



Associations of job satisfaction and burnout with psychological distress among Chinese nurses

Zheng Ren¹ · Hanfang Zhao¹ · Xiumin Zhang¹ · Xiangrong Li¹ · Hong Shi¹ · Minfu He¹ · Shuang Zha¹ · Shuyin Qiao¹ · Yuyu Li¹ · Yajiao Pu¹ · Yan Sun^{1,2} · Hongjian Liu³

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Abstract

Nurses' mental health is related to the quality of medical care and the outcome of treatment, and has become an important issue in nursing management. However, the role of burnout in the relationship between job satisfaction and psychological distress have not been evaluated. This study aimed to examine the prevalence of psychological distress among Chinese nurses and explore the associations of job satisfaction and burnout with psychological distress. A cross-sectional survey of 866 nurses was conducted in Qiqihar City, Heilongjiang Province of China. Job satisfaction, burnout, and psychological distress were assessed via the single-item, the Maslach Burnout Inventory-Human Services Survey, and the 12-item General Health Questionnaire respectively, followed by a mediation analysis through the multiple regression analysis and a PROCESS macro method. The prevalence of psychological distress was 35.2% among the participants. After controlling the potential confounding factors, job satisfaction and burnout were found to be still associated with psychological distress ($P < 0.001$). Furthermore, psychological distress was negatively correlated with both job satisfaction ($r = -0.312$) and personal accomplishment ($r = -0.422$) but positively correlated with both emotional exhaustion ($r = 0.491$) and depersonalization ($r = 0.449$). Burnout may mediate the association between job satisfaction and psychological distress ($B = 0.139$, $\beta = 0.440$, $P < 0.001$ for emotional exhaustion; $B = 0.226$, $\beta = 0.382$, $P < 0.001$ for depersonalization; and $B = -0.105$, $\beta = -0.368$, $P < 0.001$ for personal accomplishment). The mental health status of Chinese nurses remains to be improved. Low job satisfaction and burnout could increase the risk of psychological distress among Chinese nurses. Moreover, job satisfaction may partially affect psychological distress among Chinese nurses through emotional exhaustion, personal accomplishment, and depersonalization.

Keywords Job satisfaction · Burnout · Psychological distress · Nurses · China

Introduction

With the continuous enhancement and improvement of people's medical health awareness, patients' demands for hospital nursing work have also increased (National Health Commission of the People's Republic of China, 2022). In general, nurses represent a professional group with great

physical and psychological pressure. Due to multiple work-related demands, high workload, shift working hours, and complex interpersonal relationships, nurses have a high risk of psychological distress (Ghawadra et al., 2019; Portero De La Cruz et al., 2020). Psychological distress is usually used as an indicator of mental health and characterized by a series of undifferentiated symptoms from anxiety to depression, which can lead to emotional suffering (Ridner, 2004). Self-determination theory (SDT) is a useful conceptual tool to understand employees' experiences of psychological distress in the workplace. SDT proposes that if employees are intrinsically motivated because they experience the satisfaction of psychological needs of autonomy, competence and relatedness for their personal growth and development in the working environment, then positive consequences for their psychological well-being are developed (Van den Broeck et al., 2016; Gomez-Baya et al., 2018). On the contrary, work

Zheng Ren and Hanfang Zhao contributed equally.

✉ Xiumin Zhang
xiu_min@jlu.edu.cn; zhangxiumin63@163.com

¹ Department of Social Medicine and Health Management, School of Public Health, Jilin University, Changchun, China

² The First Hospital of Qiqihar City, Qiqihar, China

³ Department of Epidemiology and Biostatistics, School of Public Health, Jilin University, Changchun, China

environments that hinder these needs may lead to psychological distress and maladaptive functioning (Vansteenkiste & Ryan, 2013). In previous studies, the prevalence of psychological distress among nurses ranged from 21.0% to more than 40.0% (Jayawardene et al., 2013; Okwaraji & Aguwa, 2014; Petkovska et al., 2020). During 2019-novel coronavirus disease (COVID-19) outbreak, a study involving 263 frontline nurses in China found that 25.1% of the participants reported psychological distress (Nie et al., 2020). Nurses' mental health, which is related to the quality of medical care and the outcome of treatment, has become an important issue in nursing management.

Understanding the risk factors of psychological distress is an important step for nursing managers in formulating effective prevention strategies and measures. Job satisfaction indicates how satisfied employees are with their jobs (Kaya & Isler Dalgic, 2021), which is a highly subjective phenomenon and is therefore complicated and multifaceted. A recent study based on Herzberg's theory analyzed the related factors of nurses' job satisfaction, and found that job satisfaction is affected by intrinsic factors, such as work responsibilities, psychological empowerment, personal growth, and achievement, as well as extrinsic factors, such as colleague relationships, salaries, fringe benefits, and work conditions (Yasin et al., 2020). Job satisfaction for nurses could improve their motivation and performance and it is an important resource for delivering efficient health service and patient satisfaction. However, low and moderate job satisfaction of nurses has been reported in China. A cross-sectional survey of 13,448 nurses in the mainland of China discovered that nurses had average job satisfaction (Wu et al., 2018). According to a national questionnaire survey of 51,406 registered nurses in 311 Chinese cities, more than 80.0% of nurses reported a high level of job dissatisfaction (Zhang et al., 2021). It has been found that job satisfaction is associated with psychological distress in a previous study (Feng et al., 2018). Moreover, job satisfaction is more closely associated with mental health than with physical health (Faragher et al., 2005).

