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The Relationship Between Midwives' Psychological Capital and Core Competency: A Latent Profile Analysis

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Background: To analyze the latent profiles and influencing factors of psychological capital of midwives, and to explore the core competencies of midwives with different profiles.

Methods: From July 5 to July 19, 2024, a cross-sectional study was conducted using convenience sampling to recruit 965 midwives from Jiangsu Province, China. The Demographics Questionnaire, Positive Psycap Questionnaire, and Midwife Core Competency Scale were used for investigation. Data analysis was performed using latent profile analysis, univariate analysis, multinomial logistic regression analysis, and the Kruskal–Wallis *H*-test.

Results: The psychological capital of midwives can be classified into three profiles: low psychological capital - balanced group (C1) (56.37%), medium psychological capital - low tenacity group (C2) (21.97%), and high psychological capital - balanced group (C3) (21.66%). Compared to C1, midwives working in general hospitals were more likely to belong to C2 (*aORs* = 1.820, 95%*CI*: 1.213–2.729, $P < 0.01$) and C3 (*aORs* = 1.665, 95%*CI*: 1.117–2.481, $P < 0.05$). Compared to C2, midwives with 0–5 years of working experience were more likely to belong to C1 (*aORs* = 0.117, 95%*CI*: 0.022–0.612, $P < 0.05$) and C3 (*aORs* = 8.334, 95%*CI*: 1.295–53.645, $P < 0.05$). Compared to C3, midwives with a junior college degree were more likely to belong to C1 (*aORs* = 0.643, 95%*CI*: 0.416–0.994, $P < 0.05$). C1 showed statistically lower scores of core competency compared to C2 and C3 ($P < 0.05$), while no significant difference was observed between C2 and C3 ($P > 0.05$).

Conclusion: This study revealed heterogeneity in the psychological capital of midwives. Targeted interventions, such as Psychological Capital Intervention (PCI) strategies, should be primarily applied to the C1 group to enhance their self-efficacy, optimism, hope, and core competency levels. Concurrently, the emotional contagion and role-modeling effects of the C3 group should be leveraged. When resources permit, efforts should also be made to improve the tenacity level of the C2 group.

Keywords: midwife, psychological capital, core competency, latent profile analysis

Introduction

Childbirth is a natural physiological procedure for women that marks the end of the pregnancy. During this procedure, pregnant women may encounter risks such as prolonged labor, retained placenta, and intrapartum cesarean delivery after trial of labor. These risks, if not treated properly, can cause physical and mental harm to both mother and newborn.[1] Midwives are the key experts in charge of managing the labor process and ensuring the health of both expectant mother and newborn. As a result, midwives must acquire specific abilities to effectively handle the various duties in their role.

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The concept of core competency for midwives was refined in 2002 when the International Council of Midwives (ICM) developed a list of fundamental practice standards and competencies for midwives.[2] Therefore, the core competency of midwives can be used as a standard for evaluating work ability. Nonetheless, the work of midwives in China is characterized by great intensity, high risks, and high demands. The density of midwives in China was only 2.02 per 1000 births,[3] far lower than the ratio of 25 or more midwives per 1000 births in developed countries such as France and Germany.[4] This significant gap between the number of midwives and pregnant women results in midwives being under intense workloads. Moreover, following the implementation of China's two-child and three-child policies, the proportion of women of advanced maternal age has increased from 14.6% to 31.6%.[5] This shift increases the risk of adverse pregnancy outcomes and places greater demands on midwives' work ability.[6] Research indicates that midwives in China commonly experience compassion fatigue, occupational burnout, and secondary trauma, with lower psychological tenacity compared to general nurses.[7] Therefore, finding ways to effectively improve the core competency of midwives while maintaining their mental health has become a key issue for managers.

According to the Job Demands-Resources (JD-R) model, resources in high-demand work environments can enhance individuals' work capabilities through the gain pathway.[8] Meanwhile, they can also mitigate the adverse effects of work on physical and mental health via the loss pathway. Psychological capital represents a positive psychological state manifested during personal growth and development, comprising four traits: self-efficacy, tenacity, optimism, and hope.[9] As an important psychological resource, psychological capital is incorporated into the JD-R model. Empirical research shows that psychological capital effectively maintains nurses' mental health while enhancing work engagement and performance.[10,11] Furthermore, a Chinese study demonstrated a significant positive correlation between psychological capital and the core competency of midwives, with a correlation coefficient of 0.664.[12] Thus, focusing on midwives' psychological capital holds considerable significance for fostering the development of a competent professional workforce.

