

Influencing Factors Associated with Psychological Capital Among Ischemic Stroke Patients: A Latent Profile Analysis

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Background: China has the highest incidence of stroke worldwide because of a high rate of recurrence of ischemic stroke, which has significant negative impacts on the physical and mental health of patients. However, little research has been devoted to the psychological capital of ischemic stroke patients.

Purpose: To investigate the psychological capital of ischemic stroke patients, and uses latent profile analysis to identify the potential profiles of the psychological capital among patients as well as to explore heterogeneity within subgroups and the factors influencing it.

Methods: A survey was distributed among and completed by 427 ischemic stroke patients from November 2023 to March 2024. Four types of questionnaires were administered: the Psychological Capital Questionnaire (PCQ-26), Perceived Stress Scale (CPSS), Athens Insomnia Scale (AIS), and a general information questionnaire.

Results: Three latent profiles of the psychological capital of ischemic stroke patients were identified: the deficient psychological capital group(19.7%), medium psychological capital group(52.5%), and affluent psychological capital group(27.9%). Compared with the deficient psychological capital group, the results of a disordered multi-classification logistic regression analysis showed that the factors influencing the participants of the medium psychological capital group were their marital status (married OR = 1.081, 95% CI: 1.163–7.468, $p = 0.023$), perceived stress (OR = -0.2, 95% CI: 0.769–0.872, $p < 0.001$), and insomnia (OR = -0.273, 95% CI: 0.696–0.833, $p < 0.001$). The factors influencing the affluent psychological capital group were perceived stress (OR = -0.334, 95% CI: 0.664–0.773, $p < 0.001$) and insomnia (OR = -0.46, 95% CI: 0.56–0.712, $p < 0.001$).

Conclusion: Three potential categories of psychological capital in ischemic stroke patients were identified. Sex, marital status, education, perceived stress, and insomnia were found to be associated with psychological capital in stroke patients. Future research should explore other determinants of psychological capital in ischemic stroke patients to formulate interventions that can improve their psychological capital.

Keywords: ischemic stroke, psychological capital, perceived stress, insomnia, latent profile analysis

Introduction

Ischemic stroke (IS) is a leading cause of disability and mortality worldwide, and imposes a significant burden on public health systems.¹ It is influenced by various factors, including age, genetics, lifestyle, hypertension, diabetes, obesity, and atrial fibrillation. The rate of recurrence of stroke among patients within a year is 17%, while IS has a rate of rate of recurrence of 41% within five years.^{2,3} Advances in the prevention, early detection, and treatment of IS have led to improved patient outcomes and reduced mortality rates. However, the burden imposed by stroke in developing countries remains large because of limited resources and uneven access to healthcare.^{4,5} According to the systematic analysis provided by the Global Burden of Disease Study, China is the largest contributor to global neurological disability-adjusted life years (DALYs),⁶ which implies that the country has the highest incidence of stroke in the world. The high rate of recurrence of ischemic stroke has a significant negative impact on the physical and mental health of patients.

A study of 919 patients with stroke found that poor wellbeing was prevalent in 279 of them (30.4%), while almost all patients reported abnormal fatigue.⁷ Therefore, developing positive psychological conditions in patients can contribute to the treatment of the diseases afflicting them and improve the quality of nursing care.

The psychological capital (PsyCap) is the positive developmental state of an individual that helps them cope with stress, and can be viewed as a self-regulating process of mobilizing one's resources to manage challenging situations.⁸ To improve the motivation of stroke patients for treatment is the focus of clinical staff, because the long rehabilitation duration of stroke, some patients are easily to lose confidence in the later treatment.¹ PsyCap as a positive psychological resource for stroke patients, the higher level of PsyCap, the more resilience patients are, the more willing they are to choose challenging rehabilitation tasks, and the more hope they are to devote their energy to managing stroke disease even when they encounter obstacles. This positive psychological resource can enhance stroke patients' level of self-efficacy, promoting active patient participation in the management of stroke disease, which in turn improves the efficacy of treatment for stroke patients.⁹ Which means that individuals with a higher level of PsyCap have more flexible cognitive behavioral models, and are more likely to receive support from outside sources when dealing with intense stress.¹⁰ Thus, there is a need to focus on stroke patients' PsyCap and the influence factors in order to identify patients with low level of PsyCap and lay the foundation for intervention.

