Original Article

Nurse Credentialing, Work Motivation, and Performance: A Cross-Sectional Mediation Study

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ABSTRACT

Background: Nurse credentialing is intended to ensure professional competence, improve performance, and enhance work motivation. However, despite its widespread implementation, evidence regarding its actual impact on nurses' motivation and performance remains inconsistent and inconclusive. This inconsistency reflects an unresolved gap in understanding whether credentialing directly influences nurse performance or operates indirectly through work motivation. This study aimed to examine the relationship between credentialing, work motivation, and nurse performance, with work motivation tested as a mediating variable.

Methods: This quantitative cross-sectional study followed the STROBE reporting guideline. The population comprised all inpatient nurses at Dr. Sam Ratulangi Tondano Regional General Hospital (N = 176). Using purposive sampling, 122 nurses were selected based on inclusion criteria of at least one year of work experience and direct involvement in nursing care; nurses on leave were excluded. Credentialing level (PK0–PK3) was the independent variable, nurse performance the dependent variable, and work motivation the mediating variable. Motivation and performance were measured using validated Likert-scale questionnaires, while credentialing data were obtained from institutional records. Structural Equation Modeling–Partial Least Squares (SEM-PLS) was used to test direct and mediating effects.

Results: Credentialing showed a negligible and non-significant effect on nurse performance ($\beta = 0.002$; $p = 0.979$) and work motivation ($\beta = 0.027$; $p = 0.683$). Conversely, nurse performance had a strong and significant effect on work motivation ($\beta = 0.768$; $p < 0.001$). Work motivation did not mediate the credentialing–performance relationship.

Conclusion: Credentialing alone does not significantly influence nurse performance or motivation. Integrating credentialing with performance management and continuous professional development systems is essential to enhance its effectiveness

Keywords: Nurse Credentialing; Work Motivation; Nursing Performance; Professional Competence; Hospitals.

Implications for Practice:

- Hospitals should explicitly link credentialing outcomes to clinical role differentiation, performance appraisal, and career advancement. In culturally diverse and resource-limited settings, credentialing systems should be adapted to local workforce norms and institutional capacity, ensuring that credentialing functions not only as an administrative requirement but also as a meaningful mechanism for professional growth and retention.
- Nursing managers should prioritize regular

Implications for Practice:

performance feedback, recognition, and opportunities for professional mastery. Given that nurse performance strongly reinforces work motivation, low-cost, culturally appropriate motivational strategies such as peer recognition, reflective practice, and supervisor feedback can be effective even in hospitals with limited financial resources.

- Healthcare policymakers and hospital leaders should integrate credentialing, motivation strategies, and performance evaluation into a unified nursing management framework. Such integration, tailored to local cultural contexts and resource constraints, can strengthen care quality, enhance patient safety, and support sustainable nursing workforce development.

Introduction

Hospitals, as essential healthcare service providers, face escalating global challenges driven by rapid scientific and technological advancements, increasing service complexity, and evolving socioeconomic conditions (Sebire et al., 2025). In both high-income countries (HICs) and low- and middle-income countries (LMICs), these dynamics compel hospitals to continuously improve service quality to ensure safe, effective, and equitable healthcare delivery (Huang et al., 2025). However, international benchmarking data indicate that hospitals in LMICs experience greater variability in care quality and patient safety outcomes, largely due to disparities in human resource development systems, including credentialing and performance management frameworks (George et al., 2023; World Health Organization, 2025). As nurses constitute the largest proportion of the global healthcare workforce, nurse performance remains a critical determinant of healthcare quality, patient safety, and service effectiveness across health systems (Patrician et al., 2024; Zoromba & El-Gazar, 2021).

Globally, nurse credentialing has been adopted as a key mechanism to standardize competence and ensure safe clinical practice. In HICs, credentialing systems are typically integrated with clinical governance, performance appraisal, and career progression, and have been shown to improve professional accountability and care outcomes (Gershuni et al., 2023). In contrast, in many LMIC hospital settings, credentialing is often implemented as a procedural or administrative requirement, with limited linkage to motivation, professional development, or performance incentives, thereby reducing its practical effectiveness (Patel & Sharma, 2022). This structural gap is evident in Indonesia, including at Dr. Sam Ratulangi Tondano Regional General Hospital, where institutional data indicate that 47.72% of nurses remain at the lowest credentialing level (PK0), despite the formal implementation of the Professional Nursing Care Model (MPKP) and the national career ladder system regulated under Ministry of Health Regulation No. 40 of 2017.

Credentialing is theoretically grounded in professionalism, emphasizing a social contract between healthcare professionals and society that prioritizes patient safety, competence, and ethical responsibility (Lee et al., 2025). Empirical studies in various settings have demonstrated that well-functioning credentialing systems can strengthen professional identity, enhance self-efficacy, and improve nurse performance (Dresser & Elgin, 2023; Lumban Tobing et al., 2024; Susanti et al., 2024). Nevertheless, evidence on credentialing effectiveness remains inconsistent, particularly in resource-limited contexts, suggesting that structural mechanisms alone may be insufficient to drive performance improvement without addressing underlying motivational processes.

Work motivation represents a critical psychological mechanism linking organizational systems to individual performance. Studies consistently show that intrinsic and extrinsic motivation influence nurses' task engagement, quality of care, and job satisfaction (Elisabhet et al., 2025; Lubis, 2022; Neti Ariftaningsih & Susilo, 2025; Tumanggor et al., 2025). However, few studies have integrated credentialing and motivation within a single explanatory framework, particularly in regional hospitals in LMICs, leaving a theoretical and empirical gap regarding how credentialing translates into performance outcomes.