Current research on midwives' psychological capital primarily employs variable-centered approaches. Findings from these studies show that midwives' overall psychological capital is at a moderately high level.[13,14] However, such methods are limited in revealing potential heterogeneity within the population. Latent profile analysis (LPA) is a person-centered statistical method that can identify and categorize individuals into latent subgroups with similar characteristics.[15] Applying LPA allows us to move beyond descriptions of overall psychological capital levels, thereby providing a foundation for developing more targeted interventions.

Therefore, this study aims to (1) apply LPA to explore the latent profiles of psychological capital among Chinese midwives, (2) analyze the influencing factors of different latent profiles, and (3) compare the differences in core competencies across the identified profiles.

Materials and Methods

Participants

This study employed a convenience sampling method. From July 5 to July 19, 2024, electronic questionnaires were distributed to midwives by contacting the managers of nursing departments in various hospitals across Jiangsu Province, China. LPA requires a minimum of 50 samples per profile.[16] Based on previous studies,[17] this research anticipates the existence of 2–5 latent profiles. Multinomial logistic regression requires a sample size at least 5–10 times the number of independent variables.[18] This study included 11 independent variables. Accounting for a 20% non-response rate, the minimum sample size required was 120–300 participants. However, previous studies employing LPA used considerable variation in sample sizes, ranging from 300 to over 1000 participants.[19,20] Therefore, considering participant accessibility, this study distributed 1065 questionnaires. Data were collected via an online platform (https://www.wjx.cn). To prevent missing data, the platform was configured to allow submission only after all items were completed. Questionnaires were excluded if they exhibited straight-line responding in the Likert scales or a short completion time (< 3 minutes). Ultimately, 965 valid questionnaires were recovered, yielding an effective response rate of 90.61%. All participants provided informed consent and participated voluntarily.

Inclusion Criteria

(1) Holding midwifery qualifications; (2) Currently practicing midwifery.

Exclusion Criteria

(1) Not on duty due to rotations, training, leave, or other reasons; (2) Interns and trainees; (3) Unable to participate due to physical conditions.

Measurements

Positive Psycap Questionnaire (PPQ)

PPQ was developed in 2010 from an organizational behavior perspective.[21] The questionnaire involves 4 dimensions and 26 items, and is scored using a 7-point Likert scale. Total scores range from 26 to 182, with higher scores indicating higher levels of psychological capital. The developers have validated the PPQ in Chinese samples, with confirmatory factor analysis supporting the original four-factor structure (χ^2/df = 1.67, CFI = 0.92, RMSEA = 0.056). The Cronbach's α coefficient for the scale is 0.900. In this study, the Cronbach's α coefficient was 0.949.

Midwife Core Competency Scale

The Midwife Core Competency Scale was developed in 2011,[22] referencing the core competency standards established by the International Confederation of Midwives (ICM) in 2002. It is designed to evaluate the core competencies of midwives in China. The scale consists of 54 items across six dimensions: pre-pregnancy care (6 items), antenatal care (10 items), intrapartum care (13 items), postpartum care (8 items), neonatal care (6 items), and public health care (11 items). Each item is scored on a 5-point Likert scale, with higher scores indicating higher levels of core competency. This scale has high reliability (Cronbach's α = 0.978) and validity (S-CVI = 0.95, KMO = 0.957, Cumulative variance = 70.927%) in its original validation, and a recent scoping review recommended it as a primary tool for assessing Chinese midwives' competency.[23] In this study, the Cronbach's α coefficient was 0.989.

Statistical Analysis

The latent profile model of psychological capital among midwives was analyzed using R 4.4.0 software. The four dimensions of PPQ were used as manifest variables, and models with 1 to 4 profiles were sequentially evaluated. Lower values of AIC, BIC, and aBIC indicate better model fit. Entropy ranges from 0 to 1, with values closer to 1 indicating more precise classification. Model comparison indices included the Lo-Mendell-Rubin adjusted likelihood ratio test (LMRT) and the Bootstrapped likelihood ratio test (BLRT). A P value < 0.05 indicates that the model with k profiles is superior to the model with k-1 profiles.