In Chinese healthcare settings, nurses are faced with a lot of pressures from insufficient nursing workers and a rapidly aging population, thus being prone to burnout. Maslach classified burnout into three components that include emotional exhaustion, depersonalization, and the reduced sense of personal accomplishment (Maslach & Jackson, 1981). Emotional exhaustion refers to employees' fatigued feelings and a drain on their energy. Depersonalization reflects employees' negative and indifferent attitudes towards their clients. The reduced sense of personal accomplishment means that employees fail to enjoy their achievements in the workplace. In fact, burnout is far more common among healthcare workers than among other professional groups (Lee et al., 2015a). Based on the results of a national cross-sectional study of

25,120 medical professionals in China, 60.8% of the participants experienced at least one symptom of burnout (Xiao et al., 2022). According to the Job Demands-Resources (JD-R) model, a job is characterized by job demands on employees and job resources provided for them to deal with the demands (Demerouti et al., 2001). The former could lead to occupational stress, whereas the latter could help employees to keep healthy by offering them support. Demerouti et al. (2001) pointed out a positive correlation between the level of job demands on employees and the level of their emotional exhaustion, as well as a negative correlation between the level of job resources possessed by employees and the levels of their depersonalization. In response to a high level of job demands, individuals will inevitably spend more time and energy. When individual resources are consumed in large quantities, they will have higher expectations for objective resources and a stronger willingness to acquire and save more resources. If there is a big gap between objective resources and subjective evaluation, it will be more likely to cause dissatisfaction, aggravate emotional exhaustion, and lead to burnout at work, which may affect individuals' mental health. Job satisfaction has become an important predictor of burnout (Lee et al., 2015b). Also, a close relationship between severe burnout and psychological distress has been found in a study in the United States (Shenoi et al., 2018).

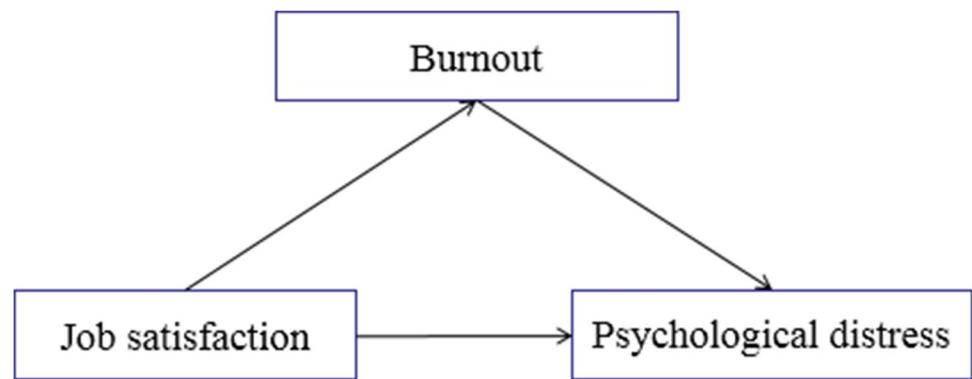
Under the guidance and framework of the JD-R model, it was hypothesized in this study that the relationship between the job satisfaction and psychological distress of Chinese nurses is mediated by burnout. The theoretical model is presented in Fig. 1. As a result, the purpose of this study was to (a) investigate the prevalence of psychological distress among nurses in a major general hospital in China; (b) explore the associations of job satisfaction and burnout with psychological distress; and (c) clarify the role of burnout in the relationship between job satisfaction and psychological distress.

Methods

Study design and participants

Conducted between March and July 2018 in Qiqihar City, Heilongjiang Province of China, this cross-sectional study was aimed at investigating nurses who had worked in a major general hospital for at least one year and were still holding their posts in departments including internal medicine, surgery, gynecology, pediatrics, outpatient service, emergency, operating room, and intensive care unit during the investigation for their experiences and viewpoints on job satisfaction, burnout, and psychological distress. First of all, the survey time, place, and participants were determined through the researcher's discussion with the management in

Fig. 1 Hypothesised mediation role of burnout on the association between job satisfaction and psychological distress



the hospital. During the survey, the investigators explained the goals and significance of the questionnaire survey to all participants, and all participants provided their informed consent. Then the research assistants distributed questionnaires with printed instructions to the participants who completed them on their own after their regular departmental meetings. A total of 975 respondents participated in this study, among whom 866 completed the entire questionnaire, with a valid response rate of 88.82%. The remaining 109 cases were excluded because of missing data on key variables. Based on the bioethics principles mentioned in the Declaration of Helsinki, this study was also approved by the Ethics Committee.