This study is explicitly guided by Path-Goal Theory, which posits that organizational structures and leadership mechanisms influence employee performance by clarifying roles, reducing barriers, and enhancing motivation. Within this framework, credentialing functions as an organizational policy instrument that defines role clarity and professional recognition; work motivation operates as the mediating psychological mechanism; and nurse performance represents the observable outcome of this interaction. Applying Path-Goal Theory provides a structured explanation of why credentialing may fail to improve performance if it does not effectively stimulate motivation.

By empirically testing this model, the present study contributes to nursing policy and management practice by clarifying the conditions under which credentialing systems can be made more effective, particularly in LMIC hospital settings. The findings are expected to inform hospital leaders and policymakers on the need to reposition credentialing from a purely administrative process to a performance-oriented and motivational tool integrated with career development and quality improvement strategies. Therefore, this study aimed to analyze the relationship between credentialing, work motivation, and nurse performance at Dr. Sam Ratulangi Tondano Regional General Hospital, and to examine the mediating role of work motivation in the relationship between credentialing and nurse performance.

Methods

Study Design

This study employed a quantitative, analytic observational design using a correlational, descriptive cross-sectional approach and was conducted in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines (Agnesia et al., 2023; Liberty, 2024; Vandenbroucke et al., 2014). The purpose was to examine the relationships among nurse credentialing (independent variable), work motivation (mediating variable), and nurse performance (dependent variable) at a single point in time. The cross-sectional design was selected to describe the distribution of study variables and to test hypothesized associations without intervention or manipulation (Capili, 2021; Pérez-Guerrero et al., 2024; Puspa Zuleika & Legiran, 2022; Wang & Cheng, 2020). In this study, credentialing (X) was hypothesized to influence nurse performance (Y), both directly and indirectly through work motivation (Z) as a mediating pathway. In contrast, nurses' characteristics (age, sex, educational level, and length of employment) were treated as control variables.

Participants

The study was conducted in the inpatient wards of Dr. Sam Ratulangi Tondano Regional General Hospital, Minahasa Regency, North Sulawesi, Indonesia. This setting was selected due to its accessibility, the availability of eligible nursing staff, and the hospital's established implementation of a nursing credentialing

system and the Professional Nursing Care Model. A non-probability purposive sampling technique was used because the study required participants who met specific professional criteria relevant to the research objectives, namely nurses with adequate clinical experience and direct involvement in patient care. Probability sampling was not feasible due to operational constraints such as shift-based work schedules and limited nurse availability across inpatient units. All nurses who met the inclusion criteria during the data collection period were invited to participate, and all 122 eligible nurses completed the study instruments, resulting in a 100% response rate with no dropouts or non-responses.

Data collection was conducted over one week, from 15 December to 20 December 2025, covering administrative preparation, data collection, and initial data processing. The target population comprised all implementing nurses working in the inpatient units of Dr. Sam Ratulangi Tondano Regional General Hospital (N = 176). A purposive sampling strategy was applied, in which nurses were selected based on predefined inclusion and exclusion criteria.

The inclusion criteria were nurses who had been working for at least one year and nurses directly involved in providing nursing care. The exclusion criterion was nurses on leave or not actively working during the study period. The sample size was estimated using Slovin's formula for a finite population with a 5% margin of error. With N = 176 and e = 0.05, the required sample size was n = 122.22, which was rounded to 122 respondents to meet the requirement of a whole number.

After obtaining institutional permission and ethical approval, eligible nurses were approached in their respective wards. The researcher explained the study objectives and procedures, verified eligibility, and obtained informed consent. Participants then completed the study questionnaire using an online format (Google Forms). All completed questionnaires were checked for completeness and consistency prior to analysis.

This study was guided by a mediation model in which nurse credentialing (X) influences nurse performance (Y) directly and indirectly through work motivation (Z). Credentialing represents a formal verification process assessing nurses' competencies and clinical authority. A strong credentialing process is expected to enhance professional recognition, confidence, job satisfaction, and responsibility, which may subsequently strengthen motivation to perform well. Work motivation was conceptualized as both intrinsic (e.g., responsibility, professional commitment, satisfaction) and extrinsic (e.g., rewards, incentives, and career development opportunities). Higher motivation is expected to increase dedication, discipline, and task engagement, thereby improving nurse performance in delivering quality nursing care. Nurse performance was defined as observable work outcomes aligned with professional standards, including service quality, timeliness, teamwork, and effectiveness in completing duties. Based on this framework, the hypotheses were that there is a relationship between credentialing and nurse performance, credentialing influences nurses' work motivation, work motivation influences nurse performance, and work motivation mediates the relationship between credentialing and nurse performance (**Figure 1**).

Instruments

Data were collected using a structured questionnaire package consisting of three components: (1) respondent characteristics (demographic form), (2) work motivation questionnaire, and (3) nurse performance

questionnaire. All instruments are provided as supplementary files. Closed-ended items were rated using a 4-point Likert scale (strongly disagree = 1, disagree = 2, agree = 3, strongly agree = 4) to minimize neutral responses (Hardani et al., 2020). Total scores for each scale were calculated by summing item responses; higher scores indicated higher levels of the measured construct. For descriptive analysis, work motivation and nurse performance scores were categorized into low, moderate, and high levels using mean ± standard deviation cut-off points as specified in the operational definitions.

Nurse credentialing (independent variable) data were obtained from institutional credentialing records and respondent verification. Credentialing status was categorized according to clinical nurse levels (PK0–PK3) and coded ordinally as PK0 = 0, PK1 = 1, PK2 = 2, and PK3 = 3. The credentialing process reflects verified nurse competencies assessed through written examinations, practical skills evaluation, and structured interviews, in accordance with national credentialing standards (Susanti et al., 2024).

