

BMJ Open Latent profile analysis of mindful self-care and associations with mental health among nurses in China

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ABSTRACT

Background Despite the crucial role of mindfulness and self-care in nurses' physical and mental health, as well as their professional well-being, most nurses exhibit low levels of self-care. Moreover, there is a lack of understanding of the diverse subgroups of mindful self-care among nurses.

Objectives The present study delved into the diverse groups of mindful self-care among nurses and investigated the correlation between these groups and their mental health.

Methods Convenience sampling was used to select nurses from Guizhou province, China, from August to September 2023. A total of 1020 nurses were investigated, and 1001 questionnaires were included, for an effective return rate of 98.1%. The demographic characteristics questionnaire, Chinese version of the Brief Mindful Self-Care Scale, Patient Health Questionnaire-9, Generalised Anxiety Disorder-7 and Perceived Stress Scale were used. Latent profile analysis was performed on the characteristics of nurses' mindful self-care, and the correlations between the latent profiles, demographic characteristics and mental well-being were identified using chi-square tests, Spearman correlation analyses and non-parametric tests.

Results A total of 1001 nurses were included, and they were divided into four heterogeneous subgroups: the Inconsistent Mindful Self-Care Group (4.40%), Balanced Development Group (43.36%), Moderate Mindful Self-Care Group (39.36%), and High Mindful Self-Care Group (12.89%). Results of single factor analysis showed that the nurses' department and average monthly income were the factors influencing the potential profiles. Mindful self-care negatively correlated with anxiety and depression but was not correlated with perceived stress. There were significant differences in perceived stress, anxiety and depression between different mindful self-care groups.

Conclusion The present study used latent profile analysis to identify four distinct subgroups of hospital nurses based on their mindful self-care and revealed varying levels of anxiety, depression and perceived stress between groups. These results emphasise the need for tailored mindful self-care strategies to promote nurses' well-being.

INTRODUCTION

Nurses occupy an important position in the healthcare field and are the largest

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ The latent profile analysis approach was used in this study to delve into the diverse subgroups of mindful self-care practices among Chinese nurses.
- ⇒ This study used confirmatory factor analysis to ensure the validity of the measurement tools.
- ⇒ This study provided evidence of the relationships between mindful self-care and anxiety, depression and perceived stress.
- ⇒ This study was limited by its cross-sectional research design.
- ⇒ The generalisability of our findings may be limited due to the survey data being sourced from a single region.

group within the healthcare system. They often perform a variety of work roles, which leads to diverse job demands, such as work overload, lack of formal rewards and work-life interference.¹ Due to the influence of multiple factors, including individual, educational, organisational, managerial and policymaking factors, the shortage of nurses has become a continuous global challenge.²⁻³ It is estimated that the demand for nursing will reach 12.9 million worldwide by 2035.⁴ Therefore, paying attention to the physical and mental health of nurses and enhancing their coping abilities is an important task in nursing management.

Nursing is recognised as a high-stress profession.⁵ Prolonged sustained stress has numerous detrimental impacts on nurses, healthcare organisations and the patients they serve. Although nurses are one of the occupations with the highest levels of stress, there are significant differences between regions. A systematic review and meta-analysis⁶ revealed that the Asian region exhibited the lowest degree of compassion satisfaction and the highest rates of compassion fatigue symptoms. Chinese nurses face a very worrying situation,^{7,8} and approximately 43.83% of Chinese nurses experience depressive symptoms.⁹



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Nursing professionals can mitigate severe consequences, such as burnout, compassion fatigue and depression, by adopting a regime of self-care management that helps them attain psychophysical balance and spiritual wellness.¹⁰ Self-care is essential for nurses to optimise their performance and ensure that they are operating at their peak abilities.¹¹ Some authors proposed that nurses' self-care is not only beneficial but also a moral and ethical responsibility from a professional perspective.^{11 12} Nurses frequently neglect self-care and prioritise the well-being and care of their patients.^{13 14} A cross-sectional study revealed that more than half of nurses did not engage in health-promoting self-care.¹⁵ Nurses encounter numerous barriers to self-care, such as shift work, hectic schedules, competing time demands, cost considerations, limited resource availability and work-related stress.¹⁶

Self-care is crucial because it facilitates the maintenance of one's physical, emotional, mental, spiritual and social well-being.¹⁷ Martínez *et al*¹⁸ stated that self-care is the ability to care for oneself through awareness, self-control and self-reliance to achieve, maintain or promote optimal health and well-being. Self-care contains six domains: physical, professional, relational, emotional, psychological and spiritual.¹⁹ Given the paramount significance of self-care, devoting attention to nurses' self-care practices is key safeguarding their professional well-being. Therefore, it is imperative to proactively address this issue and provide effective strategies to enhance nurses' self-care practices.