Measure

Job satisfaction

The single-item survey method for assessing job satisfaction has been widely used in social science studies (Kiefer et al., 2015; Lee & Kim, 2018). In this survey, job satisfaction was evaluated by asking the participants about their current views on the overall level of their satisfaction with work. According to the 5-point Likert scale, the response options included very dissatisfied, dissatisfied, fair, satisfied, and very satisfied, which were scored from 1 to 5, respectively, and the scores of three or below indicated low job satisfaction. The statistical reliability of the single-item survey method for assessing job satisfaction and its significant correlation with the multi-item survey method have been demonstrated in a prior study (Wanous et al., 1997).

Psychological distress

Psychological distress experienced by the participants was assessed through the Chinese version of the 12-item General Health Questionnaire (GHQ-12), which was first put forward by Goldberg (1986) and then adapted by Chinese scholars (Cheng & Williams, 1986). Binary GHQ scoring

(0-0-1-1) has been commonly accepted to yield a 0–12 scoring range. The GHQ-12 includes six positively worded questions and six negatively worded questions. The organization of the response scale of the two groups of questions was reverse. For the positively worded questions, the response options ranged from 1 (never or occasionally) to 0 (sometimes or usually). On the contrary, for the negatively worded questions, the response options ranged from 0 (never or occasionally) to 1 (sometimes or usually). A high score indicated a low level of mental health. The scores of four and above demonstrated the respondent's tendency to suffer psychological distress (Goldberg et al., 1997), and this evaluation criterion has widely been used in different groups in China (Phillips et al., 2009; Wang et al., 2017; Nie et al., 2020; Rao et al., 2019). Cronbach's coefficient alpha was 0.674 for the GHQ-12 in this study.

Burnout

The Maslach Burnout Inventory Human Services Survey (MBI-HSS) (Maslach & Jackson, 1981) was used to assess burnout in this study. The scale consists of 22 items, 9 of which were used for evaluating emotional exhaustion, 5 for evaluating depersonalization, and 8 for evaluating personal accomplishment. Items were assessed by the seven-point Likert scale ranged from 0 (never experienced such a feeling) to 6 (experience such feelings every day). As an internationally common scale, the Chinese version of the MBI-HSS has been widely applied in studies (Xie et al., 2021). According to its evaluation criterion (Ye et al., 2008), a high score of emotional exhaustion (the scores of 27 and above) and a high score of depersonalization (the scores of 8 and above) indicated a high level of burnout, whereas a low score of personal accomplishment (the scores of 24 and below) indicated a high level of burnout. In this study, the Cronbach's coefficient alphas of emotional exhaustion, depersonalization, and personal accomplishment were 0.870, 0.738, and 0.840, respectively.

Covariate assessment

Covariates included gender, age (≤ 30 , $31 \sim 40$, and ≥ 41), marital status (married or unmarried), educational level (junior college or below and bachelor or above), working years (≤ 5 , $6 \sim 10$, and ≥ 11), department, work stress, work-family conflict, night shift (no or yes), and average monthly personal income (yuan) (≤ 4000 RMB and > 4000 RMB). The participants were asked to indicate how they feel about their work stress and work-family conflict, respectively. Response options included very low, low, fair, high and very high. In the light of the small sample size in some categories, the data of the groups of work stress and work-family conflict were divided into two categories: low and fair, high.

Data analysis

In this study, the SPSS version 24.0 (IBM Corp, Armonk, NY, USA) for Windows operating system (Microsoft Corp, Redmond, WA, USA) was used to perform statistical analyses. To begin with, the chi-square test was conducted to compare differences among the basic characteristics of the respondents according to psychological distress. Because the dependent variable of the psychological distress was classified into two categories, the logistic regression models were applied to estimate the odds ratios (ORs) and 95% confidence intervals (CIs) for psychological distress in different job satisfaction and burnout groups, controlling for potential confounding factors. Pearson correlations were used to test the correlations among job satisfaction, burnout, and psychological distress. The mediating role of burnout in the relationship between job satisfaction and psychological distress was tested via the multiple regression analysis and a PROCESS macro, considering the values in the job satisfaction item, MBI-HSS subscales, and GHQ-12 scale as quantitative data types. The two-sided P values were statistically significant when they were lower than 0.05. We calculated 95% bootstrap CI based on 5,000 bootstrapped samples.

Results

Sample characteristics and psychological distress

According to the information shown in Table 1, female nurses accounted for 95.0% of the sample. Furthermore, 35.2% (305/866) of the participants reported that they suffered psychological distress. The prevalence of psychological distress varied in the groups of educational level ($P=0.045$), work stress ($P=0.002$), and work-family conflict ($P<0.001$). The participants with a bachelor degree or above (36.8%), high work stress (40.9%), and work-family conflict (48.6%) showed a higher prevalence of psychological

distress than those with a junior college degree or below (28.7%), low and fair work stress (30.8%), and work-family conflict (31.9%), respectively. No statistical significance was found in the difference in the prevalence of psychological distress among the groups of gender ($P=0.112$), age (year) ($P=0.968$), marital status ($P=0.988$), working years ($P=0.752$), department ($P=0.537$), night shift ($P=0.194$), and average monthly personal income (yuan) ($P=0.142$). More details of the sample characteristics and the distribution of the psychological distress in categorical items are shown in Table 1.