Work motivation (mediating variable) was measured using a 20-item instrument adapted from (Li et al., 2022). The questionnaire was translated into Indonesian using a forward–backward translation procedure by two independent bilingual experts to ensure semantic and conceptual equivalence. The translated version was reviewed by a panel of nursing academics and clinical practitioners for content validity. The instrument demonstrated satisfactory construct validity (item–total correlation coefficients > 0.474 to < 0.908) and excellent internal consistency (Cronbach's alpha = 0.960) in this study.

Nurse performance (dependent variable) was measured using a 20-item questionnaire adapted from (Wahyuningsih et al., 2024), covering four domains: quality, quantity, timeliness, and effectiveness. The same translation and expert review procedures were applied. Validity testing yielded item–total correlation coefficients ranging from > 0.527 to < 0.925, with high reliability (Cronbach's alpha = 0.957).

Questionnaires were administered in paper-based format during work breaks to accommodate limited digital access and variable shift schedules, which is appropriate for resource-limited hospital settings. A formal pilot test was not conducted because both instruments had been previously validated and demonstrated high reliability; however, preliminary testing with a small group of nurses was performed to assess clarity and feasibility, resulting in no substantive revisions.

Data Collection

Administrative procedures included: (1) submitting an official research permission request from the Faculty of Health Sciences, Universitas Brawijaya, to Dr. Sam Ratulangi Tondano Regional General Hospital; (2) obtaining ethical approval from the Health Research Ethics Committee of Universitas Brawijaya; and (3) coordinating with inpatient ward managers to explain the study objectives, schedule data collection without disrupting clinical services, and identify participating wards (Mujair A, Mujair B, Mujair C, Karper, Bomboya, Nike, Payangka, ICU, and operating room).

Prior to data collection, the principal researcher and one trained assistant underwent a briefing session covering study objectives, inclusion and exclusion criteria, standardized instructions for respondents, ethical considerations, and procedures for handling participant inquiries. This training ensured consistency in participant recruitment, explanation of questionnaires, and data quality control.

Following approval, eligible nurses were approached in each ward, and the study purpose and procedures were explained. Data were collected using a self-administered online questionnaire (Google Forms), selected to facilitate flexible participation across shift schedules and minimize disruption to clinical duties.

To ensure data quality, the online questionnaire was configured with mandatory response fields to prevent missing data and logical checks to minimize inconsistent responses. Participants completed the questionnaire independently, with the researcher available on-site to provide clarification when needed. Submitted responses were reviewed daily for completeness, duplication, and response patterns indicating random or inattentive answering. No invalid or incomplete responses were identified. As a token of appreciation, respondents who completed the questionnaire received a souvenir (drinking bottle), which was not linked to their responses.

Data management and processing followed sequential steps: editing, coding, processing, and cleaning. Editing involved checking the completeness and accuracy of responses and identifying inconsistencies. Coding converted raw responses into structured numerical codes appropriate for statistical analysis software. Processing consisted of entering the coded data into statistical software to produce descriptive summaries and to prepare for inferential testing. Cleaning ensured data integrity by identifying missing, illogical, or extreme values and resolving issues prior to analysis. When missing values occurred, strategies such as reviewing entries and applying predefined rules were used to maintain consistency.

Data Analysis

Univariate analysis was performed to describe the distribution of each study variable. Numerical variables were summarized using the mean, median, and standard deviation, while categorical variables were presented as frequencies and percentages in frequency distribution tables. Inferential analysis was subsequently conducted to examine the hypothesized relationships among credentialing, work motivation, and nurse performance, including the mediating role of work motivation.

Structural Equation Modeling–Partial Least Squares (SEM-PLS) was selected because it is well-suited for exploratory and predictive modeling, particularly in studies with complex relationships, mediation pathways, ordinal variables, and relatively small to moderate sample sizes. SEM-PLS does not require multivariate normality and is appropriate for analyzing models that integrate formative and reflective constructs, making it suitable for the present study design. Statistical significance was assessed using bootstrapping procedures with a conventional threshold of $p < 0.05$ (Starbuck, 2023).

In addition to statistical significance, effect sizes were evaluated using Cohen's f^2 to assess the practical magnitude of relationships within the model. Effect size interpretation followed established guidelines, whereby f^2 values of 0.02 indicate small effects, 0.15 indicate medium effects, and 0.35 indicate large effects. This approach enabled a more comprehensive interpretation of both the strength and relevance of the observed relationships.

Ethical Considerations

This study adhered to ethical principles for research involving human participants. Ethical approval was obtained from the Health Research Ethics Committee of Universitas Brawijaya, Faculty of Medicine,

with approval number 00012/UN10.F1716/B/PT/2025. Participants received clear information regarding the study aims, procedures, potential benefits, and risks, and were informed that participation was voluntary. Written informed consent was obtained prior to participation. Confidentiality was maintained through anonymization and restricted data access; all collected data were used solely for research purposes and were not disclosed to third parties without permission.

Results

Table 1. Respondent Characteristics Result

		Frequency (n)	Percentage (%)
Age	Category 1 (18-59 Years)	104	85.2
	Category 2 (>59 Years)	18	14.8
	TOTAL	122	100.0
Gender (Sex)	Male	19	15.6
	Female	103	84.4
	TOTAL	122	100.0
Education	D3/S1	79	64.8
	Ners	43	35.2
	TOTAL	122	100.0
Employment Period	1-5 Years	71	58.2
	6-10 Years	20	16.4
	11-15 Years	15	12.3
	> 15 Years	16	13.1
	TOTAL	122	100.0

n = number of respondents; % = percentage; D3 = Diploma III; S1 = Bachelor degree; Ners = professional nursing education.