Mindfulness enables nurses to concentrate more effectively on the functions of their bodies and minds.²⁰ A concept analysis²¹ defined mindfulness as a transformative process in which one develops an increasing ability to experience being present with awareness, acceptance and attention. Mindfulness offers a promising strategy for managing chronic stress, with significant implications for enhancing mind-body health and well-being, regardless of disease status.²² Existing studies^{23–25} have consistently demonstrated that mindfulness interventions effectively alleviated stress and burnout in nurses and simultaneously promoted their physical and mental well-being. Therefore, it is crucial for nurses to elevate their mindfulness to the utmost level.²⁶

Cook-Cottone²⁷ conceptualised mindful self-care by skilfully integrating mindful awareness, active mindful practices and mindful nurturing of every facet of oneself with traditional conceptions of self-care. Mindful self-care was defined as a continuous process comprised of two parts: mindful awareness and assessment of one's internal needs and external demands and purposeful engagement in targeted self-care practices aimed at addressing these needs and demands in a way that fosters well-being and personal effectiveness.^{27 28} Mindfulness self-care can aid in the identification of unrecognised self-care patterns and obstacles and the implementation of targeted self-care while guiding the development of intentional and focused self-care practices.¹⁷

Previous studies^{29 30} investigated the current status of mindful self-care and its influencing factors in the nurse population, and the results showed that most nurses engaged in low levels of mindful self-care. However, the current evidence could not reveal the heterogeneous subgroups of mindful self-care in the nurse population or their differences in different dimensions.

Latent profile analysis (LPA) is a reliable statistical technique for the classification of subgroups.³¹ LPA is a 'person-centered' analysis method that is frequently used in current research. This method is based on the classification of mixture models that views the population distribution as a mixture of several homogeneous populations with the same distribution and uses maximum likelihood estimation to estimate the probabilities of latent classes and the parameters of the population distribution within the class. Considering the uncertainty of classification, this method ultimately assigns observations to the category with the maximum posterior probability. Previous studies lacked correlations between latent profiles of mindful self-care and mental health.

Therefore, the present study performed a survey of the current status of mindfulness self-care among nurses and explored the heterogeneity of groups and the correlation between anxiety, depression and perceived stress.

METHODS

Study design

A cross-sectional study was performed via an online survey using a convenient sampling method. The study was designed and reported in compliance with the Strengthening the Reporting of Observational Studies in Epidemiology guidelines.³²

Sample size estimation

This study investigated the latent profiles of nurses' mindful self-care. Because the LPA requires a sample size that exceeds 500,^{31 33} the minimum sample size for this investigation was set at 500.

Participants

Participants were included in this study based on the following eligibility criteria: (1) working as a nurse in a medical facility, (2) registered as a nurse and (3) willing to participate in this study. The exclusion criteria were nurses taking sick leave or who self-reported suffering from serious physical or psychological illnesses using the questionnaire.

Measurements

The general information questionnaire

The general information questionnaire included demographic and sociological information, such as age, gender, marital status, professional title, highest degree, department, job title, working years, number of night shifts per month, average monthly income and hospital grade.

The Chinese version of the Brief Mindful Self-Care Scale

This scale was developed by Cook-Cottone and Guyker²⁸ in 2018. It was translated into Chinese and applied to the nurse population by Yang *et al*³⁴ in 2021. The scale has a total of 24 items and 6 dimensions, which are mindful relaxation, physical care, self-compassion and purpose, supportive relationships, supportive structure and mindful awareness. A 5-point Likert scale is used with a total score ranging from 24 to 120. Higher scores indicate higher levels of mindful self-care among nurses. The Cronbach's alpha coefficient for this scale is 0.92.

Perceived Stress Scale

This scale was developed by Cohen *et al* in 1983.³⁵ Yang and Huang³⁶ translated this scale into Chinese in 2003. The scale consists of 10 items that are scored on a 5-point scale from 'never' to 'always'. The total score ranges from 0 to 40, and higher scores indicate greater stress. The Cronbach's α coefficient for the Chinese version of the Perceived Stress Scale-10 is 0.76–0.83, which indicates good reliability and validity.³⁷

Patient Health Questionnaire-9

The questionnaire was developed by Kroenke *et al*³⁸ in 2001 and subsequently introduced to China in 2009.³⁹ The questionnaire is comprised of nine items, each rated on a scale from 0 (not at all) to 3 (almost every day). The total scores range from 0 to 27, with the following classifications: 0 to 5 indicating no depression, 6 to 9 indicating mild depression, 10 to 14 indicating moderate depression, 15 to 19 indicating severe depression and 20 to 27 indicating extremely severe depression. The internal consistency coefficient of the Patient Health Questionnaire-9 is 0.857.

Generalised Anxiety Disorder-7 Scale

The scale was developed by Spitzer *et al*⁴⁰ in 2006 to reflect an individual's psychosomatic activity in the past 2 weeks, and the Chinese version was translated by He *et al*⁴¹ in 2010. This scale has a Cronbach's alpha coefficient of 0.898. The Generalised Anxiety Disorder-7 (Chinese version) is used to screen and assess generalised anxiety symptoms using seven items. The scale ranges from 0 (not at all) to 3 (almost every day). The total score ranges from 0 to 21, with 0 to 5 indicating no anxiety, 6 to 9 indicating mild anxiety, 10 to 14 indicating moderate anxiety and 15 to 21 indicating severe anxiety.

Data collection

Data collection was performed from 26 August 2023 to 18 September 2023. The survey collected data mainly using a Chinese questionnaire survey network platform. The entire testing process followed the principles of anonymity and voluntariness. Before the test, the participants read the instructions and precautions and completed the questionnaire. The questionnaire was directly distributed to nurses via WeChat.

