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ORIGINAL RESEARCH

Personality Profiles and Personal Factors Associated with Psychological Distress in Chinese Nurses

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Background: A high prevalence of psychological distress is observed in nurses due to multiple occupational stressors. Personality traits and personal factors are important factors that lead to psychological distress. The personality profile reflects a combination of personality traits; however, the relationship between personality profiles and personal factors that affect psychological distress among nurses has not been defined.

Methods: This cross-sectional study was conducted in November 2020 in China. Convenience and snowball sampling were used to recruit participants. Latent profile analysis was used to identify personality profiles of nurses based on the big-five personality traits. Single-factor analysis and multivariate logistic regression were used to determine the factors affecting psychological distress. The structural equation model was used to verify the hypothetical model linking personality profiles, self-efficacy, psychological resilience, and coping style with psychological distress.

Results: A total of 953 Chinese nurses (934 female) with a mean (S.D.) age of 32.8 (8.6) years were recruited. Personality profiles identified were negative, normative, and positive. A personality profile may predict psychological distress directly and indirectly through self-efficacy, psychological resilience, and coping style.

Limitations: No complex sampling limits the representativeness of Chinese nurses. External factors affecting psychological distress were not investigated.

Conclusion: Nurses with anegative personality profile had a higher prevalence of psychological distress. This study establishes the importance of personality profile assessment to identify nurses at higher risk of psychological distress. It suggests that interventions should be based on self-efficacy, psychological resilience, and coping style as potential management strategies.

Keywords: psychological distress, personality profile, self-efficacy, psychological resilience, coping style, nurse

Introduction

Nurses are an essential part of the medical and healthcare workforce. They play an important role in maintaining and promoting the health of patients. A high prevalence of psychological distress is observed in nurses due to multiple occupational stressors such as increased workloads, shift work, and nurse-patient conflicts.[1] Studies have established that there is a high prevalence of psychological distress among Chinese nurses (92.3%).[2] Psychological distress can be broadly defined as a response to stressors (depression, anxiety, burnout, etc.)[3] that is characterised by a series of negative psychological cognition, emotion, behaviour and psychophysiological manifestations,[4] which may indicate the onset of major depressive

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disorder, anxiety disorder, schizophrenia, somatisation disorder, or a variety of other clinical conditions.[5] An international standard method for screening psychological distress is using the short-form of the Kessler Psychological Distress Scale.[4] Psychological distress in nurses detracts from job satisfaction and work efficiency increases burnout and risks medical errors and adverse events. Furthermore, it leads to a negative impact on the nurse and patient's health outcomes.[6,7] It is imperative to reduce psychological distress and promote better mental health for nurses. An understanding of factors that lead to psychological distress may assist in identifying strategies to improve mental health. This understanding would also have an impact on the quality of nursing care available. Individual mental health is based on various interacting biological, psychological, social, and ecological systems.[8] Personal factors are fundamental elements in the field of health promotion.[9] Positive personal traits are vital factors associated with psychological well-being and are an important part of positive psychology.[10] This study focuses on the personal factors associated with the psychological health of nurses.

Background

The Big Five personality trait grouping, based on the psychological trait theory, is the most widely utilised tool to identify an individual's personality traits.[11] Personality traits primarily comprise five categories: extraversion (individuals who are energetic and sociable), agreeableness (individuals who are amicable and altruistic), conscientiousness (individuals who are self-disciplined and reliable), neuroticism (reverse factor of emotional stability, individuals who are prone to being unstable and moody), and openness (individuals who are imaginative and receptive).[12] Personality traits could directly predict the onset of psychological problems, and certain personality traits, like high neuroticism and low extraversion, are strongly linked to depressive episodes and are associated with a higher risk of depression and anxiety.[13–15] Numerous mental disorders present with high neuroticism, and low conscientiousness and extraversion.[11,16] Studies of personality traits have demonstrated that neuroticism is negatively associated with the volume of the prefrontal cortex and the left medial temporal lobe and that these are associated with emotional regulation and sensitivity to threat or punishment; extraversion, agreeableness, and conscientiousness are associated with the region that processes reward coding and motivation, empathy, and self-regulation, respectively.[17] Personality traits play an important role in coping behaviour, which is a response to stress and emotions.[18] The coping strategy of individuals with a high level of neuroticism involves escapism or evasion, and they may be emotionally unstable or unable to control their emotions. They may also feel frequently anxious and depressed.[19,20] Coping is the cognitive and behavioural responses used to manage an individual's specific external or internal stressors and can broadly be classified as positive and negative coping styles.[21,22] The Transactional Theory of Stress and Coping emphasises the mutual interaction between an individual's coping ability and psychological health.[23] Psychological issues may contribute to negative and ineffective coping strategies. Therefore, positive emotions predominate if an individual responds positively and effectively to stressful situations.[22,23] A negative coping style is usually related to depression and anxiety symptoms, and it continues to intensify negative coping strategies.[24,25] A study of 500 Chinese paediatric nurses investigated the correlation between stressors, coping styles, and anxiety and depression. It was observed that a negative coping style is correlated with higher anxiety and depressive symptoms.[26] Another study of 2534 Chinese nurses revealed that rational coping styles play a beneficial role in preventing depressive symptoms.[27] Thus, coping style is considered an intermediary factor that regulates stress and mental health.[28,29]