Based on **Table 1,** the study involved 122 nurse respondents, the majority of whom were in the productive age group of 18–59 years (85.2%), while only 14.8% were older than 59 years. The respondents were predominantly female (84.4%), with males accounting for 15.6%, reflecting the typical gender distribution in the nursing profession. In terms of education, most respondents held D3/S1 qualifications (64.8%), while 35.2% had completed professional nursing education (Ners). Regarding employment period, more than half of the respondents had 1–5 years of work experience (58.2%), followed by those with 6–10 years (16.4%), 11–15 years (12.3%), and more than 15 years of experience (13.1%). Overall, the respondent characteristics indicate that the sample was dominated by productive-age female nurses with D3/S1 educational backgrounds and relatively shorter work experience.

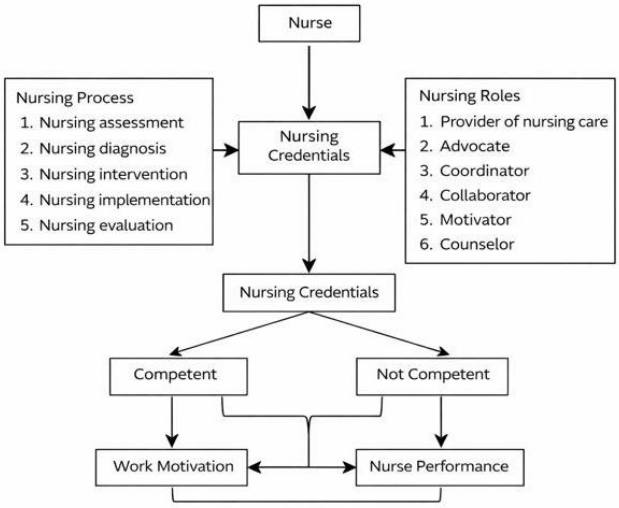

Figure 1. Conceptual Framework

Table 2. Assumption and Normality Testing Results

Variable	Skewness	Kurtosis	Normality Assessment	Interpretation
Credentialing	0.412	−0.683	Non-normal	Ordinal scale; normality not assumed
Work Motivation	−0.921	1.487	Non-normal	Acceptable for SEM-PLS
Nurse Performance	−0.756	0.963	Non-normal	Acceptable for SEM-PLS

Skewness and kurtosis values were used to assess data distribution; SEM-PLS = Structural Equation Modeling–Partial Least Squares.

Based on **Table 2**, the assessment of data distribution using skewness and kurtosis statistics indicates that none of the study variables followed a normal distribution. The credentialing variable showed a skewness value of 0.412 and a kurtosis value of −0.683, reflecting a non-normal distribution that is expected given its ordinal measurement scale. Work motivation exhibited a skewness of −0.921 and kurtosis of 1.487, while nurse performance showed a skewness of −0.756 and kurtosis of 0.963, both indicating deviations from normality. These findings confirm that the assumption of normality was not met across variables; however, this condition is acceptable for analysis using Structural Equation Modeling–Partial Least Squares (SEM-PLS), which is robust to non-normal data distributions and suitable for models incorporating ordinal variables and mediation analysis.

Table 3. Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Credentials	122	1	4	2.10	1.109
Work Motivation	122	62	202	130.81	36.899
Performance	122	57	106	68.00	8.012
Valid N (listwise)	122				

N = number of respondents; Min = minimum value; Max = maximum value; Mean = average score; SD = standard deviation.

Based on **Table 3,** the univariate analysis shows that all variables were analyzed using data from 122 respondents. The credentialing variable had a minimum score of 1 and a maximum score of 4, with a mean value of 2.10 and a standard deviation of 1.109, indicating moderate variability in nurses' credentialing levels. Work motivation scores ranged from 62 to 202, with a mean of 130.81 and a relatively large standard deviation of 36.899, suggesting substantial variation in motivation levels among nurses. Meanwhile, nurse performance scores ranged from 57 to 106, with a mean of 68.00 and a standard deviation of 8.012, indicating a moderate level of performance with relatively lower variability compared to motivation.