Statistical analyses

The omega coefficient was used to measure the internal consistency reliability of the scale. Omega coefficients greater than 0.7 indicate that the scale has a high level of internal consistency reliability. The validity of the scale must be comprehensively assessed in combination with the fit indices. (1) Smaller χ^2 test values indicate smaller degrees of deviation and a greater fit of the measurement model. (2) Df. (3) χ^2/df , smaller χ^2/df values indicate a greater fit of the model and a value between 1 and 5 indicates good model fit. (4) Root mean square error of approximation (RMSEA): an RMSEA less than 0.05 indicates a good model fit, and an RMSEA less than 0.08 indicates an acceptable model fit. (5) The Comparative Fit Index (CFI), which ranges between 0 and 1; generally, a CFI greater than 0.9 indicates a good model fit. (6) For the Tucker-Lewis Index (TLI), a TLI greater than 0.9 indicates an acceptable model and a TLI greater than 0.95 indicates a better model fit. (7) The standardised root mean square residual (SRMR), which reflects the standardised overall residual of the assumed model, is used to determine whether the model parameter setting is ideal via residual analysis and an SRMR between 0 and 1 and less than 0.08 indicates a good model fit. The Mplus V.7.4 program was used to delineate distinct subgroups of mindful self-care. To assess model adequacy and establish the optimal number of categories, various indicators were used, such as the log likelihood, Akaike information criterion, Bayesian information criterion, adjusted Bayesian information criterion, entropy, Lo-Mendell-Rubin (LMR) test and bootstrapped likelihood ratio test (BLRT). By pooling these indicators across all model-fitting results in each category, we selected the model that best suited the data. For data analysis, the statistical software SPSS V.26.0 was used. Categorical variables were characterised by assessing frequency and composition ratios, and

Table 1 Reliability and validity analysis of the scales

Variables	χ^2	df	χ^2/df	RMSEA	CFI	TLI	SRMR	Omega
Mindful self-care	1143.558	232	4.929	0.063	0.946	0.936	0.038	0.946
PHQ-9	85.956	19	4.524	0.059	0.988	0.977	0.021	0.919
GAD-7	30.132	10	3.013	0.045	0.997	0.994	0.008	0.954
PSS	119.957	26	4.614	0.060	0.985	0.973	0.032	0.777

CFI, Comparative Fit Index; GAD-7, Generalised Anxiety Disorder-7; PHQ-9, Patient Health Questionnaire-9; PSS, Perceived Stress Scale; RMSEA, root mean square error of approximation; SRMR, standardised root mean square residual; TLI, Tucker-Lewis Index.

Table 2 Potential profile analysis indicators (N=1001)

Model	LL	AIC	BIC	aBIC	Entropy	LMR P value	BLRT P value	Category probability (%)
Class 1	-15 893.553	31 811.106	31 870.011	31 830.898	—	—	—	—
Class 2	-14 886.130	29 810.259	29 903.526	29 843.180	0.865	<0.001	<0.001	47.35/52.65
Class 3	-14 500.995	29 053.990	29 181.618	29 099.041	0.896	0.001	<0.001	5.20/49.15/45.65
Class 4	-14 131.351	28 328.702	28 490.691	28 385.881	0.922	<0.001	<0.001	4.40/43.36/39.36/12.89
Class 5	-14 070.715	28 221.431	28 417.781	28 290.739	0.917	0.496	<0.001	4.40/37.56/4.30/39.96/13.79

aBIC, Sample adjusted Bayesian information criterion; AIC, Akaike information criterion; BIC, Bayesian information criterion; BLRT, bootstrapped likelihood ratio test; LL, log likelihood; LMR, Lo-Mendell-Rubin .

continuous variables were described using means and SDs. If the variables did not meet the normality test, they were represented using the median and quartiles. To compare categorical variables between different groups, the chi-square test was used. For comparing variables between groups, non-parametric tests, chi-square tests and Fisher's exact probability tests were used. Differences between the two groups were compared using post hoc tests. Cramér's V and Epsilon-squared (ϵ^2) were used to determine the effect size. Statistical significance was defined as a P value < 0.05.

Ethical considerations

If any nurse declined to participate, the questionnaire collection process was promptly terminated. The instructions clearly assured participants that there would be no consequences for refusing to participate in the survey. Furthermore, participants were assured that the study

results would be presented in aggregated form to ensure their individual anonymity.

Patient and public involvement

Patients and/or the public were not involved in the design, conduct, reporting or dissemination of this research.