The structure of the PsyCap of individuals is not completely uniform owing to their different cognitive levels.¹¹ The psychological capital questionnaire (PCQ-26) was developed by Zhang et al,¹² based on the theory of psychological capital developed by Luthans, and has been widely used in different contexts.^{13,14} There are no uniform standard that distinguish between different level of PsyCap and complex factors influencing PsyCap may be subject to heterogeneity between groups. The majority of previous studies on PsyCap of stroke patients have relied on variable-centered analyses, which is limited to exploring the correlation between variables and ignoring the existence of heterogeneity among individuals and may therefore draw over-generalized conclusions based on overall samples.^{15,16} On the contrary, latent profile analysis (LPA) is an individual-centered method that clusters the relevant data by using continuous explicit variables to allow for the exploration of population heterogeneity, to enable a more clarified understanding of symptom presentations.¹⁷

Clarifying the heterogeneity of PsyCap among stroke patients and the reasons for these differences may be vital for designing and implementing targeted interventions. However, there is a lack of research on PsyCap from an individualized perspective in order to visualize group heterogeneity in stroke patients. In light of this, we investigate the PsyCap of ischemic stroke patients by using LPA to identify the potential profiles of their psychological capital, and to explore subgroup heterogeneity and the factors influencing it. The results of our study will provide crucial information for nurses to develop precise strategies of intervention in case of mental health problems in stroke patients.

Materials and Methods

Design and Participants

This study used a cross-sectional design with latent profile analysis. The reporting was conducted according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist ([Figure S1](#)).

From October 2023 to April 2024, patients receiving treatment and hospitalization in the neurological ward of the Affiliated Hospital of Guizhou Medical University by using convenience sampling. The criteria for the inclusion of the respondents were as follows: 1) age ≥ 18 years, 2) eligibility for the diagnostic criteria of the Chinese guidelines for the diagnosis and treatment of ischemic stroke, as confirmed by computed tomography or magnetic resonance imaging,¹⁸ and 3) informed and voluntary recruitment. The criteria for exclusion were as follows: 1) patients with acute or critical diseases, 2) patients diagnosed mental disorders, and 3) patients with language dysfunction who could not complete the questionnaire.

According to Kendall,¹⁹ the number of samples of the data needs to be at least five to 10 times the number of variables considered. 20 variables were considered in this study. Given the number of invalid samples and an expansion of the samples by 20%, the sample size was $N=(20 \times 10)/(1-0.2)=250$. In addition, previous studies suggested a sample

size of 300–1000 was recommended for LPA,²⁰ and a minimum profile needs to include enough individuals(>30) to support generalizations,²¹ and the final number of samples was 427.

Data Collection

The purpose of our study was explained to the participants before they were asked to fill out the questionnaire to solicit their consent. The researchers answered any question that the participants had in detail during the survey. If the participants were unable to complete the questionnaires on their own, the researchers explained the items of the questionnaire separately to them, and filled in the questionnaire on their behalf according to their responses.

Instruments

Sociodemographic Characteristics

The sociodemographic characteristics of the participants that were collected included their sex, age, marital status, place of residence, education level, monthly income, and occupation. The disease-related information collected from them included data concerning hemiplegia, first hospitalization due to stroke (“yes” or “no”), the number of chronic diseases from which they suffered, the number of therapeutic drugs of chronic diseases, and National Institute of Health Stroke Scale(NIHSS) scores.

Psychological Capital

The psychological capital questionnaire (PCQ-26) developed by Zhang et al¹³ was used here. PsyCap was measured as adapted by Luthans et al.²² It contained 26 items along four dimensions: self-efficacy (seven items), resilience (seven items), hope (six items), and optimism (six items). Each item was rated on a seven-point scale ranging from 1 (“strongly disagree”) to 7 (“strongly agree”). The score of PCQ-26 ranged from 26 to 182, and the PsyCap of a given participant increased with their total score. This scale is widely used, and is satisfactorily applicable to Chinese patients.²³ The Cronbach’s α coefficient of the scale in this study was 0.936.