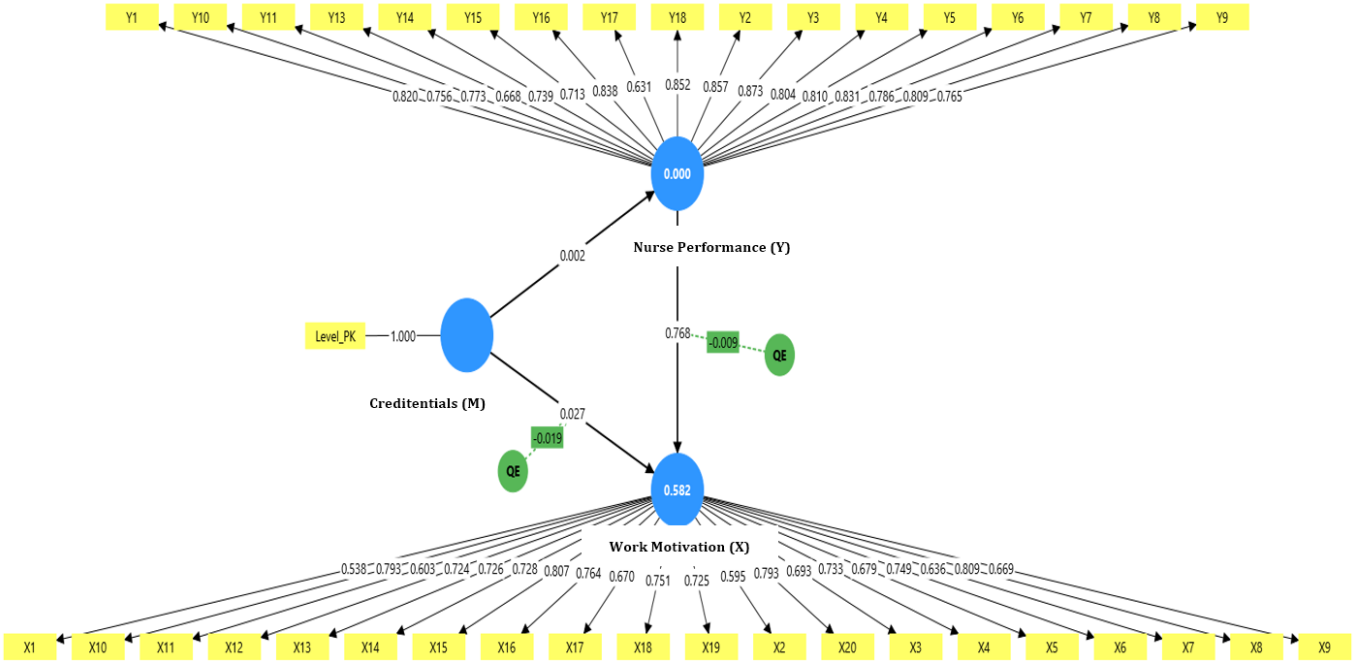

Figure 2. Outer Model

Table 4. Factor Loadings (Outer Loadings)

Indicators	Outer loadings
X1 <- Work Motivation (X)	0.538
X10 <- Work Motivation (X)	0.793
X11 <- Work Motivation (X)	0.603
X12 <- Work Motivation (X)	0.724
X13 <- Work Motivation (X)	0.726
X14 <- Work Motivation (X)	0.728
X15 <- Work Motivation (X)	0.807
X16 <- Work Motivation (X)	0.764
X17 <- Work Motivation (X)	0.670
X18 <- Work Motivation (X)	0.751
X19 <- Work Motivation (X)	0.725
X2 <- Work Motivation (X)	0.595
X20 <- Work Motivation (X)	0.793
X3 <- Work Motivation (X)	0.693
X4 <- Work Motivation (X)	0.733
X5 <- Work Motivation (X)	0.679
X6 <- Work Motivation (X)	0.749
X7 <- Work Motivation (X)	0.636
X8 <- Work Motivation (X)	0.809
X9 <- Work Motivation (X)	0.669
Y1 <- Nurse Performance (Y)	0.820
Y10 <- Nurse Performance (Y)	0.756
Y11 <- Nurse Performance (Y)	0.773
Y13 <- Nurse Performance (Y)	0.668
Y14 <- Nurse Performance (Y)	0.739
Y15 <- Nurse Performance (Y)	0.713
Y16 <- Nurse Performance (Y)	0.838
Y17 <- Nurse Performance (Y)	0.631
Y18 <- Nurse Performance (Y)	0.852

Indicators	Outer loadings
Y2 <- Nurse Performance (Y)	0.857
Y3 <- Nurse Performance (Y)	0.873
Y4 <- Nurse Performance (Y)	0.804
Y5 <- Nurse Performance (Y)	0.810
Y6 <- Nurse Performance (Y)	0.831
Y7 <- Nurse Performance (Y)	0.786
Y8 <- Nurse Performance (Y)	0.809
Y9 <- Nurse Performance (Y)	0.765

Outer loadings represent the correlation between indicators and their latent constructs; X = Work Motivation indicators; Y = Nurse Performance indicators.

Based on **Table 4**, the convergent validity assessment using outer (factor) loadings indicates that all measurement indicators for work motivation and nurse performance demonstrate acceptable loading values. The outer loadings for work motivation indicators ranged from 0.538 to 0.809, with most items exceeding the recommended threshold of 0.60, indicating that the indicators adequately represent the construct of work motivation. Although one indicator (X1) showed a slightly lower loading (0.538), it remained within an acceptable range for exploratory and social science research. The nurse performance indicators exhibited stronger convergent validity, with outer loadings ranging from 0.631 to 0.873, all surpassing the minimum acceptable threshold. Overall, these results confirm that the indicators used in the measurement model sufficiently converge to measure their respective latent constructs, supporting the adequacy of convergent validity for both work motivation and nurse performance variables **(Figure 2).**

Table 5. Final Instrument: Indicators of Study Variables

Code	Indicator Description	Variable
X1	Salary and financial incentives	Work Motivation
X2	Job security	Work Motivation
X3	Recognition from supervisors	Work Motivation
X4	Opportunities for career advancement	Work Motivation
X5	Work environment conditions	Work Motivation
X6	Relationship with colleagues	Work Motivation
X7	Leadership support	Work Motivation
X8	Professional development opportunities	Work Motivation
X9	Workload balance	Work Motivation
X10	Achievement of work targets	Work Motivation
X11	Responsibility in work	Work Motivation
X12	Autonomy in performing nursing duties	Work Motivation
X13	Fair performance appraisal	Work Motivation
X14	Organizational policies	Work Motivation
X15	Motivation to provide quality care	Work Motivation
X16	Commitment to the organization	Work Motivation
X17	Enthusiasm at work	Work Motivation
X18	Willingness to improve skills	Work Motivation
X19	Job satisfaction	Work Motivation
X20	Pride in being a nurse	Work Motivation
Y1	Accuracy in nursing assessment	Nurse Performance
Y2	Accuracy of nursing diagnosis	Nurse Performance
Y3	Appropriateness of nursing interventions	Nurse Performance
Y4	Timeliness of nursing implementation	Nurse Performance
Y5	Compliance with nursing standards	Nurse Performance