SPSS 25.0 software was used to perform statistical analyses. Normality and homogeneity of variance were verified via Kolmogorov–Smirnov and Levene's tests, respectively. Continuous variables were described as mean ± standard deviation (SD) and compared using ANOVA if normality and homogeneity of variance were satisfied. Otherwise, median (M) (P25, P75) was used, with group comparisons performed via the Kruskal–Wallis H-test. Categorical variables were described using frequencies and percentages (%), with comparisons between groups performed using Pearson's chi-square test or Fisher's exact probability test. Multicollinearity among variables statistically significant in the univariate analysis was assessed. A Variance Inflation Factor (VIF) < 5 is considered to indicate the absence of multicollinearity. Using psychological capital profiles as the dependent variable, multinomial logistic regression was employed. Adjusted Odds Ratios (aORs) with 95% confidence intervals and Wald test statistics were calculated and reported for significant predictors. The significance level was set at α = 0.05.

Results

LPA of PPQ

Based on the assessment results of the four dimensions of midwives' psychological capital, latent profile models with 1 to 4 profiles were fitted. The fit indices for each model are presented in Table 1. As the number of profiles increased, the AIC, BIC, and aBIC showed a decreasing trend. When retaining three latent profiles, both the LMRT and BLRT reached statistical significance (P < 0.05), and the entropy was ≥ 0.8. However, when retaining four latent profiles, the BIC and

Table 1 Model Fit Information for Latent Profile Analysis of Psychological Capital for Midwives (n = 965)

Model	AIC	BIC	aBIC	Entropy	LMRT (*P*)	BLRT (*P*)	Class Probability (%)
1	21,461.76	21,529.97	21,485.51	–	–	–	–
2	21,450.11	21,542.68	21,482.34	0.57	< 0.001	< 0.001	50.02/49.98
3	21,106.58	21,223.51	21,147.29	0.80	< 0.001	< 0.001	56.37/21.97/21.66
4	21,101.82	21,243.11	21,151.01	0.77	< 0.001	0.020	51.58/22.17/7.91/18.34

Abbreviations: AIC, Akaike information criterion; BIC, Bayesian information criterion; aBIC, adjusted Bayesian information criterion; LMRT, Lo-Mendell-Rubin adjusted likelihood ratio test; BLRT, Bootstrapped likelihood ratio test.

aBIC increased, and the entropy was suboptimal. Considering the model fit indices comprehensively, the three-profile model was ultimately selected as the optimal fitting model.

The three profiles were named based on their characteristics, and the scores of the four psychological capital dimensions are shown in Figure 1. Profile 1 accounted for 56.37% (n = 544) of midwives, with a total psychological capital score of 121.81 ± 14.17. Both the total score and subscale scores were at relatively low levels. Thus, this profile was named the low psychological capital - balanced group. Profile 2 accounted for 21.97% (n = 212), with a total score of 144.31 ± 10.76. The self-efficacy, hope, and optimism subscales were at moderate to high levels, but the tenacity score was lower than that of Profile 1, leading to its designation as the medium psychological capital - low tenacity group. Profile 3 accounted for 21.66% (n = 209), with a total score of 164.34 ± 12.20. Both the total score and subscale scores were at relatively high levels, resulting in its classification as the high psychological capital - balanced group.

Univariate Analysis of Three PPQ Profiles

The univariate analysis results showed that midwives in the three psychological capital latent profiles exhibited statistically significant differences in age, initial education level, marital status, level, nature of the hospital, and years of working experience ($P < 0.05$), as shown in Table 2.