Job satisfaction, burnout, and psychological distress

The average score of job satisfaction among participants was 3.29 ± 0.63 , and 34.3% of them were at a low level of job satisfaction. The average scores of emotional exhaustion, depersonalization, and personal accomplishment were 16.34 ± 7.21 , 5.30 ± 3.85 , and 26.11 ± 7.92 , and the prevalence rates of high emotional exhaustion, high depersonalization, and low personal accomplishment were 8.5%, 26.7%, and 49.8%, respectively. Table 2 shows the results of the cross-sectional analysis of the participants' psychological distress at different levels of job satisfaction and burnout. The prevalence of psychological distress was 43.1% in the low job satisfaction group. Regarding the burnout group, the prevalence of psychological distress was 71.6%, 61.5%, and 50.1% in the high emotional exhaustion group, high depersonalization group, and low personal accomplishment group, respectively. Furthermore, participants with low job satisfaction (OR = 2.987, 95% CI = [2.151, 4.148]) were seen to be at a higher risk for psychological distress than those with high job satisfaction. The risks of psychological distress suffered by the participants with high emotional exhaustion, high depersonalization, and low personal accomplishment were 5.408 (OR = 5.408, 95% CI = [3.193, 9.161]), 4.620 (OR = 4.620, 95% CI = [3.357, 6.358]), and 3.906 (OR = 3.906, 95% CI = [2.894, 5.271]) times higher than those of their counterparts, respectively. After controlling the potential confounding factors, the values of the OR changed to 2.730 (95%CI = [1.933, 3.856]), 4.821 (95%CI = [2.760, 8.421]), 4.788 (95%CI = [3.426, 6.693]), and 3.889 (95%CI = [2.848, 5.310]), respectively. Whether adjusted or not, psychological distress was significantly associated with low job satisfaction and personal accomplishment, as well as high emotional exhaustion and depersonalization.

Analysis of correlations

The variable values of job satisfaction, burnout, and psychological distress approximately fitted into the normal distribution (Supplementary Figs. S1-S5). Table 3 shows the Pearson correlations (two-tailed) of job satisfaction, emotional

Table 1 Sample characteristics and the distributions of the psychological distress in categorical items (N=866)

Variables		Sample n (%)	Psychological distress		χ^2	P
			No (n=561)	Yes (n=305)		
Gender	Male	43 (5.0)	23 (53.5)	20 (46.5)	2.529	0.112
	Female	823 (95.0)	538 (65.4)	285 (34.6)		
Age (year)	≤30	482 (55.7)	314 (65.1)	168 (34.9)	0.065	0.968
	31–40	306 (35.3)	197 (64.4)	109 (35.6)		
	≥41	78 (9.0)	50 (64.1)	28 (35.9)		
Marital status	Married	571 (65.9)	370 (64.8)	201 (35.2)	<0.001	0.988
	Unmarried	295 (34.1)	191 (64.7)	104 (35.3)		
Educational level	Junior college or below	171 (19.7)	122 (71.3)	49 (28.7)	4.024	0.045
	Bachelor or above	695 (80.3)	439 (63.2)	256 (36.8)		
Working years	≤5	265 (30.6)	176 (66.4)	89 (33.6)	0.570	0.752
	6–10	334 (38.6)	216 (64.7)	118 (35.3)		
	≥11	267 (30.8)	169 (63.3)	98 (36.7)		
Department	Internal medicine	314 (36.3)	203 (64.6)	111 (35.4)	6.026	0.537
	Surgery	231 (26.7)	145 (62.8)	86 (37.2)		
	Gynaecology	56 (6.5)	38 (67.9)	18 (32.1)		
	Paediatrics	50 (5.8)	38 (76.0)	12 (24.0)		
	Outpatient service	36 (4.2)	22 (61.1)	14 (38.9)		
	Emergency	55 (6.4)	38 (69.1)	17 (30.9)		
	Intensive care unit	52 (6.0)	29 (55.8)	23 (44.2)		
	Operating room	72(8.3)	48 (66.7)	24 (33.3)		
Work stress	Low and fair	487 (56.2)	337 (69.2)	150 (30.8)	9.522	0.002
	High	379 (43.8)	224 (59.1)	155 (40.9)		
Work-family conflict	Low and fair	693 (80.0)	472 (68.1)	221 (31.9)	16.851	<0.001
	High	173 (20.0)	89 (51.4)	84 (48.6)		
Night shift	No	355 (41.0)	221 (62.3)	134 (37.7)	1.684	0.194
	Yes	511 (59.0)	340 (66.5)	171 (33.5)		
Average monthly personal income (yuan)	≤4000 RMB	462 (53.3)	289 (62.6)	173 (37.4)	2.152	0.142
	>4000 RMB	404 (46.7)	272 (67.3)	132 (32.7)		