Perceived Stress

The perceived stress scale (PSS) was developed by Cohen et al²⁴ to assess the perceived level of stress among participants. The Chinese version of the PSS (CPSS), developed by Yang and Huang,²⁵ contains 14 items and two subscales: those related to a sense of being out of control (seven items) and a feeling of tension (seven items). Each item is rated on a five-point scale ranging from 0 (“strongly disagree”) to 4 (“strongly agree”). CPSS scoring uses two subscales, and its scores range from zero to 56. As the total score increases, so does the level of perceived stress in the corresponding participant. The reliability and validity of the CPSS have been proven, and it has been applied to stroke patients.²⁶ The Cronbach’s α coefficient of the scale in this study was 0.828.

Insomnia

Insomnia was measured by using the Athens Insomnia Scale (AIS), which was developed as a sleep assessment tool to quantify the degree of difficulty encountered in sleeping according to the International Classification of Diseases-10th edition (ICD-10).²⁷ The AIS contains eight items along two dimensions: the quantity and quality of sleep (five items), and daytime symptoms (three items). It uses a four-point Likert scale ranging from 0 (“no problem”) to 3 (“serious problem”), with the total score ranging from zero to 24. Higher AIS scores reflect higher levels of insomnia. Its validity and reliability have been verified in past research, and a total score above six is considered to reflect insomnia.²⁸ The Cronbach’s α coefficient of the scale in this study was 0.878.

Statistical Analysis

Data analysis was performed by using SPSS 27.0 and Mplus 8.3 software. The scores of the participants on the 26 PsyCap items were entered for LPA, and profiles 1–5 were sequentially chosen for analysis.²⁰ To identify the optimal number of latent profiles to fit the data, we compared several evaluation indices of each model, including the Akaike information criterion (AIC), Bayesian information criterion (BIC), sample size-adjusted Bayesian information criterion (aBIC), entropy, Lo–Mendell–Rubin likelihood ratio test (LMR), and bootstrapped likelihood ratio test (BLRT). Smaller

values of the AIC, BIC, and aBIC, larger values of entropy (>0.8), and high levels of significance of the p -values of the LMR and BLRT (<0.05) were considered to represent a better model.

SPSS version 27.0 was used to compare the differences in sociodemographic characteristics between ischemic stroke patients, and their PsyCap was identified by using LPA. A chi-square (χ^2) test and one-way ANOVA were used to compare the differences in the sociodemographic characteristics, perceived stress, and insomnia between profiles. The statistically significant indicators were subjected to multi-nomial logistic regression when the subgroups were compared to analyze the factors associated with the PsyCap of ischemic stroke patients. The differences were considered statistically significant at $p<0.01$ or $p<0.05$.

Ethics

This study complied with the Declaration of Helsinki and was approved by the Committee of Medical Ethics of the Affiliated Hospital of Guizhou Medical University (ethics approval number: 2024149). All the participants provided informed consent.

Results
Tests for Common Method Bias and Multicollinearity

Given that the data were collected by self-report methods, Harman’s univariate test was performed prior to data analysis using exploratory factor analysis to detect common method bias. The results showed that 16 factors had eigenvalues greater than 1, 65.85% of the variance. The first factor explained 27.51% of the variance, which was below the critical value of 40%.²⁹ Therefore, there was no significant common method bias in this study.

For predictive analysis, multicollinearity diagnosis among observed variables was performed. The results showed that the tolerance index of each model(0.495–0.948) was less than 1, and the variance inflation factor(VIF) of independent variables were 1.055–2.018. According to the common rule of thumb that a VIF of 10 or above as a cutoff value for a large multicollinearity problem,³⁰ the results indicate that there is no significant multicollinearity problem among the independent variables in the present study.