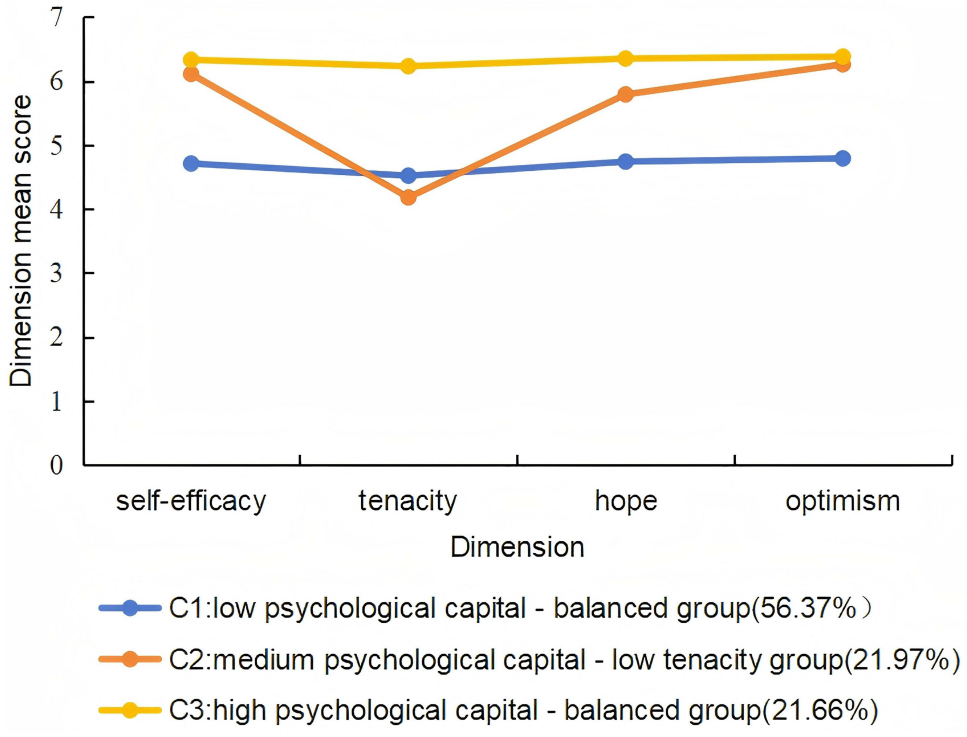

Figure 1 The characteristic distribution of 3 latent profiles of psychological capital for midwives.

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Table 2 Demographic Characteristics of Midwives and Their Univariate Analysis on Psychological Capital Profiles

Variables	Overall (n = 965)	C1 (n = 544)	C2 (n = 212)	C3 (n = 209)	Value	*P* value
Age (year)					14.980[a]	0.020
≤ 25	65 (6.74)	42 (7.72)	12 (5.66)	11 (5.26)		
26-35	555 (57.51)	327 (60.11)	107 (50.47)	121 (57.89)		
36-45	233 (24.15)	123 (22.61)	55 (25.94)	55 (26.32)		
≥ 46	112 (11.60)	52 (9.56)	38 (17.93)	22 (10.53)		
Initial education level					18.946[a]	< 0.001
Technical secondary degree	227 (23.52)	106 (19.49)	68 (32.07)	53 (25.36)		
Junior college degree	561 (58.14)	342 (62.87)	111 (52.36)	108 (51.67)		
Bachelor's degree	177 (18.34)	96 (17.64)	33 (15.57)	48 (22.97)		
Final education level					2.602[b]	0.877
Technical secondary degree	6 (0.62)	4 (0.74)	1 (0.47)	1 (0.48)		
Junior college degree	50 (5.18)	28 (5.15)	13 (6.13)	9 (4.30)		
Bachelor's degree	899 (93.16)	504 (92.65)	197 (92.93)	198 (94.74)		
Master's degree and above	10 (1.04)	8 (1.46)	1 (0.47)	1 (0.48)		
Initial major					1.010[b]	0.947
Nursing	140 (14.51)	83 (15.26)	27 (12.74)	30 (14.35)		
Midwifery	820 (84.97)	458 (84.19)	184 (86.79)	178 (85.17)		
Others	5 (0.52)	3 (0.55)	1 (0.47)	1 (0.48)		
Final major					3.143[b]	0.537
Nursing	336 (34.82)	196 (36.03)	76 (35.85)	64 (30.62)		
Midwifery	620 (64.25)	344 (63.23)	133 (62.74)	143 (68.42)		
Others	9 (0.93)	4 (0.74)	3 (1.41)	2 (0.96)		
Marital status					9.831[a]	0.007
Married	782 (81.04)	422 (77.57)	180 (84.91)	180 (86.12)		
Single	183 (18.96)	122 (22.43)	32 (15.09)	29 (13.88)		
Level					19.448[a]	0.013
N0	29 (3.01)	19 (3.49)	4 (1.89)	6 (2.87)		
N1	127 (13.16)	72 (13.24)	30 (14.15)	25 (11.96)		
N2	365 (37.82)	232 (42.65)	60 (28.30)	73 (34.93)		
N3	353 (36.58)	178 (32.72)	93 (43.87)	82 (39.24)		
N4	91 (9.43)	43 (7.90)	25 (11.79)	23 (11.00)		
Nature of the hospital					10.105[a]	0.006
General hospital	729 (75.54)	390 (71.69)	172 (81.13)	167 (79.90)		
Specialized hospital	236 (24.46)	154 (28.31)	40 (18.87)	42 (20.10)		
Years of working experience					30.215[a]	< 0.001
0-5	103 (10.67)	69 (12.68)	14 (6.60)	20 (9.57)		
6-10	319 (33.06)	201 (36.95)	63 (29.72)	55 (26.32)		
11-15	264 (27.36)	140 (25.74)	53 (25.00)	71 (33.97)		
16-20	84 (8.70)	40 (7.35)	20 (9.43)	24 (11.48)		
≥ 20	195 (20.21)	94 (17.28)	62 (29.25)	39 (18.66)		
Refresher training experience					0.089[a]	0.956
No	525 (54.40)	298 (54.78)	115 (54.25)	112 (53.59)		
Yes	440 (45.60)	246 (45.22)	97 (45.75)	97 (46.41)		
Employment type					7.286[b]	0.255
Career establishment	264 (27.36)	150 (27.57)	67 (31.60)	47 (22.49)		
Contract system	676 (70.05)	380 (69.85)	139 (65.57)	157 (75.12)		
Temporary employment	5 (0.52)	3 (0.55)	0 (0.00)	2 (0.96)		
Others	20 (2.07)	11 (2.02)	6 (2.83)	3 (1.43)		