RESULTS

Participant characteristics

The study participants were recruited from Guizhou province, China. A total of 1020 questionnaires were returned, and 1001 questionnaires were valid, which resulted in an effective recovery rate of 98.1%. Among the 19 invalid questionnaires, 9 contained logical errors in basic information and 10 had missing data. Among the included participants, 48 were men (4.8%) and 953 were women (95.2%). The average age was 32.6 years, and the range

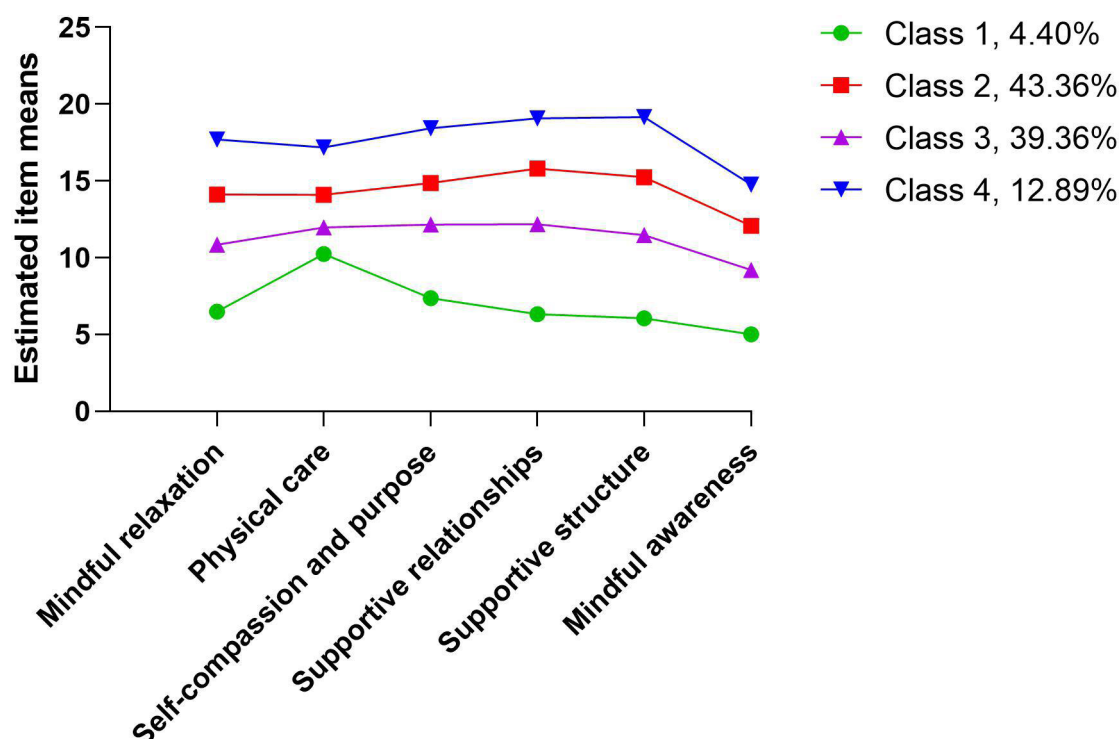
**Figure 1** Latent profiles of mindful self-care.

Table 3 Demographics and characteristics by latent profile (N=1001)

Variables	Category	Class 1	Class 2	Class 3	Class 4	X ² /H	P value	V/ε ²
Age, median (P25, P75)		31.5 (28.0, 37.0)	32.0 (29.0, 36.0)	31.5 (28.0, 35.0)	33.0 (28.0, 36.0)	2.067	0.559	0.001
Gender	Female	43 (97.7%)	407 (93.8%)	380 (96.4%)	123 (95.3%)	3.407	0.317	0.062
	Male	1 (2.3%)	27 (6.2%)	14 (3.6%)	6 (4.7%)			
Marital status	Single	10 (22.7%)	70 (16.1%)	74 (18.8%)	20 (15.5%)	6.463	0.373	0.055
	Married	34 (77.3%)	354 (81.6%)	312 (79.2%)	103 (79.8%)			
	Others	0 (0%)	10 (2.3%)	8 (2.0%)	6 (4.7%)			
Professional title	Junior level	24 (54.5%)	257 (59.2%)	241 (61.2%)	80 (62.1%)	2.587*	0.860	0.039
	Intermediate level	19 (43.2%)	154 (35.5%)	137 (34.8%)	45 (34.9%)			
	Senior level	1 (2.3%)	23 (5.3%)	16 (4.1%)	4 (3.1%)			
Highest degree	Junior college and below	7 (15.9%)	61 (14.1%)	62 (15.7%)	25 (19.4%)	9.701	0.138	0.047
	Undergraduate and above	37 (84.1%)	373 (85.9%)	332 (84.3%)	104 (80.6%)			
Department	Internal medicine	12 (27.3%)	90 (20.7%)	129 (32.7%)	24 (18.6%)	50.627*	0.001	0.133
	Surgery	10 (22.7%)	94 (21.7%)	67 (17.0%)	30 (23.3%)			
	Obstetrics and gynaecology	11 (25.0%)	38 (8.8%)	33 (8.4%)	7 (5.4%)			
	Paediatrics	2 (4.5%)	32 (7.4%)	31 (7.9%)	16 (12.4%)			
	Emergency/ICU	0 (0%)	57 (13.1%)	47 (11.9%)	19 (14.7%)			
	Operating room	2 (4.5%)	25 (5.8%)	10 (2.5%)	7 (5.4%)			
	Functional assistance departments	1 (2.3%)	20 (4.6%)	16 (4.1%)	5 (3.9%)			
Administrative and logistics departments		0 (0%)	17 (3.9%)	7 (1.8%)	4 (3.1%)			
	Others	6 (13.6%)	61 (14.1%)	54 (13.7%)	17 (13.2%)			
Job title	No	37 (84.1%)	348 (80.2%)	322 (81.7%)	107 (82.9%)	0.858	0.839	0.029
	Yes	7 (15.9%)	86 (19.8%)	72 (18.3%)	22 (17.1%)			
Working years (years)	<5	7 (15.9%)	77 (17.7%)	76 (19.3%)	25 (19.4%)	5.204	0.518	0.051
	5~10	23 (52.3%)	209 (48.2%)	193 (49.0%)	51 (39.5%)			
>10	14 (31.8%)	148 (34.1%)	125 (31.7%)	53 (41.1%)				