A number of factors, primarily personal characteristics, profoundly impact coping style and psychological distress.[1] Psychological capital is a variable that reflects personal characteristics within the framework of positive psychology.[30] Psychological capital indirectly affects burnout and psychological distress, mediated by coping styles.[31,32] Self-efficacy and resilience are vital components within psychological capital.[30] Self-efficacy may increase psychological resilience[31,32] and is defined as "a belief about the ability to coordinate skills and abilities to attain desired goals in particular domains and circumstances".[33] Nurses with higher self-efficacy may cope with occupational stress and burdens more positively and calmly and may not evade such situations to prevent higher psychological distress.[34,35] Furthermore, self-efficacy can alleviate the negative effect of neuroticism on occupational stress and work burnout among nurses.[36] Psychological resilience has been defined as the ability to bounce back from difficulties.[37] This resilience can enhance the ability of nurses to proactively cope with work-related stress and identify and prevent burnout and potential mental problems.[8,38] Higher psychological

resilience is associated with a positive coping style,[39,40] which mediates the relationship between psychological resilience and psychological well-being. Resilience may also play a mediating role in the relationship between personality traits and depressive symptoms.[41,42]

Studies that link personality traits with self-efficacy, psychological resilience, coping style, and the multiple effects on psychological distress among nurses are lacking. Furthermore, personality traits are primarily investigated without considering previous studies. However, from a person-centred perspective, an individual should be considered a combination of all five personality traits. Therefore, latent profile analysis (LPA) is now conducted to identify and describe distinct personality profiles of individuals defined by multiple dimensions of personality traits.[43–45] LPA is a person-centred approach aimed at identifying heterogeneity within groups and classifying the population into unobserved clusters.[46] A cluster characterised by a lower level of neuroticism (higher emotional stability) and a higher level of extraversion, agreeableness, conscientiousness, and openness is assumed indicate a positive personality profile.

This study attempts to identify the subgroup of personality profiles among Chinese nurses and investigates the association of personality profiles, self-efficacy, psychological resilience, and coping styles with psychological distress. The hypotheses are: i) a positive personality profile is negatively associated with levels of psychological distress; ii) coping style mediates the relationship between personality profile and psychological distress. A positive personality profile is directly associated with a more positive coping style, thereby alleviating psychological distress; and iii) self-efficacy and psychological resilience mediate the relationship between personality profile and psychological distress. A positive personality is associated with higher self-efficacy and psychological resilience, and may further promote the positive coping style, thereby alleviating psychological distress.

Methods

Participants and Data Collection

This cross-sectional study was conducted in Guangzhou, Guangdong Province, in November 2020. Participants were recruited through convenience and snowball sampling. Participants fulfilling the following criteria were included: 1) age ≥18 years; 2) had obtained the nursing qualification certificate; 3) currently worked in a department related to clinical nursing (eg, outpatient clinic, inpatient ward, intensive care unit, surgery, or paramedical unit); and 4) voluntarily consented to participate in the survey. Nurses and nursing supervisors, who met the inclusion criteria, were recruited first. They were then asked to invite eligible nurses to participate in the survey. All invitees completed the online survey through the Questionnaire Star platform (Changsha Ranxing Information Technology Co. LTD, www.wjx.cn). It was mandatory to answer all the questions in the electronic questionnaire before submission, and thus, no response was marked as missing.

The sample size calculation was based on a multiple logistic regression analysis. A sample size of five to ten times the number of independent variables in the equation is generally required. The potential number of independent variables in the equation was 35 (25 on demographic characteristics, 3 on personality profiles, 2 on coping styles, 3 on self-efficacy, and 3 on psychological resilience), and so, assuming an invalid response rate of 10 to 20%, a minimum of 193 participants were required for this study. Also, considering the rule of EVP≥10 in calculating a logistic model sample size,[47] 350 participants with positive events were preferred. Initially, 1003 participants received and completed the questionnaire, after excluding participants with the 5.0% lowest response time, 953 valid responses (367 participants with moderate or severe psychological distress) were collected (median [P25, P75] for response time was 514 [373, 734] seconds), resulting in a valid rate of 95.0%. Among 953 participants, 491 were working in Guangzhou, 75 in Shenzhen, 147 in Foshan and 247 were from other cities.