Participant Characteristics

The demographic characteristics and disease-related information of the ischemic stroke patients are presented in Table 1. A total of 427 participants were included in this study, and had a mean age of 60.32 years ($SD=12.40$; range, 20–88 years). A total of 59.95% of the patients were male, 55.5% were older than 60 years, 76.81% were married, 64.17% lived in urban areas, 35.36% had a junior high school diploma, 39.11% had a monthly income of less than 3000 yuan, and 26.93% were farmers. A majority of the ischemic stroke patients was not hemiplegic ($N=292$ [68.38%]), most of the

Table 1 General Information of Patients with Ischemic Stroke and Their Differences in Psychological Capital Latent Profile(N = 427)

Variables	Category	N	Percentage (%)	Profile 1 (N=84)	Profile 2 (N=224)	Profile 3 (N=119)	χ^2 / F	P-value
Sex	Male	256	59.95	41(48.8)	136(60.7)	79(66.4)	6.450	0.040
	Female	171	40.05	43(51.2)	88(39.3)	40(33.6)		
Years, Mean (SD)	60.32±12.40						4.907	0.297
	<60	190	44.50	39(46.4)	98(43.8)	53(44.5)		
	60–74	187	43.79	34(40.5)	106(47.3)	47(39.5)		
	≥75	50	11.71	11(13.1)	20(8.9)	19(16.0)		
Place of residence	Rural	152	35.60	32(38.1)	82(36.6)	38(31.9)	1.025	0.599
	Urban	275	64.40	52(61.9)	142(63.4)	81(68.1)		
Marital status	Single	34	7.96	10(11.9)	17(7.6)	7(5.9)	13.642	0.009
	Married	328	76.81	52(61.9)	179(79.9)	97(81.5)		
	Divorced or widowed	65	15.23	22(26.2)	28(12.5)	15(12.6)		

(Continued)

Table 1 (Continued).

Variables	Category	N	Percentage (%)	Profile 1 (N=84)	Profile 2 (N=224)	Profile 3 (N=119)	χ^2 / F	P-value
Education	Primary school or below	111	26.00	24(28.6)	69(30.8)	18(15.1)	17.165	0.009
	Junior high school	151	35.36	20(23.8)	80(35.7)	51(42.9)		
	High school	94	22.01	25(29.8)	42(18.8)	27(22.7)		
	Undergraduate or higher	71	16.63	15(17.9)	33(14.7)	23(19.3)		
Monthly income	<3000	167	39.11	28(33.3)	100(44.6)	39(32.8)	7.531	0.110
	3000–6000	156	36.53	36(42.9)	76(33.9)	44(37.0)		
	>6000	104	24.36	20(23.8)	48(21.4)	36(32.3)		
Occupation	Worker or Farmer	159	37.24	36(42.9)	83(37.1)	40(33.6)	9.535	0.146
	Public official	70	16.39	14(16.7)	30(13.4)	26(21.8)		
	Freelance	105	24.59	23(27.4)	58(25.9)	24(20.2)		
	Retired	93	21.78	11(13.1)	53(23.7)	29(24.4)		
Did first hospitalization occur due to stroke?	Yes	332	77.75	69(82.1)	170(75.9)	93(78.2)	1.395	0.498
	No	95	22.25	15(17.9)	54(24.1)	26(21.8)		
Number of chronic diseases	0	143	33.49	26(31.0)	80(35.7)	37(31.1)	6.042	0.196
	1	156	36.53	32(38.1)	87(38.8)	37(31.1)		
	≥2	128	29.98	26(31.0)	57(25.4)	45(37.8)		
Therapeutic drugs of chronic diseases	0	84	19.67	13(15.5)	50(59.5)	21(25.0)	6.178	0.404
	1	158	37.00	31(19.6)	87(55.1)	40(25.3)		
	2	147	34.43	33(22.4)	71(48.3)	43(29.3)		
	3	38	8.90	7(18.4)	16(42.1)	15(39.5)		
Whether hemiplegia	Yes	135	31.62	24(28.3)	72(32.1)	39(32.8)	0.463	0.794
	No	292	68.38	60(71.4)	152(67.9)	80(67.2)		
NIHSS	0–1	198	46.37	35(17.7)	109(55.1)	54(27.3)	8.572	0.073
	2–4	156	36.53	36(23.1)	69(44.2)	51(32.7)		
	5–15	73	17.09	13(17.8)	46(63.0)	14(19.2)		
Perceived stress(±s)	29.64±9.669			40.21±5.887	30.46±7.163	20.61±7.287	201.913	<0.001
Insomnia (±s)	9.45±6.085			16.38±3.921	9.56±5.287	4.36±3.118	174.352	<0.001

participants had undergone their first hospitalization due to stroke [$N=331$ (77.52%)], and most of them had no chronic diseases ($N=143$ [33.49%]) or had only one chronic disease ($N=156$ [36.53%]).