Continued



Table 3 Continued

Variables	Category	Class 1	Class 2	Class 3	Class 4	X ² /H	P value	V/ε ²
Number of night shifts per month	0	17 (38.6%)	154 (35.3%)	133 (33.8%)	47 (36.4%)	7.512	0.276	0.061
	1~4	4 (9.1%)	75 (17.3%)	57 (14.5%)	28 (21.7%)			
	≥5	23 (52.3%)	205 (47.2%)	204 (51.8%)	54 (41.9%)			
Average monthly income (yuan)	≤¥3000	16 (36.4%)	47 (10.8%)	68 (17.3%)	18 (14.0%)	24.460	<0.001	0.111
	¥3001~¥6000	23 (52.3%)	299 (68.9%)	256 (65.0%)	90 (69.8%)			
	>¥6000	5 (11.4%)	88 (20.3%)	70 (17.8%)	21 (16.3%)			
Hospital grade	Primary level	1 (2.3%)	16 (3.7%)	12 (3.0%)	2 (1.6%)	3.396	0.749	0.044
	Secondary level	35 (79.5%)	298 (68.7%)	278 (70.6%)	90 (69.8%)			
	Tertiary level	8 (18.2%)	120 (27.6%)	104 (26.4%)	37 (28.7%)			

*Fisher's exact probability test.
 ε², Epsilon-squared; ICU, intensive care unit.

was 22–54 years. 31 people (3.1%) were from first-level hospitals, 701 people (70.0%) were from second-level hospitals and 269 people (26.9%) were from third-level hospitals.

Reliability and validity analysis

The omega coefficients of the scales ranged from 0.723 to 0.954, which indicated that the scales were reliable. The fit indices of all scales were within the ideal range, which suggested that the scales had good validity. The results are presented in [table 1](#).

Latent class identification

The results of LPA showed that the LMR p value and BLRT P value of Class 2, Class 3 and Class 4 were statistically significant (P<0.05). Compared with Class 2 and Class 3, Class 4 had the highest entropy value. Therefore, we ultimately determined that Class 4 was the optimal profile analysis model, and it indicated that classifying nurses' mindful self-care into four profiles was the best approach. The results are shown in [table 2](#).

Based on the results of the LPA, a score distribution chart of different profiles between different dimensions was drawn. These results are presented in [figure 1](#). Based on the trend of the profile distribution in the chart, we named Class 1 the Inconsistent Mindful Self-Care Group (n=44, 4.40%), Class 2 the Balanced Development Group (n=434, 43.36%), Class 3 the Moderate Mindful Self-Care Group (n=394, 39.36%) and Class 4 the High Mindful Self-Care Group (n=129, 12.89%).

Single-factor analysis of the latent profiles of nurses' mindful self-care

The distribution and characteristics of the basic information of the different potential profiles are shown in [table 3](#). The results showed that the nurses' department and average monthly income were the factors influencing the potential profiles (P<0.05), and there was no statistically significant difference between the other factors. The results of the effect size analysis showed that the effect size was moderate or small.

Correlation analysis between mindful self-care and mental health

Spearman's correlation was used to analyse the relationships between mindful self-care, perceived stress, anxiety and depression. The results showed that mindful self-care negatively correlated with anxiety and depression (P<0.05). However, there was no correlation between mindful self-care and perceived stress (P>0.05). There were positive correlations between perceived stress, anxiety and depression (P<0.05). The results are shown in [table 4](#).

Using the grouping of mindful self-care as the dependent variable and the scores of perceived stress, anxiety and depression as the independent variables, a non-parametric test was performed. The results are shown in [table 5](#). There were significant differences in nurses' scores for perceived stress, anxiety and depression

Table 4 Correlations between mindful self-care and mental health

	Median (P25, P75)	1	2	3	4
(1) Mindful self-care	80.00 (69.00, 91.00)	1			
(2) PHQ-9	7.00 (3.00, 11.00)	-0.333**	1		
(3) GAD-7	6.00 (1.00, 8.00)	-0.295**	0.826**	1	
(4) PSS	20.00 (16.00, 22.00)	-0.030	0.498**	0.496**	1

**P value<0.01.

GAD-7, Generalised Anxiety Disorder-7 ; PHQ-9, Patient Health Questionnaire-9 ; PSS, Perceived Stress Scale.

between the different groups. There were differences in depression scores between the different groups. Comparison of multiple groups revealed that the Inconsistent Mindful Self-Care Group and Moderate Mindful Self-Care Group had higher levels of depression than the Balanced Development Group and High Mindful Self-Care Group, but there was no difference between the Inconsistent Mindful Self-Care Group and Moderate Mindful Self-Care Group. The results for anxiety were similar to depression. Perceived stress was statistically different between the groups, and further two-by-two comparisons showed that the Balanced Development Group and Moderate Mindful Self-Care Group had higher levels than the High Mindful Self-Care Group and Inconsistent Mindful Self-Care Group. The Inconsistent Mindful Self-Care Group had the highest level of perceived stress. The results of the effect size analysis showed that the comparison of anxiety and depression between the different groups revealed a medium effect, but the value of the effect size for the comparison of perceived stress was small.