Ethical Consideration

This study has been approved by the institutional review board of the First Affiliated Hospital of Guangdong Pharmaceutical University. All participants were informed about the 1) research objectives and procedures, 2) potential risks and benefits, and 3) the privacy protection policy before they answered the questionnaire, and they had the right to withdraw at any time. No personal information which could be traced back to a particular individual or institution was collected from the participants. Anonymous completion and return of the self-recorded electronic questionnaire was considered to be informed consent for the study.

Measures

Personality Traits

The Chinese version of the Ten-Item Personality Inventory (TIPI-C) questionnaire has been used for this study.[48] The

TIPI is a brief personality assessment scale for the big-five personality traits dimensions (ie, extraversion, agreeableness, conscientiousness, emotional stability [antithesis of neuroticism], and openness), and is scored on a 7-point Likert scale (1 for strongly disagree and 7 for strongly agree). Each dimension consists of two reverse items, wherein one item represents a positive trait (eg, extroverted, enthusiastic, etc.), while the other represents a negative trait (eg, reserved, quiet, etc.). The scores for each dimension were summed up with two items; the higher scores of each dimension indicating each positive trait are preferred.[49] The Cronbach's alpha coefficient for TIPI-C in this study was 0.733.

Coping Style

The 20-item Chinese version of the Trait Coping Style Questionnaire (TCSQ-C),[50] which includes two dimensions of positive and negative coping, was used to assess the coping style of nurses. Each dimension included 10-items scored on a 5-point Likert scale (1 for strongly disagree and 5 for strongly agree). The total score of coping style was equal to the score of positive coping minus the score of negative coping, and a total score >0 indicated a positive coping tendency. The Cronbach's alpha for TCSQ-C in this study was 0.833.

Self-Efficacy

Self-efficacy was measured through the brief Occupational Coping Self-Efficacy Questionnaire for Nurses (OCSE-N).[51] The OCSE-N assesses two distinct self-efficacy beliefs: occupational burden and relational difficulties at the workplace. A higher score for OCSE-N indicates stronger beliefs regarding coping with nursing-related difficulties and a tendency to address challenges confidently and actively. The Cronbach's α for OCSE-N in this study was 0.930. The fit indices from confirmatory factor analysis (CFA) model were $\chi 2/df$ =7.039, CFI = 0.985, TLI=0.972, and RMSEA = 0.013.

Psychological Resilience

Psychological resilience was assessed through the Connor-Davidson Resilience Scale (CD-RISC), a 25-item scale that contains the following three dimensions: strength (eg, able to adapt to change), tenacity (eg, when things look hopeless, I do not give up), and optimism (eg, see the humorous side of things).[52] This was assessed on a 5-point scale (1=not true at all, 2=rarely true, 3=sometimes true, 4=often true, and 5=true nearly always). Higher total scores on CD-RISC indicated that the individual has a high level of resilience when confronted with a stressful situation. The Cronbach's α of CD-RISC for this study was 0.966. The fit indices from the CFA model were $\chi 2/df$ =6.384, CFI = 0.952, TLI=0.944, and RMSEA = 0.075.

Dependent Variable: Psychological Distress

The 10-item Kessler Measure of Psychological Distress (K10) was used to assess levels of psychological distress in the nurses.[4] Respondents were asked how frequently they experienced the associated ten symptoms in the past thirty days. These included tiredness, nervousness, depression, etc. Each item was rated on a 5-point Likert scale (1=none of the time, 2=a little of the time, 3=some of the time, 4=most of the time, and 5=all the time). Analogous with previous studies, a cut-off score of >15 and >21 and >29 was used to identify individuals displaying a likelihood of mild, moderate, and severe psychological distress.[53,54] The K10 has good reliability, and the Cronbach's α in this study was 0.953.

Covariates: Demographic Characteristics

The demographic characteristics of nurses included age, gender, marital status (unmarried/widowed/divorced, married), educational level (technical secondary school, junior college, undergraduate, master's degree or above), hospital-level (tertiary, secondary, first, other), departments (inpatient ward, outpatient clinic, ICU/surgery/emergency/paediatric, paramedical), personal income every month (0, 1–5000, 5001–10,000, >10,000), and years of experience as a nurse (<5, 5–9, ≥10).

Statistical Analyses

An unconditional LPA using Z-score ($Z=(x-\mu)/\sigma$) on the five dimensions of TIPI-C scales was conducted to identify subgroups of personality profiles among nurses (Supplementary Table 1). To determine the best-fitting model, the goodness of fit according to Akaike information criterion (AIC), Bayesian information criterion (BIC), Adjusted Bayesian information criterion (Adjusted-BIC), Entropy, Lo-Mendell-Rubin likelihood ratio (LMR-LRT), and bootstrap likelihood tests (BLRT), were conducted from two- to four-class models. The model with smaller values of AIC, BIC, Adjusted-BIC, and statistically significant LMR-LRT and BLRT, were preferred. Descriptive statistics were used to report the distribution of the baseline characteristics of participants.