Latent Profile Analysis of Psychological Capital Among Participants

LPA was performed with 26 items as the input variables. Latent profile models 1–5 were selected for an exploratory LPA of the PsyCap of ischemic stroke patients (Table 2). The values of the AIC, BIC, and aBIC continuously decreased in all five profiles, but the entropy had the largest value in profile model 3, while the indicator for LMR was not significant in profile model 5 ($p>0.05$). Each indicator of profile model 4 was statistically significant, but it was considered to be too complex to be useful and thus did not provide clinical guidance. By combining the above results, we chose profile model 3 as the optimal latent profile model for ischemic stroke patients.

Characterization of Psychological Capital Profile

Based on the results of latent classification, the scores of the three profiles on the 26 items of the PsyCap questionnaire are plotted in Figure 1. The total score for profile 1 was 59.80 ± 11.817 , and the average score of all its items was lower than 4, indicating a low level of PsyCap. We called this profile the “deficient psychological capital group.” There were 84

Table 2 Comparison of Indices of Fit Between Models

Model	AIC	BIC	aBIC	Entropy	LMR (p-value)	BLRT (p-value)	Proportion (%)
1	45,600.233	45,811.186	45,646.17	—	—	—	—
2	42,801.839	43,122.325	42,871.628	0.965	0.0000	0.0000	25.7/74.3
3	41,674.480	42,104.499	41,768.12	0.949	0.0000	0.0000	20.0/52.1/28.0
4	41,403.584	41,943.137	41,521.077	0.933	0.0483	0.0000	18.8/21.8/37.5/22.4
5	41,231.142	41,880.228	41,372.487	0.926	0.5002	0.0000	19.2/15.5/15.1/28.4/21.8

ischemic stroke patients in this group (19.7%). Profile 2 had the highest proportion of participants, at 52.5%. The overall level of PsyCap of individuals in this profile (106.10 ± 10.792) was close to the moderate level of the conventional model, while the development of its items was uneven. Fluctuations were observed in both the dimensions of self-efficacy and resilience. We called this profile the “medium psychological capital group”, and it contained 224 individuals. The total score for profile 3 was 142.76 ± 11.242 , and the average score of each item was above 4, but there were mild fluctuations in its dimension of self-efficacy. We called this class the “affluent psychological capital group”, and it comprised 119 patients, accounting for 27.8% of all participants.

Factors Influencing Psychological Capital Among Ischemic Stroke Patients

Sex, marital status, education, perceived stress, and insomnia were found to influence the profile of the psychological capital of ischemic stroke patients according to the results of a univariate analysis ($p < 0.05$) (Table 1).

When profile 1 was used as the reference group, the results of disordered multi-classification logistic regression indicated that the participants' marital status, perceived stress, and insomnia were statistically significant factors, as shown in Table 3. The factors influencing the participants of the medium psychological capital group were their marital status (married OR = 1.081, 95% CI: 1.163–7.468), perceived stress (OR = -0.2, 95% CI: 0.769–0.872), and insomnia (OR = -0.273, 95% CI: 0.696–0.833). The factors influencing the affluent psychological capital group were perceived stress (OR = -0.334, 95% CI: 0.664–0.773) and insomnia (OR = -0.46, 95% CI: 0.56–0.712).