DISCUSSION

The present study used LPA to investigate diverse groups of mindful self-care practices among nurses in hospitals. Based on cross-sectional data, we identified four distinct subgroups: the Inconsistent Mindful Self-Care Group, the Balanced Development Group, the Moderate Mindful Self-Care Group and the High Mindful Self-Care Group. To the best of our knowledge, this study is the first study to explore heterogeneous groups of mindful self-care using the LPA method. Compared with traditional person-centred analysis methods, such as cluster analysis, LPA is a more flexible and model-based classification method. Notably, LPA provides a variety of adaptability indices

to determine the number of profiles more scientifically with a lower bias. We further used correlation analysis to confirm a significant correlation between four subgroups, anxiety, depression and perceived stress.

The LPA results revealed that nearly half (43.36%) of the nurses had a relatively lower level of mindful self-care, and 39.36% of the nurses had a moderate level of mindful self-care. A survey of oncology nurses in China reported an average mindful self-care score of 59.30.⁴² In another survey of emergency nurses used the 36-item mindful self-care scale and found that scores averaged 89.74, which was low overall.²⁹ According to our findings, nurses' mindful self-care score was 80.00, which was higher than previous studies. Similarly, the LPA results revealed characteristic differences between the groups. The two groups with high LPA values scored significantly higher on the dimensions of supportive relationships and supportive structures than the other dimensions and may have a stronger external self from the perspective of Attuned Representational Models of Self.²⁸ The Natural Development Group scored more consistently on all dimensions. However, the Inconsistent Group scored significantly higher on physical care, self-compassion and purpose, which indicates a stronger internal self. These results suggest that future studies should prioritise the characteristics of the population and the implementation of effective interventions.

Our study also revealed several different profile characteristics. Specifically, department and average monthly income were influencing factors in different groups. The results showed that a larger proportion of nurses in the internal medicine department belonged to the medium-scoring and high-scoring groups, which indicated that internal medicine nurses more frequently adopted mindful self-care practices. Potential reasons may be

Table 5 Comparative analysis of mental health between different groups

	(1) Inconsistent Mindful Self-Care Group	(2) Balanced Development Group	(3) Moderate Mindful Self-Care Group	(4) High Mindful Self-Care Group	H	P value	Post hoc	ε ²
PHQ-9	9.0 (4.5, 16.0)	6.0 (2.0, 10.0)	9.0 (6.0, 13.0)	3.0 (0, 7.0)	107.327	<0.001	3≈1>2>4	0.104
GAD-7	7.0 (0, 13.0)	4.0 (0, 7.0)	4.0 (0, 7.0)	7.0 (3.0, 10.0)	90.593	<0.001	3≈1>2>4	0.088
PSS	17.0 (10.0, 16.0)	20.0 (16.0, 22.0)	20.0 (17.0, 22.0)	18.0 (13.0, 22.0)	11.585	0.009	3≈2>4>1	0.009

ε², Epsilon-squared; GAD-7, Generalised Anxiety Disorder-7; PHQ-9, Patient Health Questionnaire-9 ; PSS, Perceived Stress Scale.

that nurses in internal medicine departments have relatively low workloads, and working in such an environment, where some chronic diseases are often caused by unhealthy lifestyles, may promote nurses' self-care behaviours. The present study included full-time nurses because there are no part-time nurses in China. There is a significant income disparity between different hospitals and departments, which is also one of the factors affecting mindful self-care. Nurses' capacity for health-promoting self-care is significantly influenced by a confluence of factors, including time constraints, excessive workloads, scarcity of resources and facilities, the draining effects of fatigue and the demands of external commitments.^{15 43} A previous study⁴² demonstrated that educational level and health status were predictors of mindful self-care, but our investigation did not support this finding, which may be related to the inclusion of the study population. Another study³⁰ showed that gender was also an influencing factor for mindful self-care, but the large gap between the male and female ratios in this study failed to validate this difference. Future research should actively focus on key populations to explore the factors influencing the population of nurses with low levels of mindful self-care to provide targeted interventions.

Our study further confirmed the correlation between mindfulness and mental health. Anxiety and depression scores showed weak negative correlations with mindful self-care scores. Although perceived stress was not correlated with the mindful self-care score, the perceived stress score differed between the four groups. Zhang and Zhang⁴² showed that mental health literacy positively correlated with mindful self-care. Mindfulness can function as a protective factor to mitigate or even eliminate the negative impact of perceived stress.⁴⁴ This relationship may further explain the potential stress-buffering effects of mindful self-care. More research is needed to further validate the relationships between the variables related to mental health and mindful self-care.