Continuous variables were displayed as mean ± S.D., and categorical variables were displayed as the frequency with percentage (%). Histograms were used to assess normality in continuous variables, and continuous data were compared with analysis of independent-samples *t*-test, while Pearson's χ^2 tests were used to compare baseline characteristic differences across levels of psychological distress. Stratification logistic regression models were constructed to identify factors associated with psychological distress among nurses. In Model 1, age (continuous) and sex were imported. In Model 2, age, sex, marital status, education level, hospital level, departments, personal income, and years of being a nurse were imported. In Model 3, variables in Model 2 and personality profiles, coping style, self-efficacy, and psychological resilience, were imported. Finally, a structural equation model (SEM) was constructed to investigate the association between personality profiles, coping style, self-efficacy, psychological resilience, and psychological distress. The Root Mean Square Error of Approximation (RMSEA), Standardised Root Mean Square Residual (SRMR), Comparative Fit Index (CFI), and Tucker-Lewis Index (TLI) were used to compare the model fitness. Indirect effect analysis was conducted using the bootstrap estimate based on 1000 bootstrap samples. A two-tailed $p<0.05$ was considered statistically significant. Descriptive statistics and single-factor analysis were performed using SPSS 21.0 (IBM Corp., Armonk, N.Y., USA), LPA modelling was performed using Mplus v7.2 (Muthen & Muthen, LA, CA), SEM and CFA analyses were performed using Amos 26.0 (Amos Development Corporation, Meadville, PA, USA).

Results

Determination of the Subgroup of Personality Profiles

The model goodness of fit for the LPA analyses is presented in Supplemental Table 1. The value of AIC, BIC, and Adjusted-BIC, decreased with the model increase from two-class to four-class. However, the LMR-LRT and BLRT for the four-class model did not achieve statistical significance. Therefore, we retained the three-class model for subsequent analyses. The mean probability for most likely class membership was 0.924, 0.849, and 0.904, and the class counts (proportions) were 608 (63.8%), 288 (30.2%), and 57 (6.0%), for classes 1 to 3, respectively. The mean Z-scores on five dimensions of the TIPI-C, according to the classes of personality profiles, were analysed and each score on the five dimensions was compared to identify the characteristics of each cluster of nurses. As shown in Figure 1, class 1 was characterised by lower scores on all five dimensions of personality traits (Z-score < 0), class 3 displayed a relatively higher score on all dimensions (Z-score >1), and class 2 represented a normative class with means of Z-score located between class 1 and class 3 (Z-score were between 0 and 0.68). Results indicated that nurses with class 3 personality profile were likely to be extroverted, agreeable, conscientious, emotionally stable, and open-minded. However, it was the opposite for class 1. Considering the Z-score distribution of each cluster, class 1, class 2, and class 3 were interpreted as negative, normative, and positive personality profiles, respectively.

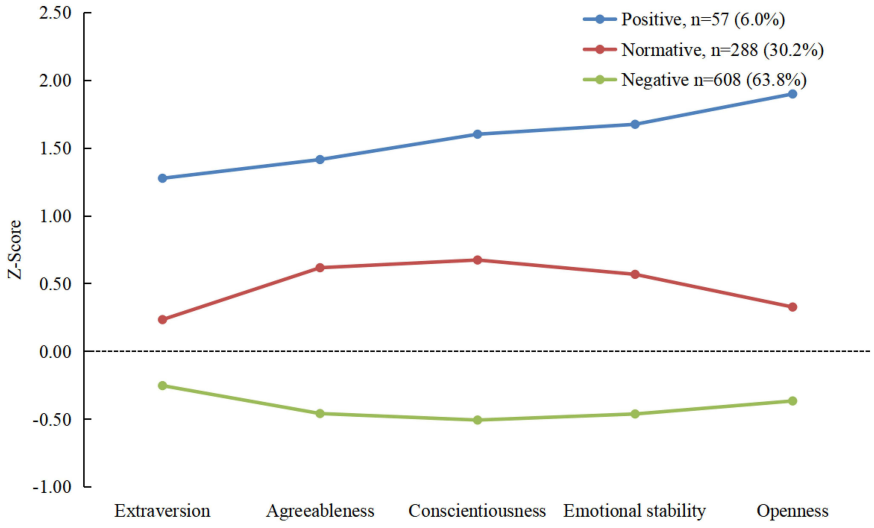

Figure 1 Subgroup of the personality profile of nurses by latent profile model. Z-score was calculated as Z=(x-μ)/σ.

Single-Factor Analysis for Levels of Psychological Distress

The participants' demographic characteristics and single-factor analysis for levels of psychological distress are presented in Table 1. The mean (S.D.) age of the 953 participants (934 females) was 32.79 (8.57) years. The difference in the prevalence of moderate-severe psychological distress among nurses in different departments was statistically significant, and 58.1% of paediatric nurses and 45.7% of nurses in ICU/surgical/emergency departments reported moderated-severe psychological distress. No significant differences in levels of psychological distress were observed between nurses based on the other demographic characteristics.