Code	Indicator Description	Variable
Y6	Documentation completeness	Nurse Performance
Y7	Patient safety practices	Nurse Performance
Y8	Communication with patients	Nurse Performance
Y9	Collaboration with the health team	Nurse Performance
Y10	Responsiveness to patient needs	Nurse Performance
Y11	Problem-solving ability	Nurse Performance
Y12	Ethical practice in nursing care	Nurse Performance
Y13	Patient-centered care	Nurse Performance
Y14	Time management	Nurse Performance
Y15	Work discipline	Nurse Performance
Y16	Quality of nursing services	Nurse Performance
Y17	Initiative in nursing care	Nurse Performance
Y18	Overall job performance	Nurse Performance

X1–X20 represent indicators measuring Work Motivation; Y1–Y18 represent indicators measuring Nurse Performance. All indicators were included in the final measurement model and demonstrated acceptable outer loading values in SEM-PLS analysis.

Table 6. Reliability, Cronbach's Alpha, Discriminant Validity

Composite reliability (rho_a)		
Nurse Performance (Y)	0.964	
Work Motivation (X)	0.954	
Cronbach's alpha		
Nurse Performance (Y)	0.961	
Work Motivation (X)	0.948	
Discriminant Validity	Nurse Performance (Y)	Work Motivation (X)
Nurse Performance (Y)	0.787	
Work Motivation (X)	0.763	0.713

Based on **Table 6,** the reliability and validity assessments demonstrate that the measurement model meets the required psychometric standards. Composite reliability values for Nurse Performance (0.964) and Work Motivation (0.954) exceed the recommended threshold of 0.70, indicating excellent internal consistency. Similarly, Cronbach's alpha coefficients for both constructs are high (0.961 for Nurse Performance and 0.948 for Work Motivation), confirming the reliability of the measurement instruments. Discriminant validity assessed using the Fornell–Larcker criterion shows that the square root of the Average Variance Extracted (AVE) for Nurse Performance (0.787) and Work Motivation (0.713) is greater than the correlation between the constructs (0.763), indicating that each construct is empirically distinct. Overall, these results confirm that the instruments used are reliable and demonstrate adequate discriminant validity, supporting the suitability of the measurement model for subsequent structural analysis.

Table 7. HTMT Ratio

	Nurse Performance (Y)	Credentials (M)	Work Motivation (X)	QE [Credentials (M)]	QE [Nurse Performance (Y)]
Nurse Performance (Y)					
Credentials (M)	0.056				
Work Motivation (X)	0.777	0.097			
QE [Credentials (M)]	0.073	0.491	0.091		
QE [Nurse Performance (Y)]	0.626	0.068	0.462	0.035	

Description: Composite reliability (ρa) and Cronbach's alpha indicate internal consistency; discriminant validity was assessed using the Fornell–Larcker criterion; AVE = Average Variance Extracted; X = Work Motivation; Y = Nurse Performance.

Based on **Table 7**, all Heterotrait–Monotrait (HTMT) ratio values are below the conservative threshold of 0.85, indicating satisfactory discriminant validity among the constructs. The HTMT value between Work Motivation and Nurse Performance (0.777) remains within acceptable limits, confirming that the constructs are not excessively correlated.

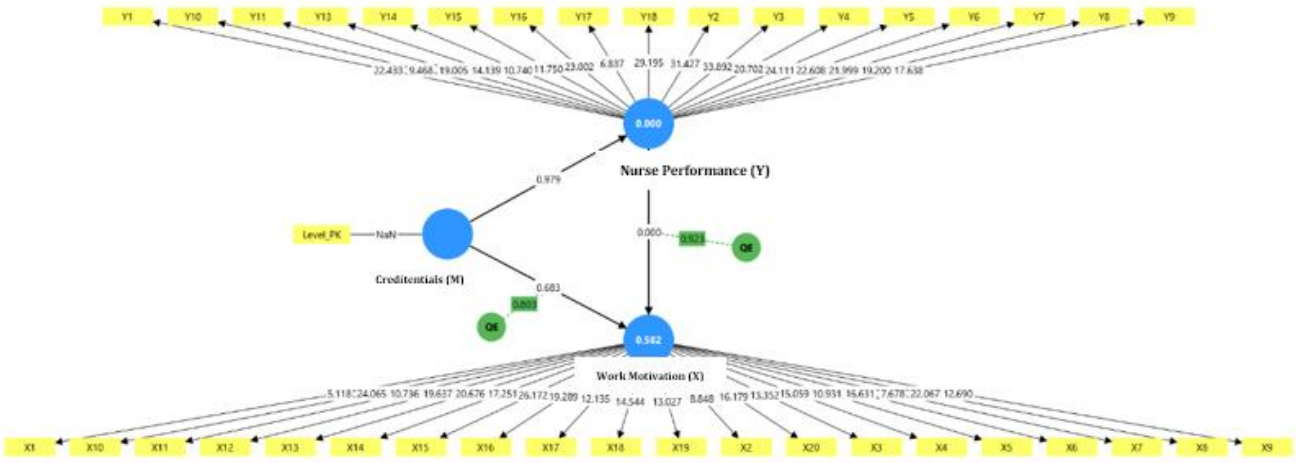

Figure 3. Inner Model

Table 8. R-Square (R^2)

	R-square	R-square adjusted
Nurse Performance (Y)	0.000	-0.008
Work Motivation (X)	0.582	0.568

HTMT = Heterotrait–Monotrait ratio; values below 0.85 indicate adequate discriminant validity; X = Work Motivation; Y = Nurse Performance; M = Credentials; QE = Quadratic Effect.