The present study revealed that there is much room for improvement in mindful self-care for nurses. Notably, nurses' awareness of self-care should increase, and mindfulness should be integrated into their daily work and life.¹⁷ There have been many mindful self-care-related interventions, such as mindfulness workshops,⁴⁵ mindful self-compassion training⁴⁶ and mindfulness-based self-care and resiliency interventions,⁴⁷ but these interventions did not use mindful self-care as a valid outcome indicator. Some personalised and convenient interventions, such as digital health apps⁴⁸ and fragmented interventions, should be provided according to the special characteristics of the nurses.

Limitations

This research has several notable limitations. First, the methodology was a cross-sectional survey, and despite the substantial size of the sample, data collection relied on convenience sampling instead of random sampling. Second, the sample was exclusively drawn from Guizhou

province in China, which resulted in a potential selection bias that hindered a comprehensive portrayal of the current state of mindfulness self-care among nurses throughout the country. Third, because the present research was performed exclusively with Chinese nurses, whether the findings can be generalised to other cultural contexts is not certain. Therefore, there is a pressing need for further research with a larger and higher-quality sample size.

CONCLUSION

This study used LPA to investigate mindful self-care practices among hospital nurses and revealed four distinct subgroups: the Inconsistent Mindful Self-Care Group, the Balanced Development Group, the Moderate Mindful Self-Care Group and the High Mindful Self-Care Group. The four groups showed different levels of anxiety, depression and perceived stress, which highlights the importance of mindful self-care for nurses' mental well-being. Nursing managers and researchers should prioritise the enhancement of nurses' awareness of mindful self-care and the development of concise, accessible and feasible intervention programmes.