Note: C1, low psychological capital - balanced group; C2, medium psychological capital - low tenacity group; C3, high psychological capital - balanced group. [a]Pearson's chi-square test; [b]Fisher's exact probability test.

Table 3 Multinomial Logistic Regression Analyses of 3 Latent Profiles of Psychological Capital for Midwives

Variables	*β*	*SE*	Wald χ^2	*P* value	*aORs*	95% *CI*
C1 (ref) VS C2						
Intercept	−1.068	0.425	6.321	0.012	–	–
Nature of the hospital (General hospital)	0.599	0.207	8.369	0.004	1.820	1.213–2.729
Years of working experience (0–5)	−2.143	0.843	6.461	0.011	0.117	0.022–0.612
C1 (ref) VS C3						
Intercept	−1.232	0.429	8.243	0.004	–	–
Initial education level (Junior college degree)	−0.442	0.222	3.945	0.047	0.643	0.416–0.994
Nature of the hospital (General hospital)	0.510	0.204	6.268	0.012	1.665	1.117–2.481
C2 (ref) VS C3						
Intercept	−0.165	0.496	0.110	0.740	–	–
Years of working experience (0–5)	2.120	0.950	4.981	0.026	8.334	1.295–53.645

Notes: the highest assignment was used as the control for all independent variables; C1, low psychological capital - balanced group; C2, medium psychological capital - low tenacity group; C3, high psychological capital - balanced group; *β*, unstandardized coefficients.
Abbreviations: SE, standard error; aORs, adjusted Odds Ratios; CI, confidence interval.

Table 4 Differences in Core Competencies Among Midwives with Different Latent Profiles of Psychological Capital

Variables	C1 (n = 544)	C2 (n = 212)	C3 (n = 209)	H	Post hoc Comparisons
Core competency	217.00 (204.00,244.25)	261.00 (237.75,269.00)	263.00 (228.00,270.00)	241.123*	C1 < C2, C1 < C3, C2 = C3
Pre-pregnancy care	24.00 (20.00,24.00)	27.00 (24.00,30.00)	28.00 (24.00,30.00)	180.817*	C1 < C2, C1 < C3, C2 = C3
Antenatal care	40.00 (39.00,46.00)	49.00 (44.00,50.00)	50.00 (40.50,50.00)	187.582*	C1 < C2, C1 < C3, C2 = C3
Intrapartum care	54.00 (51.00,64.00)	64.00 (61.00,65.00)	65.00 (58.00,65.00)	158.642*	C1 < C2, C1 < C3, C2 = C3
Postpartum care	32.00 (32.00,39.00)	40.00 (36.00,40.00)	40.00 (32.50,40.00)	192.058*	C1 < C2, C1 < C3, C2 = C3
Neonatal care	24.00 (22.00,27.00)	30.00 (25.00,30.00)	30.00 (24.00,30.00)	217.202*	C1 < C2, C1 < C3, C2 = C3
Public health care	44.00 (40.00,49.00)	54.00 (47.00,55.00)	55.00 (44.00,55.00)	234.788*	C1 < C2, C1 < C3, C2 = C3