Based on **Table 8,** the R-square results show that Work Motivation has an R^2 value of 0.582, meaning that 58.2% of the variance in work motivation is explained by the predictor variables in the model. In contrast, Nurse Performance has an R^2

value of 0.000, indicating that the predictors do not meaningfully explain variance in nurse performance **(Figure 3)**.

Table 9. Effect Size (f^2)

	f-square
Nurse Performance (Y) -> Work Motivation (X)	0.872
Credentials (M) -> Nurse Performance (Y)	0.000
Credentials (M) -> Work Motivation (X)	0.001
QE [Nurse Performance (Y)] -> Work Motivation (X)	0.000
QE [Credentials (M)] -> Work Motivation (X)	0.000

R^2 = coefficient of determination indicating the proportion of variance explained by predictor variables; adjusted R^2 accounts for model complexity; X = Work Motivation; Y = Nurse Performance.

Based on **Table 9**, the effect size analysis reveals that the relationship between Nurse Performance and Work Motivation has a large effect size (f^2 = 0.872), indicating a substantial contribution to explaining work motivation. Meanwhile, the effects of Credentials on Nurse Performance and Credentials on Work Motivation show negligible effect sizes, suggesting minimal practical influence.

Table 10. Model Fit

	Saturated model	Estimated model
SRMR	0.079	0.080
d_ULS	4.677	4.735
d_G	3.546	3.534
Chi-square	1838.521	1839.644
NFI	0.612	0.612

f^2 = effect size indicating the magnitude of influence of exogenous variables (0.02 = small, 0.15 = medium, 0.35 = large); X = Work Motivation; Y = Nurse Performance; M = Credentials; QE = Quadratic Effect.

Based on **Table 10**, the model fit indices indicate that the SRMR values for both the saturated model (0.079) and the estimated model (0.080) are within acceptable limits (< 0.08), suggesting an adequate overall model fit. Other indices, including d_ULS, d_G, Chi-square, and NFI (0.612), further support the suitability of the model for exploratory SEM-PLS analysis.

Table 11. Direct Effect Hypothesis Test Results

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
Nurse Performance (Y) -> Work Motivation (X)	0.768	0.782	0.063	12.169	0.000
Credentials (M) -> Nurse Performance (Y)	0.002	0.003	0.090	0.026	0.979
Credentials (M) -> Work Motivation (X)	0.027	0.028	0.065	0.408	0.683
QE [Nurse Performance (Y)] -> Work Motivation (X)	-0.009	-0.011	0.094	0.097	0.923
QE [Credentials (M)] -> Work Motivation (X)	-0.019	-0.021	0.075	0.249	0.803

SRMR = Standardized Root Mean Square Residual; d_ULS = squared Euclidean distance; d_G = geodesic distance; NFI = Normed Fit Index; lower SRMR values indicate better model fit.

Based on **Table 11,** the direct effect analysis shows that the path from Nurse Performance to Work Motivation is statistically significant (β = 0.768; t = 12.169; p < 0.001). However, the direct effects of Credentials on Nurse Performance and Credentials on Work Motivation are not statistically significant (p > 0.05), indicating that credentials do not directly influence these variables.

Table 12. Indirect Hypothesis Test

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
Credentials (M) -> Work Motivation (X)	0.002	0.002	0.071	0.026	0.979

β = path coefficient; t = t-statistic; p = probability value; STDEV = standard deviation; X = Work Motivation; Y = Nurse Performance; M = Credentials; QE = Quadratic Effect.

Based on **Table 12,** the indirect effect analysis indicates that the path from Credentials to Work Motivation through mediation is not statistically significant (β = 0.002; t = 0.026; p = 0.979). This result suggests that work motivation does not mediate the relationship between credentials and the outcome variable, and therefore, the mediation hypothesis is not supported.

Discussion

The findings of this study indicate that nurse credentialing at Dr. Sam Ratulangi Tondano Regional General Hospital is predominantly concentrated at the PK1–PK2 levels, with a limited proportion of nurses reaching the highest clinical level (PK3). Credentialing in this study was operationalized through the clinical authority ladder (PK0–PK3), reflecting nurses' competencies based on knowledge assessment, practical skills, and competency interviews. Although structurally aligned with national regulations, the credentialing system has not yet translated into clear differentiation of clinical authority in daily nursing practice. This pattern is characteristic of many low- and middle-income country (LMIC) health systems, where credentialing frameworks are formally established but weakly embedded in operational workflows, in contrast to high-income settings where credentialing is closely linked to clinical privileges, role autonomy, and accountability mechanisms. As a result, the intended functions of credentialing professional recognition, quality assurance, and patient safety are often diluted in LMIC hospital contexts.

Contrary to evidence from several studies conducted primarily in high-income countries that report positive associations between credentialing and nurse performance, this study found no significant direct effect of credentialing on nurse performance (β = 0.002; p = 0.979). This discrepancy highlights a contextual implementation gap. In HICs, credentialing is typically integrated with differentiated clinical responsibilities, remuneration, and career progression, thereby reinforcing its performance-enhancing function. In LMIC hospital settings, however, credentialing frequently remains an administrative requirement without corresponding authority, incentives, or workload differentiation, limiting its impact on actual performance. This finding supports nursing management literature emphasizing that professional development systems improve performance only when supported by organizational commitment, continuous competency development, and tangible institutional reinforcement (Geerts, 2024; Hariaty et al., 2022).