Nurses with negative personality profiles displayed the highest risk of moderate-severe psychological distress (50.3%), while those with positive personality profiles displayed extremely low risk (5.3%) (p<0.001). Furthermore, nurses with a negative coping style had a high prevalence of moderate-severe psychological distress (73.4%) (p<0.001).

Nurses with moderate-severe psychological distress had lower self-efficacy (occupational burden: 8.31 ± 2.51 vs 10.51 ± 3.01; relational difficulties: 11.07 ± 3.19 vs 14.34 ± 3.58; all p<0.001) and psychological resilience (tenacity: 24.01 ± 7.68 vs 30.39 ± 9.34; strength: 18.71 ± 5.08 vs 23.67 ± 5.66; optimism: 8.38 ± 2.65 vs 10.57 ± 3.02; all p<0.001) scores, as compared to nurses without or with mild psychological distress (Table 1).

Multivariate Logistic Regression Analysis of Factors Affecting Psychological Distress

The covariates were not significant in Models 1 and 2; therefore, only the results for Model 3 are presented in Table 2. It was found that paediatric nurses and nurses with negative personality profiles and coping styles are at a significantly greater risk of moderate-severe psychological distress; the OR (95% CI) was 2.49 (1.18, 5.24), 2.75 (1.90, 3.97), and 2.50 (1.50, 4.17). Additionally, nurses with higher self-efficacy levels are negatively correlated with the risk of moderate-severe psychological distress (OR= 0.86, 95% CI=0.79, 0.92). However, no significant independent association was found between psychological resilience and the risk of psychological distress.

Path Analysis

As shown in Figure 1, the fit indices were satisfactory for the hypothesised model (χ^2/df = 1.732, RMSEA (90% CI) =0.028 (0.000, 0.096), SRMR = 0.003, CFI =1.000, TLI = 0.998).

Total Effect on Psychological Distress

It was observed that personality profiles, self-efficacy, and coping style negatively affect psychological distress, and the standardised coefficient for total effect were −0.382, −0.417, and −0.285, all p <0.01, respectively. The total indirect effect of personality profiles on psychological distress was −0.297, p <0.01. In the path analysis model, the following direct and indirect effects were found (Figure 2).

Direct Effect

The direct effect of the following has been identified: (i) personality profile on self-efficacy (0.445), psychological resilience (0.047), coping style (0.379), and psychological distress (−0.085), all p <0.01. This indicates that nurses with normative and positive personality profiles display higher scores of self-efficacy and psychological resilience, higher probability of positive coping style, and lower levels of psychological distress, than nurses with a negative personality profile; (ii) self-efficacy on psychological resilience (0.925), coping style (0.177), and psychological distress (−0.298), all p <0.01. This indicates that nurses with higher scores of self-efficacy display greater psychological resilience, a higher probability of positive coping style, and lower levels of psychological distress; (iii) psychological resilience on coping style (0.264, p <0.01), which indicates that nurses with greater psychological resilience display a higher probability of positive coping style; and (iv) coping style on psychological distress (−0.285, p <0.01), which indicates that the more positive the nurse is in coping style, the lower their levels of psychological distress.

Indirect Effects

The indirect effects were: (i) self-efficacy simply mediated the relationship between personality profiles and psychological resilience (standardised coefficient for indirect effect: 0.411, p <0.01), between personality profiles and coping style (0.199, p <0.01), and between personality profiles and psychological distress (−0.132, p <0.01); (ii) coping style simply mediated the relationship between personality profiles and psychological distress (−0.108, p <0.01); (iii) coping style completely mediated the relationship between psychological resilience and psychological distress (−0.075, p <0.01); (iv) self-efficacy, psychological resilience, and coping style

Table 1 Descriptive and Single-Factor Analysis According to Levels of Psychological Distress

