work and family roles [11]. In many cases, workers' autonomy and competence are frustrated by sudden and difficult risk events. If this situation continues over time, family-work conflict can enhance depression by weakening basic psychological needs satisfaction.

5. Limitations and prospects

The results of this study have two main implications: first, attention should be paid to basic psychological needs, and the after-effects of basic psychological needs satisfaction warrants further study. Second, close attention should be paid to various characteristics of high subjective social status groups, while strengthening the ability to maintain mental health among lower subjective social

status groups under pressure. There were several limitations to this study, so the results should be treated with caution. The experiences of medical workers may change as the COVID-19 pandemic progresses; therefore, further studies are needed to track and extend existing findings. In addition, more laboratory evidence is essential to support the establishment of the moderated mediation model presented here. Differences in the moderating role of subjective social status at different stages also require further investigation and clarification.

6. Conclusions

This study examined the effect of family-work conflict on depression among medical workers after an emergency risk event, and further examined the specific roles of basic psychological needs satisfaction and subjective social status. The study conclusions are as follows: (1) family-work conflict had a positive predictive effect on depression, (2) in the relationship between family-work conflict and depression, satisfaction of basic psychological needs played a mediating role, (3) Subjective social status negatively moderated the mediating effect of basic psychological needs satisfaction on the relationship between family-work conflict and depression.

Author contribution statement

Xuyun Tan; Miao Lv: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Lingxia Fan: Conceived and designed the experiments; Analyzed and interpreted the data; Wrote the paper.

Yuan Liang: Performed the experiments; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Jiayin Liu: Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

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Data availability statement

The authors do not have permission to share data.

Declaration of interest's statement

The authors declare no competing interests.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.heliyon.2023.e13762.

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