Notes: C1, low psychological capital - balanced group; C2, medium psychological capital - low tenacity group; C3, high psychological capital - balanced group. *$P < 0.001$.

Multinomial Analysis of Three PPQ Profiles

The six variables statistically significant in the univariate analysis all had a VIF below 5 (range: 1.027–4.779). The assignment of independent variables is shown in Supplementary Table 1. The results of the multinomial logistic regression analysis are presented in Table 3, with the full version shown in Supplementary Table 2. The Nagelkerke pseudo-R^2 was 0.08. Compared to C1, midwives working in general hospitals were more likely to belong to C2 (*aORs* = 1.820, $P = 0.004$) and C3 (*aORs* = 1.665, $P = 0.012$). Compared to C2, midwives with 0–5 years of working experience were more likely to belong to C1 (*aORs* = 0.117, $P = 0.011$) and C3 (*aORs* = 8.334, $P = 0.026$). Compared to C3, midwives with a junior college degree were more likely to belong to C1 (*aORs* = 0.643, $P = 0.047$).

Comparison of the Core Competencies of Midwives in Different Latent Profiles

The results indicated significant differences across the three latent profiles for both the total score and all six dimensions of the Midwife Core Competency Scale ($P < 0.05$). Post hoc comparisons revealed that the scores for C2 and C3 were significantly higher than those for C1 ($P < 0.05$). The detailed results are presented in Table 4.

Discussion

This study identified three psychological capital profiles of midwives through LPA. These profiles are the low psychological capital - balanced group (accounting for 56.37% of the sample), the medium psychological capital - low tenacity group (21.97%), and the high psychological capital - balanced group (21.66%). Initial education level, nature of the hospital, and years of working experience were influencing factors in grouping midwives' psychological capital

characteristics. Midwives in the low psychological capital - balanced group had significantly lower levels of core competencies compared to the other two groups.

Latent Profiles of Midwives' Psychological Capital

Midwives in the low psychological capital - balanced group exhibited a low level, with a junior college degree as their initial education, and short years of working experience. These characteristics suggest that midwives in this group are in the stage of knowledge and experience accumulation, with limited work capabilities. Traditional Chinese values regarding childbirth make pregnant women unable to accept adverse birth outcomes,[24] placing pressure on midwives. China's three-child policy has increased the proportion of advanced maternal age,[5] heightening midwives' occupational challenges. Midwives in this group may exhibit low self-efficacy, tenacity, optimism, and hope due to inadequate coping capacities with policy and cultural contexts. Psychological capital is open to development and can be enhanced to improve work capabilities.[25] The Psychological Capital Intervention (PCI) model is a promising strategy that has been widely validated among employee groups.[26] Specifically, managers can enhance the four dimensions of psychological capital for this group by providing training in task mastery, observing experts, multiple pathway planning, positive expectations, and social persuasion.[27]

The midwives in the medium psychological capital - low tenacity group scored lowest in the tenacity dimension among the three groups. This indicates that they are prone to compromise and struggle to proactively overcome difficulties when facing challenges.[28] This group primarily consists of midwives aged 45 and above with over 20 years of working experience. Due to their extensive expertise, they are primarily responsible for managing high-risk deliveries. However, midwives in this group generally face issues such as declining physical function, reduced learning capacity, and insufficient organizational support. According to the Conservation of Resources Theory, when individuals perceive that their resources may be depleted and lack avenues for replenishment, they will prioritize preventing further resource loss.[29] Consequently, they tend to adopt resource conservation strategies, including avoiding challenges. Managers should prioritize enhancing the tenacity level of this group. Research indicates that face-to-face education programs encompassing personal awareness development, reactive strategies, and proactive strategies can effectively improve the tenacity levels of midwives.[30]