Characteristic	Psychological Distress		t/χ^2	*p*
	No-Mild	Moderate-Severe		
Age, mean (S.D.), yrs	32.23 ± 8.50	33.14 ± 8.59	−1.61	0.11
Age, n (%), yrs				
<25	114 (58.8)	80 (41.2)	3.43	0.33
25–29	119 (57.8)	87 (42.2)		
30–39	201 (62.8)	119 (37.2)		
≥40	152 (65.2)	81 (34.8)		
Gender, n (%)				
Male	10 (52.6)	9 (47.4)	0.64	0.42
Female	576 (61.7)	358 (38.3)		
Marital status, n (%)				
Single/unmarried/widowed/divorced	188 (58.4)	134 (41.6)	1.98	0.16
Married	398 (63.1)	233 (36.9)		
Education level, n (%)				
Technical secondary school	40 (67.8)	19 (32.2)	1.40	0.71
Junior college	187 (60.3)	123 (39.7)		
Undergraduate	353 (61.6)	220 (38.4)		
Postgraduate	6 (54.6)	5 (45.5)		
Hospital level, n (%)				
Tertiary	289 (59.2)	199 (40.8)	5.58	0.13
Secondary	94 (59.9)	63 (40.1)		
First	125 (63.1)	73 (36.9)		
Other	78 (70.9)	32 (29.1)		
Departments, n (%)				
Inpatient ward	282 (61.3)	178 (38.7)	13.48	0.02
Outpatient clinic	180 (66.9)	53 (33.1)		
ICU/surgery/emergency	63 (54.3)	53 (45.7)		
Paediatric	18 (41.9)	25 (58.1)		
Paramedical	43 (66.2)	22 (33.9)		
Personal income, n (%)				
0	35 (61.4)	22 (38.6)	0.27	0.97
1–5000	188 (61.8)	116 (38.2)		
5001–10,000	266 (60.7)	172 (39.3)		
>10,001	97 (63.0)	57 (37.0)		
Years of experience as a nurse, n (%)				
<5	143 (56.3)	111 (43.7)	4.56	0.10
5–9	123 (65.8)	64 (34.2)		
≥10	320 (62.5)	192 (37.5)		
Personality traits, n (%)				
Negative	302 (49.7)	306 (50.3)	103.52	<0.001
Normative	230 (79.9)	58 (20.1)		
Positive	54 (94.7)	3 (5.3)		
Coping style, n (%)				
Positive	559 (65.9)	289 (34.1)	63.78	<0.001
Negative	27 (25.7)	78 (73.4)		

(*Continued*)

Table 1 (Continued).

Characteristic	Psychological Distress		t/χ^2	*p*
	No-Mild	Moderate-Severe		
Self-efficacy, mean (SD)				
Occupational burden	10.51 ± 3.01	8.31 ± 2.51	12.16	<0.001
Relational difficulties	14.34 ± 3.58	11.07 ± 3.19	14.66	<0.001
Psychological resilience, mean (SD)				
Tenacity	30.39 ± 9.34	24.01 ± 7.68	11.48	<0.001
Strength	23.67 ± 5.66	18.71 ± 5.08	13.70	<0.001
Optimism	10.57 ± 3.02	8.38 ± 2.65	11.80	<0.001

Table 2 Multiple Logistic Regression Analysis for Factors Predicting Risk of Moderate-Serious Psychological Distress Among Nurses

Variable	B	S.E	*t*	OR (95% CI)	*p*
Constant	1.15	0.90	1.65	–	0.20
Department (Pediatric)[a]	0.91	0.38	5.79	2.49 (1.18, 5.24)	0.016
Personality traits (Internalising)[b]	1.01	0.19	28.83	2.75 (1.90, 3.97)	<0.001
Coping style (Negative)[c]	0.92	0.26	12.30	2.50 (1.50, 4.17)	<0.001
Self-efficacy (Continuous)	−0.16	0.04	16.70	0.86 (0.79, 0.92)	<0.001
Psychological resilience (Continuous)	0.02	0.02	1.16	1.02 (0.99, 1.05)	0.28

Notes: [a]Reference is department (inpatient ward); [b]reference is personality traits (normative); [c]reference is coping style (positive).

displayed multiple mediator effects between personality traits and psychological distress (−0.031, p <0.01); (v) self-efficacy and coping style displayed multiple mediator effects between personality profiles and psychological distress (−0.022, p <0.01); and (vi) psychological resilience and coping style displayed multiple mediator effects between personality profiles and psychological distress (−0.003, p <0.01).

Discussion

This study focused on personal protective factors associated with psychological distress in Chinese clinical nurses and the association between personality profiles, self-efficacy, psychological resilience, coping style, and psychological distress. The results indicate a high prevalence of moderate-severe psychological distress (K10 scores >21) among Chinese nurses