Discussion

We used LPA to explore the types of PsyCap and the factors influencing them in ischemic stroke patients. We eventually classified the participants into three potential profiles: the “deficient psychological capital group”, “medium psychological capital group”, and “affluent psychological capital group.” The medium psychological capital group had the highest proportion of participants, 52.5%, with scores of 106.10 ± 10.792 . These scores are lower than those reported for the

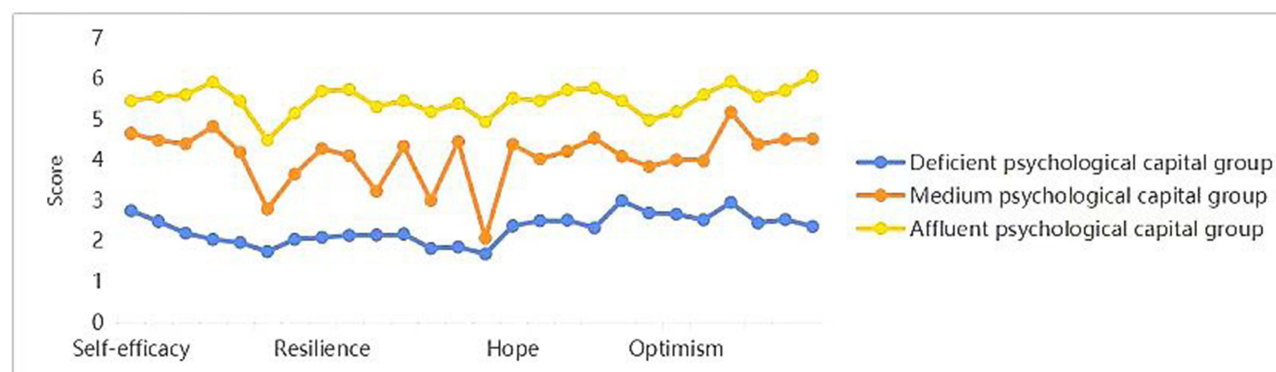
**Figure 1** Latent profile model of psychological capital among ischemic stroke patients.

Table 3 Results of Multi-Nomial Logistic Regression

	Measures	Profile 2				Profile 3			
		OR	95% CI		P	OR	95% CI		P
			LLCI	ULCI			LLCI	ULCI	
Sex (Female)	Male	0.406	0.701	3.214	0.296	0.390	0.568	3.847	0.424
Marital status (Divorced or widowed)	Single	−0.172	0.192	3.682	0.819	−0.671	0.073	3.585	0.500
	Married	1.081	1.163	7.468	0.023	1.133	0.872	11.052	0.080
Education (Undergraduate or higher)	Primary school or below	0.651	0.647	5.687	0.240	0.329	0.337	5.732	0.649
	Junior high school	0.828	0.762	6.877	0.140	0.936	0.661	9.836	0.174
	High school	0.158	0.380	3.614	0.783	0.539	0.409	7.184	0.461
Perceived stress		−0.200	0.769	0.872	<0.001	−0.334	0.664	0.773	<0.001
Insomnia		−0.273	0.696	0.833	<0.001	−0.460	0.560	0.712	<0.001

Note: Profile 2: medium psychological capital group. Profile 3: affluent psychological capital group. OR= Odds ratio.

Abbreviation: CI, Confidence interval.

PsyCap of stroke patients by He et al.¹⁵ Moreover, the affluent psychological capital group accounted for only 28% of the participants, suggesting that the PsyCap of most ischemic stroke patients in China is low. This can be attributed to the fact that stroke patients typically suffer from long-term physical and psychological health issues.³¹ These findings are beneficial for nurses and clinicians to better understand the heterogeneous and clustered classification of PsyCap in stroke patients, and plan more targeted interventions to improve the quality of care for them. A study by Hu et al³² on patients with coronary heart disease showed that positive psychological intervention improved the negative cognition of the individuals, helped them regulate their psychological and emotional problems, and enhanced their sense of wellbeing.

We also considered the factors influencing the latent profile of PsyCap. We found that the marital status of stroke patients in the medium psychological capital group was a more influential factor than for patients in the deficient psychological capital group. Wu and Yan found a significantly positive correlation between PsyCap and the marital status of medical staff,³³ which is consistent with the findings of Bouzanjani et al.³⁴ A husband, wife, or family is an individual's spiritual harbor, and an important source of social support. If patients can obtain affirmation, recognition, and support from marriage, their PsyCap and self-efficacy can be enhanced. However, these results may be related to the fact that the participants of our study included a larger number of married people. Therefore, nurses should pay more attention to stroke patients who are single, divorced, or widowed, seek to alleviate their psychological stress, and encourage their family members to provide psychological support to them to enhance their PsyCap. As an important resource, PsyCap can alleviate and regulate stress among people. This is because it can help patients adapt to their stressful environment, encourage them to accept, face, and accommodate the development of the disease, and alleviate negative emotions and unfavorable mental states, such as anger, helplessness, and anxiety.