Midwives in the high psychological capital - balanced group had a higher level of psychological capital. Compared to the other two groups, this group had a higher proportion of midwives with a bachelor's degree and those who graduated from a midwifery major. Their years of working experience and age distribution fell between the other two groups. Midwives in this group have received more systematic education and training, established a well-rounded midwifery knowledge system, and accumulated a certain amount of clinical experience. When facing clinical challenges, they are more likely to demonstrate an optimistic and confident attitude, along with tenacity. Midwives in this group can enhance the hope and optimism of other midwives through emotional contagion.[31] Furthermore, according to Social Learning Theory, psychological capital can be imitated, observed, and learned.[32] Therefore, managers should leverage the role-modeling effects of this group to foster the development of team psychological capital (TPsyCap).[33] Specifically, managers should enhance the status of this group of midwives within the team, thereby amplifying their emotional contagion and role-modeling effects.[34]

Influencing Factors of the Identified Profiles

The results of this study indicate that midwives with a junior college degree are more likely to belong to the low psychological capital - balanced group, which aligns with previous research findings.[35] Midwifery is a highly specialized profession that requires practitioners to possess extensive knowledge. However, the relatively short training cycle of junior college education makes it difficult to ensure that students acquire solid foundational knowledge and skills. This affects their ability to build competency in future clinical work, weakens their professional self-efficacy and resilience, and creates a negative cycle. Additionally, hospitals are increasingly raising the requirements for initial education levels, and the proportion of bachelor's degree hires is growing.[36] This group faces a gap between their qualifications and the actual talent demands, making it easy for them to lack optimism and hope for their career prospects. Therefore, it is recommended that midwives with lower educational qualifications actively participate in continuing education or refresher training to enhance their professional confidence.[37] Fortunately, China has established clear pathways for in-service midwives to upgrade their academic qualifications, with opportunities for refresher training available at the national, provincial, and municipal levels. For midwifery managers, it is important to move beyond the current level-based hierarchical training by integrating both educational background and

competency needs into the stratification criteria.[38] By providing differentiated career development pathways, managers can help midwives improve their career adaptability and competitiveness. The educational structure of maternal and child healthcare professionals in China requires optimization.[36] Midwifery has also been included in the scope of nationally controlled programs by the Ministry of Education in 2024. This presents both challenges and opportunities for development in existing junior colleges. It is recommended to strengthen the top-level design of the profession while establishing a dual-track teaching mechanism integrating "clinical-psychological" aspects. This approach aims to promote the comprehensive development of students at both cognitive and psychological levels.

We observed that midwives with 0–5 years of working experience are more likely to belong to either the low psychological capital - balanced group or the high psychological capital - balanced group. This indicates heterogeneity in psychological capital among midwives within the 0–5 years of working experience range, which may result from the broad interval grouping. Research indicates that psychological capital follows a "V"-shaped curve distribution as work experience increases.[39] The psychological capital levels of midwives with 0–5 years of working experience are unstable. Among them, newly hired midwives are enthusiastic about entering clinical work and have limited awareness of work pressures and challenges.[40] Therefore, they may exhibit temporary high psychological capital. As their careers progress, the novelty of work fades, and the gap between expectations and reality becomes increasingly apparent. Midwives must bear the load of training and workload while facing multiple pressures from work, family, and society, leading to increased job burnout,[41] which may subsequently causes a decline in psychological capital levels. From an overall perspective, the psychological capital of midwives with 0–5 years of working experience remains lower than that of senior midwives. Therefore, we recommended that managers and future research dynamically monitor the psychological capital of midwives with 0–5 years of working experience, to verify whether it follows a "V"-shaped trajectory. At the same time, managers can implement hierarchical interventions for junior midwives. Career education should be offered to newly hired midwives to help them establish reasonable career expectations and maintain their work enthusiasm. Midwives in the career adaptation phase should be provided with stress management training and accessible psychological counseling resources.

We found that midwives working in general hospitals are more likely to belong to the medium psychological capital - low tenacity group and the high psychological capital - balanced group. The reason for this may be that general hospitals have larger scales and platforms, as well as more comprehensive talent development and management systems. These factors enable them to fully tap into employees' potential, enhance their professional self-efficacy, and foster positive expectations and optimism about their future careers.[42] Therefore, managers in specialized hospitals need to strengthen talent development and management efforts. This can be achieved by implementing magnetic hospital management strategies,[43] optimizing standardized training programs for newly hired midwives,[44] and building high-level professional development platforms. These measures will comprehensively promote the enhancement of midwives' psychological capital and career development.