Table 2 Adjusted and unadjusted odds ratio and 95% CI of the association of job satisfaction and burnout according to the categorized psychological distress

Variables		Psychological distress n (%)		Unadjusted OR(95% CI)	Adjusted OR ^a (95% CI)
		GHQ-12 < 4	GHQ-12 ≥ 4		
Low job satisfaction	No	237 (79.8)	60 (20.2)	1	1
	Yes	324 (56.9)	245 (43.1)	2.987 (2.151, 4.148)	2.730 (1.933, 3.856)
Burnout					
High emotional exhaustion	No	540 (68.2)	252 (31.8)	1	1
	Yes	21 (28.4)	53 (71.6)	5.408 (3.193, 9.161)	4.821 (2.760,8.421)
High depersonalization	No	472 (74.3)	163 (25.7)	1	1
	Yes	89 (38.5)	142 (61.5)	4.620 (3.357, 6.358)	4.788 (3.426, 6.693)
Low personal accomplishment	No	346 (79.5)	89 (20.5)	1	1
	Yes	215 (49.9)	216 (50.1)	3.906 (2.894, 5.271)	3.889 (2.848, 5.310)

Note: ^aAdjusted for gender, age (year), marital status, education level, working years, department, work stress, work-family conflict, night shift, and average monthly personal income (yuan)

Table 3 Pearson correlation matrix for psychological distress, burnout and job satisfaction

Variables	1	2	3	4	5
1. Job satisfaction	1				
2. Emotional exhaustion	-0.446 ^{***}	1			
3. Depersonalization	-0.313 ^{***}	0.636 ^{***}	1		
4. Personal accomplishment	0.247 ^{***}	-0.301 ^{***}	-0.393 ^{***}	1	
5. Psychological distress	-0.312 ^{***}	0.491 ^{***}	0.449 ^{***}	-0.422 ^{***}	1

Note: ^{***} $P < 0.001$

exhaustion, depersonalization, personal accomplishment, and psychological distress. The correlation coefficients were found to be significant ($P < 0.001$), ranging from 0.247 to 0.636. Furthermore, psychological distress was negatively correlated with job satisfaction and personal accomplishment but positively correlated with emotional exhaustion and depersonalization.

Testing for the mediation effect

A multiple linear regression analysis was used to examine whether burnout mediates the relationship between job satisfaction and psychological distress. Matrix scatter plot shows the correlations of job satisfaction and burnout with psychological distress (Supplementary Fig. S6). A co-linearity analysis presents a Variance Inflation Factor (VIF) < 5 and no co-linearity among the variables (Supplementary Table S1). The analyzes of residual scatterplots showed that the model residuals basically fitted into the homogeneity of variance (Supplementary Figs. S7-S9). The potential confounding factors were controlled in the analysis of the mediation effect. Table 4 displays the testing results. In the first step, job satisfaction was significantly associated with psychological distress ($B = -0.981$, $\beta = -0.273$, $P < 0.001$). In the second step, job satisfaction was significantly associated with burnout ($B = -3.960$, $\beta = -0.348$, $P < 0.001$ for emotional exhaustion; $B = -1.753$, $\beta = -0.288$, $P < 0.001$ for depersonalization; and $B = 3.033$, $\beta = 0.242$, $P < 0.001$ for personal accomplishment). In the third step, when we controlled for job satisfaction, burnout was associated with psychological distress ($B = 0.139$, $\beta = 0.440$, $P < 0.001$ for emotional exhaustion; $B = 0.226$, $\beta = 0.382$, $P < 0.001$ for depersonalization; and $B = -0.105$, $\beta = -0.368$, $P < 0.001$ for personal accomplishment). In addition, after emotional exhaustion, depersonalization, and personal accomplishment were included in the equation, the explained percentage of the variance in psychological distress increased from 13.0 to 26.4%, 25.8%, and 25.4%, respectively. Although the standard regression coefficient for the effect of job satisfaction on psychological distress reduced, it remained significant. Figure 2 shows the final output model which describes the direct, indirect, and total effects of job satisfaction and burnout on psychological distress. The proportion

of the total effect mediated by emotional exhaustion, depersonalization, and personal accomplishment was 56.09% ($-0.348 \times 0.440 / -0.273$), 40.30% ($-0.288 \times 0.382 / -0.273$), and 32.62% ($-0.368 \times 0.242 / -0.273$), respectively.

The effect was reconfirmed through the PROCESS macro (Model 4), which showed a reduced direct effect of job satisfaction on psychological distress. In this model, we calculated the 95% CI based on 5,000 bootstrap resampling. It was found that job satisfaction had indirect effects on psychological distress through emotional exhaustion (95% CI = $[-0.692, -0.426]$), depersonalization (95% CI = $[-0.538, -0.283]$), and personal accomplishment (95% CI = $[-0.435, -0.213]$), excluding 0, respectively. Thus, we confirmed that burnout partially mediated the relationship between job satisfaction and psychological distress.