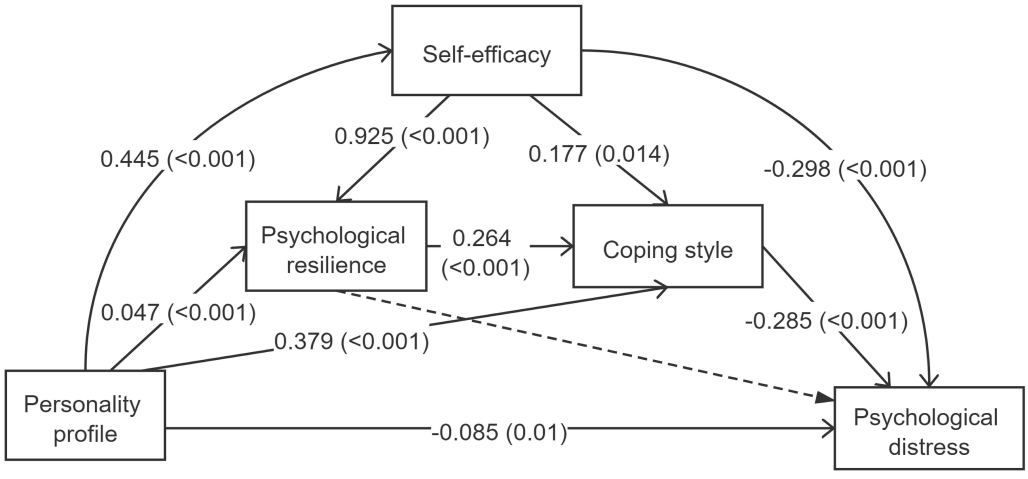

Figure 2 Structural equation modelling for the association of personality traits, coping style, self-efficacy, psychological resilience, and levels of psychological distress. Direct effects are displayed as solid arrows and indirect effects are displayed as dotted arrows. Values are standardised coefficients (p values) indices of model fit: χ^2/df = 1.732, RMSEA (90% CI) =0.028 (0.000, 0.096), SRMR = 0.003, CFI =1.000, TLI = 0.998).

(38.5%), with a negative personality profile (50.3%) and coping style (73.4%). This is specifically relevant for nurses in the paediatric (58.1%) and ICU/surgery/emergency (45.7%) departments. These findings are consistent with previous literature that has reported a prevalence of 58.1%[55] for depression and 85.5% to 92.3%[56] for psychological distress among Chinese nurses. These nurses face a higher risk of psychological problems. Furthermore, they have high occupational stress and are more likely to suffer from job burnout. This can lead to psychological problems such as depression, anxiety, and psychological distress.[57,58] These issues are more serious in the case of nurses working in the paediatric department, ICU, emergency, etc. and could be attributed to the inadequate distribution of the workforce or the threat of violence,[59–61] and may contribute to increased turnover intention.[62,63] Nurses who experience workplace violence have a 1.82 times higher possibility of developing depressive symptoms.[64] Effective institutional strategies that ensure a safe work environment and relieve intrinsic occupational stress are required to avoid the early onset of psychological disorders among nurses and other healthcare professionals.

This study identifies three personality-based profiles for nurses (negative, normative, and positive personality profiles) through LPA models. These profiles have high heterogeneity for the five dimensions of personality traits. The nurses with positive personality profiles scored higher on all five dimensions of TIPI, while those with negative personality profiles scored lower. Nurses with a positive personality profile are more extroverted, agreeable, conscientious, emotionally stable (less neuroticism), and open-minded. Nurses with a negative personality profile have lower levels of extraversion, agreeableness, conscientiousness, emotional stability (higher level on neuroticism), openness, and display higher levels of psychological distress. This study links psychological distress to the personality profile based on the big-five personality traits. The association between personality profiles and psychological distress has been analysed using a person-centre approach among nurses, and this provides additional insights. The results were consistent with previous studies, and three clusters according to the big five personality traits were identified.[43,65] Previous studies investigated the relationship between four of the big five personality traits and psychological issues and established that nursing students with higher neuroticism scores and introversion were prone to greater psychological distress.[66] Similarly, neuroticism could predict levels of depression and anxiety symptoms among junior physicians.[67] Another study conducted in China found that agreeableness, conscientiousness, and openness are negatively associated with anxiety, whereas there is a positive association between neuroticism and anxiety among medical students.[42] Additionally, higher neuroticism, lower extraversion, and lower conscientiousness, are associated with a greater risk of depressive symptoms in the general population.[13,68] A quantitative review of 175 cross-sectional studies of big-five personality traits linked to mental disorders[11] indicated that personality traits are highly associated with the risk of anxiety and depression. A population-based study also indicated that neuroticism is strongly associated with increased risk of major depression.[69] A prospective study used LCA and latent transition analysis to examine the change in latent personality, and the diagnostic mental status showed that emotionally unstable, introverted, or individuals with low conscientiousness are at the risk of being in the severe comorbidity class.[16]

The underlying mechanisms that link the big-five personality traits to emotional disorders have been associated with biological factors by some studies. These have demonstrated the association of personality traits with the volume of different brain regions. Neuroticism is associated with reduced volume in the posterior hippocampus and increased volume in both grey and white matter and is associated with emotional dysregulation and self-evaluated negativity. Hippocampal volume is a key factor that impacts mental health, and depressed individuals have a greater reduction in left hippocampal volume than individuals who are not depressed.[70] Three of the big-five personality traits, including agreeableness, conscientiousness, and extraversion, also had a correlation in predicting an increased volume in brain regions and functions.[17] This study and previous research have indicated that personality traits can be predictors of psychological disorders. Therefore, attention should be focused on personality traits to maintain nurses' mental health and these traits should be considered for rational manpower allocation, and identification of psychological disorders and their prevention in nurses.