Identified Profiles and the Core Competencies of Midwives

The results of this study show that midwives in the low psychological capital - balanced group demonstrated significantly lower scores across all dimensions of core competencies compared to the other two groups. A possible explanation is that positive psychological capital plays a key role in enhancing work engagement and self-directed learning abilities.[45,46] Conversely, lower psychological capital levels may increase job burnout,[47] thereby hindering the development of core competency. Notably, in this study, the differences in core competency between the medium psychological capital - low tenacity group and the high psychological capital - balanced group were not significant. The median scores for the two groups were 261 and 263, both close to the maximum score of 270. A ceiling effect of the scale may be one reason for the non-significant result. The Midwife Core Competency Scale was developed based on the midwifery practice standards from 2002. To adapt to evolving needs, these standards were updated in 2013 and 2019.[48] Therefore, it is recommended that future studies develop scales based on the latest standards to accurately measure core competency and explore its relationship with psychological capital. Furthermore, both of the above comparative results suggest that high tenacity may not be a necessary condition for achieving high core competency. The four dimensions of psychological capital are complementary.[49] Moderate to high levels of self-efficacy, optimism,

and hope may compensate for tenacity. Therefore, we suggested that midwifery managers focus on enhancing self-efficacy, optimism, and hope among midwives in the low psychological capital - balanced group. Specifically, established models such as the PCI can be adapted to design more targeted interventions for midwives, facilitating their transition to higher psychological capital profiles.

Limitations

First, participants were selected only from Jiangsu Province in China. This regional focus limits the generalizability of the results to midwives in other provinces or different healthcare systems. Second, this study utilized a convenience sampling method. This non-probability sampling technique increases the risk of selection bias and limits the representativeness of the findings. Third, reliance on self-reported questionnaires introduces the risk of social desirability and common method biases. Future research should employ more objective measures. Fourth, this study did not collect specific hospital information. Although the nature of the hospital was included as an independent variable in the multinomial logistic regression analysis, the results cannot account for clustering by hospital. Fifth, the cross-sectional design cannot establish a causal relationship between the latent profiles of psychological capital and core competency, nor can it verify the potential "V"-shaped curve of psychological capital across years of working experience. Furthermore, categorizing work experience into broad 5-year intervals may lead to a loss of statistical power and potentially unstable regression estimates. Future research could adopt a longitudinal design and measure midwives' specific years of working experience to uncover causal relationships between variables and test the "V"-shaped hypothesis proposed in this study. Lastly, the lack of confirmatory factor analysis for the scales in our specific sample is a limitation that should be noted when interpreting the findings.

Conclusion

Midwives' psychological capital can be divided into three profiles: the low psychological capital - balanced group (C1), the medium psychological capital - low tenacity group (C2), and the high psychological capital - balanced group (C3). Initial education level, nature of the hospital, and years of working experience can influence the latent profiles of midwives' psychological capital. Midwives in the C2 and C3 groups demonstrated significantly higher core competency levels than those in C1, while no difference was observed between C2 and C3. Managers should prioritize enhancing the self-efficacy, optimism, and hope of midwives in the C1 group by drawing on established PCI strategies. Secondly, the emotional contagion and role-modeling effects of the C3 group should be leveraged to disseminate high psychological capital. For the C2 group, tenacity can be strengthened through education focusing on personal awareness development, reactive strategies, and proactive strategies. These findings are specific to midwives in Jiangsu Province, China. Future research is recommended to adopt a multicenter longitudinal design and collect precise objective data to validate the present results.

Data Sharing Statement

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Ethics Statement

This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the medical ethics committee of Nanjing Maternity and Child Health Hospital (Approval Date: November 28, 2022 / Approval No: 2022KY-137-01). A re-review of the ethical approval was completed on August 16, 2024, and the validity of the ethical approval was extended to November 27, 2026 (Approval Date: August 16, 2024 / Approval No: 2022KY-137-02).

Patient Consent Statement

Informed consent was obtained from all participants, and they were given the commitment to withdraw from the study at any time.

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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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Disclosure

The authors declare no conflicts of interest in this work.

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