Discussion

There are three major findings in our study. (1) The Chinese nurses who participated in the study reported a high prevalence of psychological distress. (2) The increased prevalence of psychological distress among them was related to low job satisfaction and high burnout. (3) The relationship between job satisfaction and psychological distress may be partially mediated by personal accomplishment, depersonalization, and emotional exhaustion. These findings suggest that managers of the healthcare workforce should be aware of the risks of low job satisfaction and burnout of nurses, as well as the consequent psychological distress, and provide better training and support for nurses to adapt themselves to work-related stressors.

There were more than one-third of the participants obtaining a GHQ-12 score beyond the cut-off point. It was reported that the proportion of Iranian nurses reporting psychological distress was 26.2% (Bazazan et al., 2018), and the figure was 22.6% among the nurses and midwives working in the Middle East (Alshawish & Nairat, 2020). As important forces to cope with the aging society and reshape the image of the public health system, nurses play an irreplaceable role in promoting the overall health condition of the whole population. By the end of 2020, the total number of registered nurses in China was more than 4.7 million (National Health

Table 4 Multiple linear regression analyses; testing the mediation effect of burnout in the association between job satisfaction and psychological distress

Variables	<i>B</i>	<i>SE</i>	β	<i>t</i>	<i>R</i> ²	<i>F</i>
Job satisfaction → Emotional exhaustion → Psychological distress						
Step 1: Job satisfaction predicts psychological distress						
Independent variable: job satisfaction	-0.981	0.122	-0.273	-8.059 ^{***}	0.130	11.554 ^{***}
Dependent variable: psychological distress						
Step 2: Job satisfaction predicts emotional exhaustion						
Independent variable: job satisfaction	-3.960	0.344	-0.348	-11.500 ^{***}	0.308	34.585 ^{***}
Dependent variable: emotional exhaustion						
Step 3: Emotional exhaustion predicts psychological distress						
Independent variable: job satisfaction	-0.431	0.120	-0.120	-3.584 ^{***}	0.264	25.465 ^{***}
Mediator: emotional exhaustion	0.139	0.011	0.440	12.470 ^{***}		
Dependent variable: psychological distress						
Job satisfaction → Depersonalization → Psychological distress						
Step 1: Job satisfaction predicts psychological distress						
Independent variable: job satisfaction	-0.981	0.122	-0.273	-8.059 ^{***}	0.130	11.554 ^{***}
Dependent variable: psychological distress						
Step 2: Job satisfaction predicts depersonalization						
Independent variable: job satisfaction	-1.753	0.207	-0.288	-8.482 ^{***}	0.125	11.055 ^{***}
Dependent variable: depersonalization						
Step 3: Depersonalization predicts psychological distress						
Independent variable: job satisfaction	-0.585	0.117	-0.163	-4.995 ^{***}	0.258	24.658 ^{***}
Mediator: depersonalization	0.226	0.019	0.382	12.127 ^{***}		
Dependent variable: psychological distress						
Job satisfaction → Personal accomplishment → Psychological distress						
Step 1: Job satisfaction predicts psychological distress						
Independent variable: job satisfaction	-0.981	0.122	-0.273	-8.059 ^{***}	0.130	11.554 ^{***}
Dependent variable: psychological distress						
Step 2: Job satisfaction predicts personal accomplishment						
Independent variable: job satisfaction	3.033	0.437	0.242	6.938 ^{***}	0.076	6.398 ^{***}
Dependent variable: personal accomplishment						
Step 3: Personal accomplishment predicts psychological distress						
Independent variable: job satisfaction	-0.661	0.116	-0.184	-5.706 ^{***}	0.254	24.266 ^{***}
Mediator: personal accomplishment	-0.105	0.009	-0.368	-11.957 ^{***}		
Dependent variable: psychological distress						

Note: Adjusted for gender, age (year), marital status, education level, working years, department, work stress, work-family conflict, night shift, and average monthly personal income (yuan)

*** *P* < 0.001

Commission of the People’s Republic of China, 2021). However, with the aggravation of the aging population and the growth of the public demand for multi-level health services, the social requirements for nurses’ education levels, nursing levels, and service quality are gradually increasing. Thus, the stress suffered by nurses is increasing day by day, and they often have to work with high labor intensity, which may bring psychological distress to them. A prior study showed that the mental health level of Chinese nurses decreased steadily from 1998 to 2016 (Xin et al., 2019). Therefore, the government, society, and hospitals should make joint efforts and take comprehensive measures to alleviate the pressure on nurses and promote their health.