This study also found that perceived stress was an influential factor for both the medium psychological capital group and the affluent psychological capital group. Previous studies have shown that perceived stress is negatively associated with PsyCap in patients with chronic diseases.³⁵ Studies have shown that CPSS have satisfactory internal consistency and alphas, the two-factor structure (sense of being out of control and feeling of tension) for CPSS has also been widely validated in China.^{36,37} A meta-analysis has also shown that perceived psychological stress is associated with an increased risk of total ischemic stroke (HR=1.40),³⁵ which means that perceived stress not only directly affects the physical health of the individual, but also affects their mental health.³⁸ Perceived stress is the degree to which an individual perceives a stimulus as stressful. Prather et al³⁹ found that stress was prevalent among stroke patients, since lacking of knowledge about disease, fearing of disease progression and heavy financial burden were the main sources of stress. When individual faced perceived stress can mobilize their own internal and external resources to cope with

stressful events, PsyCap as a positive psychological resource, stroke patients with lower level of PsyCap are more likely are they to experience tension and feel helpless about the future.⁴⁰ As a result, they are mentally unable to come to terms with their physical condition, and have a low level of wellbeing.⁴¹ On the contrary, stroke patients with less perceived stress are more likely to have resilient and optimistic attitudes, a higher degree of acceptance of the disease and compliance with the treatment, and better wellbeing.⁴² Therefore, in addition to caring for the physical symptoms of patients, nurses should implement effective psychological interventions to help them, such as relaxation training, *Baduanjin*, and health education. This can reduce the perceived stress of patients and promote their recovery from disease.

In addition, insomnia was found to be an influential factor for the medium psychological capital group and affluent psychological capital group. The negative correlation between insomnia and PsyCap has been reported in previous studies.⁴³ A meta-analysis showed that 14 studies on the prevalence of post-stroke insomnia or symptoms of insomnia identified 38.2% stroke patients (95% CI, 30.1–46.5).⁴⁴ In China, 40% of old adults were suffered from sleep disturbance or insomnia, as defined by a cut-off score on the AIS(≥ 6).^{45,46} In the COVID-19 pandemic, a cross study have examined the prevalence of insomnia symptoms with screener of insomnia AIS and Pittsburgh Sleep Quality Index(PSQI), finally, similar results were discovered.⁴⁷ According to the theory of sleep disturbance, illness depletes the PsyCap of patients, and since overall PsyCap is limited and difficult to replenish in short term, if psychological resource depletion is not replenished in time, it would cause to insomnia symptoms.⁴⁸ Patients with higher levels of PsyCap will actively acquire and replenish psychological resources during the treatment period, thus maintaining the normal mental activities of patients and the insomnia symptoms will disappear.⁴⁹ Du et al⁵⁰ found that insomnia was negatively correlated with PsyCap among Chinese nurses, which is similar to the results of this study. In fact, stroke patients were more likely to suffer from insomnia owing to long-term treatment and emotion disorders.

Limitations

This study has several limitations that should be noted. First, the list of influential factors considered here was not exhaustive. Second, the sample was limited to patients in Guizhou, China, and the results may vary when patients from different geographical areas of the country are considered. Third, this study used a cross-sectional design, because of which the relevant causal relationships were not verified. Therefore, multi-center longitudinal clinical studies with large sample sizes are needed in future research to clarify the causal relationships between the variables considered, so that precise interventions can be developed and implemented.

Conclusion

In summary, this is study to use LPA to identify three profiles of the psychological capital of stroke patients: deficient, medium, and affluent. Patients belonging to different profiles were found to differ in terms of their sex, marital status, education, perceived stress, and insomnia. Comparisons between these groups of stroke patients can help medical staff better understand the factors influencing them, and can provide a theoretical basis for developing helpful interventions.

Data Sharing Statement

The dataset supporting the conclusions of this study can be shared with the corresponding author via e-mail.

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Disclosure

The authors report no conflicts of interest in this work.

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