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REFERENCES

- 1 Broetje S, Jenny GJ, Bauer GF. The key job demands and resources of nursing staff: an integrative review of reviews. *Front Psychol* 2020;11:84.
- 2 Tamata AT, Mohammadnezhad M. A systematic review study on the factors affecting shortage of nursing workforce in the hospitals. *Nurs Open* 2023;10:1247–57.
- 3 Boniol M, Kunjumen T, Nair TS, et al. The global health workforce stock and distribution in 2020 and 2030: a threat to equity and “universal” health coverage? *BMJ Glob Health* 2022;7:e009316.
- 4 Adams R, Ryan T, Wood E. Understanding the factors that affect retention within the mental health nursing workforce: a systematic review and thematic synthesis. *Int J Ment Health Nurs* 2021;30:1476–97.
- 5 Myers RE. Cultivating mindfulness to promote self-care and well-being in perioperative nurses. *AORN J* 2017;105:259–66.
- 6 Xie W, Chen L, Feng F, et al. The prevalence of compassion satisfaction and compassion fatigue among nurses: a systematic review and meta-analysis. *Int J Nurs Stud* 2021;120:103973.
- 7 Zhang W, Miao R, Tang J, et al. Burnout in nurses working in China: a national questionnaire survey. *Int J Nurs Pract* 2021;27:e12908.
- 8 Xia M, Wang J, Bi D, et al. Predictors of job burnout among Chinese nurses: a systematic review based on big data analysis. *Biotechnol Genet Eng Rev* 2023;2023:1–24.
- 9 Gao YQ, Pan BC, Sun W, et al. Depressive symptoms among Chinese nurses: prevalence and the associated factors. *J Adv Nurs* 2012;68:1166–75.
- 10 Nilsson H. Spiritual self-care management for nursing professionals: a holistic approach. *J Holist Nurs* 2022;40:64–73.
- 11 Tierney M. Secure your mask first: the importance of self-care. *J Am Psychiatr Nurses Assoc* 2021;27:334–6.
- 12 Linton H, Koonmen J. Self-care as an ethical obligation for nurses. *Nurs Ethics* 2020;2020:969733020940371.
- 13 Muhlare ML, Downing C. Self-care behaviours and practices of professional nurses working in primary health care clinics. *Afr J Prim Health Care Fam Med* 2023;15:4188.
- 14 Nkabinde-Thamae G, Downing C, Nene S. Self-care neglect through the voices of nurses working in primary healthcare clinics in Gauteng, South Africa. *Nurs Forum* 2022;57:1330–8.
- 15 Ross A, Yang L, Wehrlen L, et al. Nurses and health-promoting self-care: do we practice what we preach? *J Nurs Manag* 2019;27:599–608.
- 16 Akter N, Akter MK, Turale S. Barriers to quality of work life among Bangladeshi nurses: a qualitative study. *Int Nurs Rev* 2019;66:396–403.
- 17 Sawyer H. Mindfulness: strategies to implement targeted self-care. *J Interprof Educ Pract* 2023;31:100614.
- 18 Martínez N, Connelly CD, Pérez A, et al. Self-care: a concept analysis. *Int J Nurs Sci* 2021;8:418–25.
- 19 Butler LD, Mercer KA, McClain-Meeder K, et al. Six domains of self-care: attending to the whole person. *J Hum Behav Soc Environ* 2019;29:107–24.
- 20 Aşık E, Albayrak S. Determining mindfulness levels of the nurses working in a university hospital. *J DU Health Sci Ins* 2021;11:16–20.
- 21 White L. Mindfulness in nursing: an evolutionary concept analysis. *J Adv Nurs* 2014;70:282–94.
- 22 Greeson JM, Chin GR. Mindfulness and physical disease: a concise review. *Curr Opin Psychol* 2019;28:204–10.
- 23 Suleiman-Martos N, Gomez-Urquiza JL, Aguayo-Estremera R, et al. The effect of mindfulness training on burnout syndrome in nursing: a systematic review and meta-analysis. *J Adv Nurs* 2020;76:1124–40.
- 24 Ghawadra SF, Abdullah KL, Choo WY, et al. Mindfulness-based stress reduction for psychological distress among nurses: a systematic review. *J Clin Nurs* 2019;28:3747–58.
- 25 Ramachandran HJ, Bin Mahmud MS, Rajendran P, et al. Effectiveness of mindfulness-based interventions on psychological well-being, burnout and post-traumatic stress disorder among nurses: a systematic review and meta-analysis. *J Clin Nurs* 2023;32:2323–38.
- 26 Üzen Cura Ş, Yılmaz Coskun E. Correlation of nurses’ mindfulness with their perception of individualized care: a cross-sectional study. *Perspect Psychiatr Care* 2022;58:2570–6.
- 27 Cook-Cottone CP. Incorporating positive body image into the treatment of eating disorders: a model for attunement and mindful self-care. *Body Image* 2015;14:158–67.
- 28 Cook-Cottone CP, Guyker WM. The development and validation of the mindful self-care scale (MSCS): an assessment of practices that support positive embodiment. *Mindfulness (N Y)* 2018;9:161–75.
- 29 Zeb H, Arif I, Younas A. Mindful self-care practice of nurses in acute care: a multisite cross-sectional survey. *West J Nurs Res* 2022;44:540–7.
- 30 Garcia ACM, Ferreira ACG, Silva LSR, et al. Mindful self-care, self-compassion, and resilience among palliative care providers during the COVID-19 pandemic. *J Pain Symptom Manage* 2022;64:49–57.
- 31 Spurk D, Hirschi A, Wang M, et al. Latent profile analysis: a review and “how to” guide of its application within vocational behavior research. *J Vocat Behav* 2020;120:103445.
- 32 von Elm E, Altman DG, Egger M, et al. The strengthening the reporting of observational studies in epidemiology (STROBE) statement: guidelines for reporting observational studies. *Int J Surg* 2014;12:1495–9.
- 33 Nylund KL, Asparouhov T, Muthén BO. Deciding on the number of classes in latent class analysis and growth mixture modeling: a Monte Carlo simulation study. *Struct Equ Modeling* 2007;14:535–69.
- 34 Yang Z, Chen F, Liu S, et al. Psychometric properties of the Chinese version of the brief-mindful self-care scale: a translation and validation study. *Front Psychol* 2021;12:715507.
- 35 Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. *J Health Soc Behav* 1983;24:385–96.
- 36 Yang TZ, Huang HT. An epidemiological study on stress among urban residents in social transition period (in Chinese). *Chin J Epidemiol* 2003;24:760–4.
- 37 Huang F, Wang H, Wang Z, et al. Psychometric properties of the perceived stress scale in a community sample of Chinese. *BMC Psychiatry* 2020;20:130.
- 38 Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. *J Gen Intern Med* 2001;16:606–13.
- 39 Bian CD, Yan HX, Qian J, et al. The reliability and validity of a modified patient health questionnaire for screening depressive syndrome in general hospital outpatients (in Chinese). *J Tongji Univ (Med Sci)* 2009;30:136–40.
- 40 Spitzer RL, Kroenke K, Williams JBW, et al. A brief measure for assessing generalized anxiety disorder: the GAD-7. *Arch Intern Med* 2006;166:1092–7.
- 41 He XY, Li CB, Qian J, et al. Reliability and validity of a generalized anxiety disorder scale in general hospital outpatients (in Chinese). *Shanghai Arch Psychiatry* 2010;22:200–3.
- 42 Zhang C, Zhang H. Mindful self-care of oncology nurses and its influencing factors (in Chinese). *J Nurs Sci* 2023;38:100–2.
- 43 Ross A, Touchton-Leonard K, Perez A, et al. Factors that influence health-promoting self-care in registered nurses: barriers and facilitators. *ANS Adv Nurs Sci* 2019;42:358–73.
- 44 Lu F, Xu Y, Yu Y, et al. Moderating effect of mindfulness on the relationships between perceived stress and mental health outcomes among Chinese intensive care nurses. *Front Psychiatry* 2019;10:260.
- 45 Sarazine J, Heitschmidt M, Vondracek H, et al. Mindfulness workshops effects on nurses’ burnout, stress, and mindfulness skills. *Holist Nurs Pract* 2021;35:10–8.
- 46 Delaney MC. Caring for the caregivers: evaluation of the effect of an eight-week pilot Mindful Self-Compassion (MSC) training program on nurses’ compassion fatigue and resilience. *PLoS One* 2018;13:e0207261.
- 47 Slatyer S, Craigie M, Rees C, et al. Nurse experience of participation in a mindfulness-based self-care and resiliency intervention. *Mindfulness (N Y)* 2018;9:610–7.
- 48 Taylor H, Cavanagh K, Field AP, et al. Health care workers’ need for headspace: findings from a multisite definitive randomized controlled trial of an unguided digital mindfulness-based self-help app to reduce healthcare worker stress. *JMIR Mhealth Uhealth* 2022;10:e31744.