Low job satisfaction was found to be able to increase the risk of psychological distress after controlling the potential confounding factors, which is in line with the findings in a prior study (Zhang et al., 2022). Nurses’ job satisfaction includes satisfaction from their working conditions, relationships with colleagues and managers, scheduling and staffing, salaries, promotion opportunities, job security, work time, and managers’ acknowledgement of their performance (Spector, 1997). Nurses usually spend a lot of time in their work. If they are dissatisfied with some aspects of their work, they may develop negative emotions that will affect their work engagement and cause them to adopt a negative attitude towards their work, thus experiencing psychological/

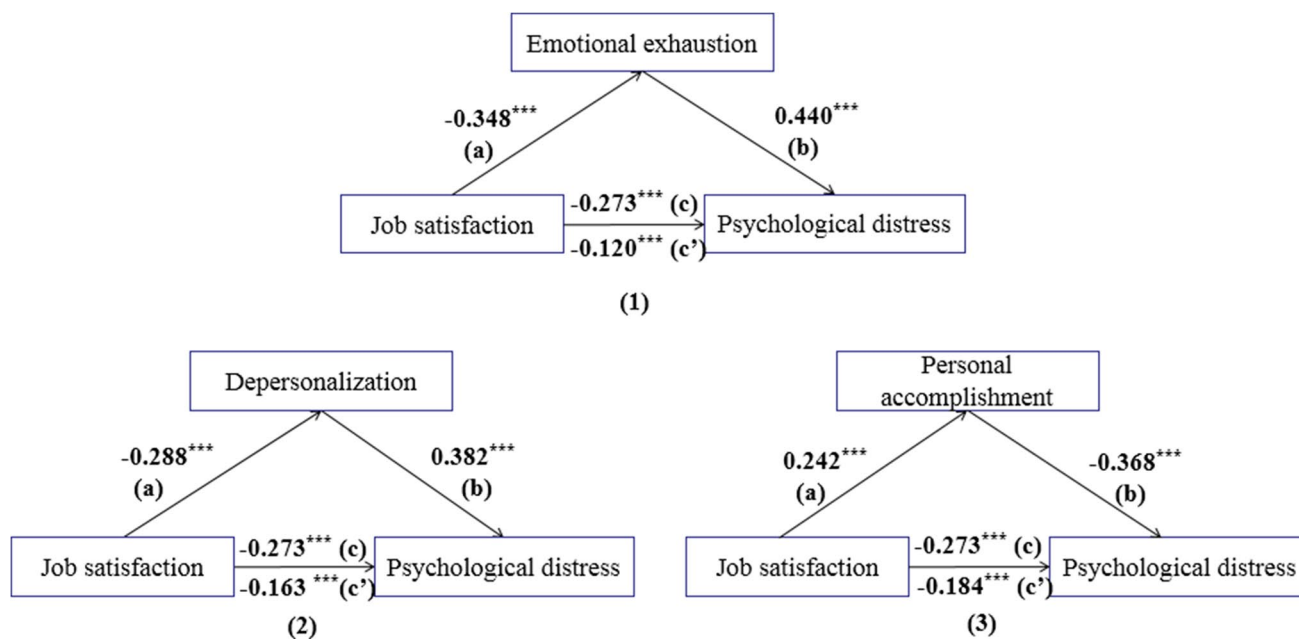


Fig. 2 The mediating role of burnout on the association between job satisfaction and psychological distress. Note: a path: a significant association between job dissatisfaction and burnout. b path: a significant association between burnout and psychological distress

after controlling job dissatisfaction. c' path: a significant association between job dissatisfaction and psychological distress after controlling burnout $c=c'+ab$. All regression coefficients were standardized. $^{***}P < 0.001$

mental health problems. Consistent with previous studies (Alshawish & Nairat, 2020; Khamisa et al., 2015), this study also found that a high level of burnout could increase the risk of psychological distress. According to the World Health Organization (2019), burnout is an “occupational phenomenon” and syndrome caused by long-term workplace stress without successful management. Affected by long-term stressors, people with burnout will have nervous system disorders, as well as abnormal neurotransmitters and their receptors in the nervous system that may cause mental health problems (Chow et al., 2018). This association highlights the importance of the early recognition of burnout, which is a significant predictor of psychological distress.

In line with the findings in previous studies (Feng et al., 2018; Kaya & Isler Dalgic, 2021), the results of the correlation analysis in this study indicated that job satisfaction was negatively correlated with burnout and psychological distress. To be more specific, the nurses with high job satisfaction showed a stronger sense of professional identity and a more positive response to daily work and difficulties, which contributed to a good working state and a lower rate of burnout (Hu et al., 2015). According to a previous study (Satuf et al., 2018), satisfaction with work has a positive impact on individuals' physical and mental performance, decreasing the possibility of individuals' desire to lower their workload and their job difficulties. In addition, high job satisfaction is favorable for increasing the probability of a higher level of energy reported by individuals, raising the quantity and

quality of their social interactions, and enhancing additional protection for individuals from anxiety and depression. This study demonstrated a positive correlation between burnout and psychological distress, indicating that nurses will suffer poor mental health if they experience serious emotional exhaustion and depersonalization and a low level of personal accomplishment.