Work motivation in this study was found to be moderate and not significantly influenced by credentialing status (β = 0.027; p = 0.683). While studies from resource-rich settings suggest that credentialing enhances motivation through professional recognition and career mobility, the present findings reflect a common LMIC reality in which credentialing does not materially alter nurses' work conditions or professional standing. Within this context, credentialing

may be perceived as a regulatory obligation rather than a source of recognition or achievement. Consistent with Herzberg's Two-Factor Theory, credentialing that lacks visible rewards or professional autonomy is unlikely to function as a true motivator and instead operates as a hygiene factor, explaining its limited motivational influence (Saleh et al., 2022).

A notable and theoretically meaningful finding of this study is the strong and significant relationship between nurse performance and work motivation in a reverse direction from traditional assumptions ($\beta = 0.768$; $p < 0.001$). Rather than motivation driving performance, higher performance appears to generate increased motivation. This pattern is particularly relevant in LMIC health systems, where external motivators such as financial incentives, promotion opportunities, and advanced training are often limited. In such contexts, intrinsic motivation may be reinforced primarily through successful task completion, clinical effectiveness, and positive performance feedback. This finding aligns with Bandura's self-efficacy theory, emphasizing mastery experiences as a critical source of motivation, and underscores the importance of performance feedback and recognition mechanisms in resource-constrained environments.

Finally, the mediation analysis confirmed that work motivation did not mediate the relationship between credentialing and nurse performance ($p = 0.979$), reinforcing the conclusion that credentialing, as currently implemented, lacks both direct and indirect influence on performance outcomes. This study contributes important evidence from an LMIC hospital setting by demonstrating that credentialing systems alone are insufficient to drive performance improvement unless they are functionally integrated into clinical practice, performance appraisal, and incentive structures. For nursing management and policy, these findings highlight the need to reposition credentialing from a predominantly administrative process toward a practice-based competency development model that is sensitive to resource limitations. Strengthening the integration of credentialing, performance evaluation, and motivation within a unified nursing management framework may enhance care quality, patient safety, and workforce sustainability in LMIC health systems.

Implications and limitations

This study provides important conceptual and scientific implications for nursing management and health services research. The findings challenge the conventional assumption that formal credentialing systems inherently enhance nurse performance and motivation. Instead, the results indicate that credentialing functions as an administrative mechanism primarily unless it is meaningfully integrated into clinical practice, career development pathways, and organizational reward systems. By demonstrating that nurse performance can act as a driver of work motivation rather than solely an outcome of motivation, this study contributes to the growing body of evidence supporting performance-generated motivation and self-efficacy–based models. These insights extend existing motivational and performance theories within nursing contexts and underscore the importance of strengthening functional linkages among credentialing, performance evaluation, and motivational strategies, particularly in resource-constrained health systems. Several limitations should be acknowledged. First, the use of a cross-sectional design limits the ability to establish causal relationships among credentialing, work motivation, and nurse performance. The observed associations

reflect relationships at a single point in time and may be influenced by unmeasured temporal or contextual factors. Second, data were collected from a single hospital, which may limit the generalizability of the findings to other institutional or regional settings. Future studies employing longitudinal or experimental designs across multiple hospitals are recommended to better capture causal pathways and contextual variability.

Relevance to Practice

The findings of this study have direct relevance for nursing practice, healthcare management, and policy development. At the organizational level, hospital administrators and nursing leaders should critically review how credentialing systems are operationalized in daily clinical practice. Credentialing outcomes should be formally linked to clinical role differentiation, task delegation, performance appraisal, and structured career pathways to ensure that credentialing functions as a meaningful professional and motivational mechanism rather than a purely administrative requirement. At the managerial level, nursing managers should leverage the strong relationship between performance and work motivation by implementing systematic performance feedback, recognition of clinical achievements, and opportunities for mastery experiences, such as advanced clinical roles, mentoring, and competency-based training. Strengthening supervision, teamwork, and transparent evaluation processes can reinforce nurses' self-efficacy and sustained motivation, particularly in resource-limited settings. At the policy level, healthcare policymakers and hospital governing bodies should develop integrated nursing workforce policies that align credentialing standards with performance management and incentive systems. Embedding credentialing within national and institutional quality improvement frameworks may enhance accountability, support professional development, and improve patient safety outcomes. Such policy alignment is essential to ensure that credentialing systems contribute effectively to high-quality and sustainable nursing care.

Conclusion

This study demonstrates that nurse credentialing, as currently implemented, does not have a significant direct or indirect effect on nurse performance or work motivation. Instead, nurse performance emerges as a strong predictor of work motivation, highlighting the importance of performance-generated motivation in nursing practice. These findings underscore the need to move beyond administrative credentialing toward integrated systems that connect competency development, motivation, and performance management. The key takeaway is that improving nursing performance requires not only formal credentialing structures but also supportive organizational practices that translate professional recognition into meaningful clinical and motivational outcomes.

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CrediT Authorship Contributions Statement

Deyfi Christine Wokas: Conceptualization, Methodology, Supervision, Writing - Original Draft, Software, Validation, Formal Analysis, Writing - Review & Editing, Investigation, Resources, Data Curation, Project Administration, Writing - Original Draft, Dina

Ahsan: Review & Editing

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Conflicts of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Supplementary Materials

Supplementary File S1: Research Instrument contains the full questionnaire used for data collection.

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