The study found that nurses with moderate-severe psychological distress had significantly lower levels of self-efficacy and psychological resilience and were prone to adopting a negative coping style. Path analysis indicated that self-efficacy, psychological resilience, and coping style have multiple mediator effect between personality profiles and psychological distress, while coping style plays a complete mediating role on psychological resilience affecting psychological distress. This supports the hypotheses proposed. Self-efficacy plays a mediating role between personality and psychological distress and higher levels of

self-efficacy may impede the negative effect of personality profiles. High self-efficacy, and a positive and stable personality may negate the effect of job-related distress.[34] These findings are consistent with previous literature that nurses with higher self-efficacy may tackle occupational stress and burdens easily, and it is associated with lower burnout and psychological distress,[35,36,71] and higher job satisfaction and personal accomplishment.[72] Psychological resilience was found to have multiple mediating effects with coping style on the relationship between personality profiles and psychological distress, but no single mediating effect. It was suggested that the effect of psychological resilience on psychological distress should be mediated by coping styles. Psychological resilience was associated with a more positive coping style,[39,40,42] and inversely associated with psychological issues;[1] lower psychological resilience and negative coping style were associated with posttraumatic stress disorder and job burnout,[38,73–75] leading to a decline in the quality of medical care quality and nurse demission. Additionally, psychological resilience was found to be a mediator between psychological distress and job burnout in nurses, therefore, promoting resilience is a strategy to reduce psychological concerns and retain nurses.[76] Self-efficacy is a critical factor that leads to psychological resilience. Self-efficacy-based interventions may enhance psychological resilience and a positive coping style, and reduce psychological distress.[77] A positive coping style implies that an individual actively faces and deals with stressful situations. Coping style has a mediating effect between personality profile, self-efficacy, and resilience with psychological distress. This is consistent with the findings of previous studies.[32] Studies have concluded that individuals with a positive coping style are less likely to face psychological distress.[26,78,79] Adopting effective coping methods may play a crucial role in reducing occupational-related psychological distress among nurses.

Implications for Clinical Practice

This study found that Chinese clinical nurses experienced a high prevalence of psychological distress. It establishes that personality profiles directly affect psychological distress and have an indirect impact through self-efficacy, psychological resilience, and coping styles. This emphasises the significance of potential intervention strategies to reduce psychological distress. Furthermore, interventions to promote self-efficacy and enhance psychological resilience may encourage nurses to adopt a positive coping style and reduce psychological distress.

Strengths and Limitations

While numerous studies have explored the relationship between the associated factors and psychological distress among nurses, this study explores the direct effect of personality profiles and the impact on psychological distress through self-efficacy, psychological resilience, and coping style. It provides a comprehensive understanding of the impact of personal factors on psychological distress. What's more, individuals are constituted of the big-five personality traits rather than discrete variables; thus, a person-centred method by LPA models could better identify potential clusters of personality profiles for nurses in a real-world setting.

However, this study has several limitations. First, this is a cross-sectional study, and therefore, no causal inference can be drawn. Second, although participants have been recruited from different grades of hospitals, due to the no complex sampling design, it is still considered as an underrepresentation. Third, the study focuses on the correlation of personality profiles, self-efficacy, psychological resilience, and coping styles on psychological distress; however, only personal factors affecting psychological distress have been investigated. Other external factors associated with psychological distress (eg, workload, workplace safety, social support) must be studied in future. Furthermore, this study used self-report questionnaires, and this may result in reporting bias.

Conclusion

There is a high prevalence of psychological distress among Chinese nurses. It has been identified that personality profiles are related to psychological distress. Negative and positive personality profiles are associated with higher or lower psychological distress, respectively. The study found that self-efficacy, psychological resilience, and coping style mediate the association between personality profile and psychological distress and are inversely associated with psychological distress. This study highlights the importance of personality profile assessment to identify nurses at a higher risk of psychological distress. It also establishes that interventions based on self-efficacy, psychological resilience, and coping style, can be considered potential management strategies to support their mental health.

Abbreviations

LPA, latent profile analysis; LCA, latent class analysis; TIPI-C, Chinese version of the Ten-Item Personality Inventory; TCSQ-C, Chinese version of the Trait Coping Style Questionnaire; OCSE-N, Occupational Coping Self-

Efficacy Questionnaire for Nurses; CFA, Confirmatory Factor analysis; CD-RISC, Connor-Davidson Resilience Scale; K10, The 10-item of Kessler Measure of Psychological Distress; AIC, Akaike information criterion; BIC, Bayesian information criterion; Adjusted-BIC, Adjusted Bayesian information criterion; LMR-LRT, Lo-Mendell-Rubin likelihood ratio; BLRT, Bootstrap likelihood test; RMSEA, Root Mean Square Error of Approximation; SRMR, Standardised Root Mean Square Residual; CFI, Comparative Fit Index; TLI, Tucker-Lewis Index.

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Author Contributions

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

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