This study also showed that the relationship between job satisfaction and psychological distress may be partially mediated by emotional exhaustion, depersonalization, and personal accomplishment. According to the JD-R model (Bakker & Demerouti, 2017), it is perhaps not surprising that nurses have excessive physical and mental demands as they have to work under stressful conditions. Workers with lower job satisfaction are more likely to lack emotional resources for work and even feel emotionally exhausted (Satuf et al., 2018), thereby suffering health issues such as workplace phobic anxiety (Vignoli et al., 2017). The Conservation of Resources theory (Hobfoll, 1989) assumes that time pressure is more likely to be a threatening energy resource that can adversely affect nurses' flexible access to other resources. Nurses may not be able to mobilize enough emotional resources at work and show indifference to patients and colleagues. And then nurse-patient and doctor-nurse disputes may increase, which could further consume one's own emotional resources and eventually lead to mental health problems. In addition, according to Herzberg's two-factor theory (Herzberg et al., 1974), the significance of job is important

for nurses' job satisfaction. People who work hard are trying to derive a sense of meaning from their work for their entire life. Nurses who are dissatisfied with their jobs may have a reduced sense of accomplishment and lack enough motivation to work. Then psychological confusion and emptiness would emerge. If things go on like this, psychological problems such as irritability and depression may occur.

Multiple departments should make joint efforts and take comprehensive measures to improve the mental health level of the nursing staff. For example, the government should provide stable support for hospital managers to carry out health promotion work for the nursing staff. In response to the current shortage of nurses, institutions should strengthen the ideological education of nursing specialty, correct the professional outlook, and affirm the ability and role of nurses in the nursing team. Moreover, it is important to create a good working environment, improve the salary level of nurses, offer nurses more opportunities to be promoted, study abroad, and develop their careers, stimulate their work enthusiasm by various incentives, and finally improve their job satisfaction. In addition, the hospital management can organize innovative activities and invite nurses' family members to improve their relationship with nurses. At the same time, nurses should be provided with regular targeted psychological counseling or psychological behavior training. Appropriate psychological counseling can help them reduce psychological pressure, deepen the understanding of the professional role of nurses, and face nursing work with a positive attitude. Especially, the unprecedented pressure exerted by the COVID-19 pandemic on every country's healthcare system has presented various challenges to nurses, such as the increase in the number of patients and the fear of COVID-19. Working in COVID-19 epidemic has a great influence on nurses' well-being and work performance. In the context of the global spread of the epidemic, our findings may help nurse managers to take supportive strategies to improve their psychological health and sustain a well-engaged nursing workforce.

From a theoretical perspective, this study provides an empirical framework to explore the mediating role of burnout in the relationship between job satisfaction and psychological distress under the guidance of the JD-R model. This empirical research presents job satisfaction may affect psychological distress through emotional exhaustion, depersonalization, and personal accomplishment, respectively, which contributes to the understanding of the internal pathway of the association between job satisfaction and psychological distress of nurses, thereby providing empirical support for future research that aims to promote nurses' mental health.

Among the three variables of job satisfaction, burnout and psychological stress, we acknowledge that there may be a bidirectional relationship between every two variables. Nurses with a high level of burnout are more likely to have a high degree of job dissatisfaction (Zhang et al., 2021).

Nurses dealing with psychological distress are prone to burnout (Zarei & Fooladvand, 2022). Negative thoughts related to psychological distress consume certain cognitive resources, resulting in insufficient cognitive resources to deal with more important tasks, which will reduce one's work enthusiasm and lead to burnout in the long run. Therefore, any of the three variables included in the model could hypothetically take the role of predictor, mediator or outcome. Major limitations of this study include its nature as a cross-sectional study, which may lead to difficulties in associating causes with effects from the findings, and its data collection through self-reporting, which could yield recall biases as well. In addition, the method of convenience sampling was adopted to recruit the participants, which may hinder the generalization of the findings.

Conclusion

To sum up, this study indicated the necessity for attention to psychological distress among Chinese nurses as low job satisfaction and high burnout could bring a potentially increased risk of psychological distress. Furthermore, burnout may mediate the relationship between job satisfaction and psychological distress. Thus, improving job satisfaction and reducing burnout could be an effective way to prevent and reduce the possibility of psychological distress occurrence among nurses.

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Author contributions Conceptualisation and study design: XMZ and HJL; data acquisition and management: ZR, HFZ, XRL, SZ, SYQ, YYL, YJP and YS; statistical analysis and data analysis: ZR, HFZ, XRL, MFH, HS and YS; manuscript drafting: ZR and HFZ; manuscript revision: XMZ, HJL and MFH; final approval: all authors.

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Data availability The datasets analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval statement Based on the bioethics principles mentioned in the Declaration of Helsinki, this study was also approved by the Ethics Committee of Jilin University School of Public Health (No. 2016-04-26).

Informed consent Informed consent was obtained from the nurses.

Conflict of interest We have no conflicts of interest to disclose.

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