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Empowerment of Health Cadres in the Early Detection of High-Risk Pregnancies: The Role of Motivation, Competence, and Social Support

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ABSTRACT

Introduction: Community health cadres serve as vital front-line actors in improving maternal health outcomes, particularly in the early identification of high-risk pregnancies. Operating as motivators, facilitators, and educators, their performance is influenced by internal attributes such as knowledge, skills, competence, and motivation, alongside external elements including social support. However, limited evidence exists on how these factors interact to influence their effectiveness. This study aimed to develop a structural model to analyze the relationships between these internal and external factors and their impact on cadre performance in early risk detection.

Methods: A cross-sectional study with a correlational approach was conducted from January to May 2025. A total of 330 active health cadres from 37 community health centers in Kediri Regency, Indonesia, were selected using proportional random sampling. Data were collected through a structured questionnaire and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) to explore both direct and mediated effects among variables.

Results: Knowledge ($\beta = 0.044$, $p = 0.004$), skills ($\beta = 0.329$, $p < 0.001$), and social support ($\beta = 0.639$, $p < 0.001$) significantly enhanced competence. Competence, in turn, strengthened motivation ($\beta = 0.546$, $p < 0.001$), which had the strongest direct effect on performance ($\beta = 0.319$, $p = 0.043$). Social support and skills indirectly improved performance through competence and motivation. The final model demonstrated good fit (SRMR = 0.046; NFI = 0.91; RMS_theta = 0.08) and explained 68% of the variance in cadre performance ($R^2 = 0.68$).

Conclusion: Competence and motivation act as key mediators linking individual capacities and social support to performance. Strengthening these aspects through structured training and continuous social reinforcement is essential to enhance early detection of high-risk pregnancies and improve maternal health outcomes.

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INTRODUCTION

Maternal and child health remains a significant public health concern in Kediri Regency. In 2024, the number of high-risk pregnant women was reported at 3,889 individuals, while the number of active health cadres reached 12,629 (Dinas Kesehatan Kabupaten Kediri, Profil Kesehatan 2023/2024). Despite this, the coverage of early detection of pregnancy risks remains suboptimal, with cadres contributing only a small fraction of early detections compared with expected targets; this gap reflects systemic challenges in community-based maternal health services (1).

The Infant Mortality Rate (IMR) in the region for 2024 was 47 cases, with leading causes including asphyxia, low birth weight, infections, and congenital abnormalities; given an estimated 26,964 pregnant women in the region, these numbers indicate an urgent need to strengthen early detection and prevention strategies at the community level (1).

One major barrier to improved maternal outcomes is limited cadre readiness, specifically gaps in knowledge, skills, motivation, and structured support, which reduces effectiveness of early risk screening and community follow-up. The Knowledge-Attitude-Practice (KAP) framework remains useful to conceptualize how cadre knowledge influences attitudes and practice; recent Indonesian studies emphasise that KAP improvements require regular, competency-based support (2–7).

Recent systematic reviews and empirical studies further highlight that supervision mechanisms, manageable workload, and community-health system linkages are critical determinants of cadre performance. Evidence from Indonesia and LMICs shows that structured supervision, refresher training, and appropriate digital tools substantially improve community health workers' detection accuracy, motivation, and data quality (5–8).

Multiple contemporary studies (2024–2025) identify determinants of antenatal care (ANC) utilisation that are directly relevant to cadre performance: socioeconomic status, education, perceived service quality, access to information, family and community support, and geographic access to services. These studies also show that strengthening cadre capacity (training, supervision, data-recording skills) significantly improves ANC uptake and early detection of maternal risks in community settings (9,10).

Maternal deaths continue to be explained by the three delays model (delay in decision, delay in reaching care, delay in receiving adequate care), while individual physiological risk factors (maternal age extremes, short interpregnancy interval, malnutrition, short stature, obesity) remain important contributors to adverse outcomes; community cadres have a crucial preventive role by identifying those risks early and facilitating timely referral (9).

Improving maternal health outcomes therefore requires not only service availability but higher quality ANC and integrated community–facility linkages. Recent Indonesian evidence confirms that targeted cadre training, structured supervision, and appropriate digital/recording tools improve cadres' accuracy in early detection and their counselling effectiveness; nevertheless, interventions must be context-adapted to ensure community trust and health-system integration (2,3,5,7).

Conceptually, participatory approaches and community engagement frameworks are central to successful community-based maternal programs; global and regional guidance (11) emphasises co-production, two-way communication, and institutional support to make engagement meaningful and sustainable.

Health cadres' roles in early risk detection are multi-functional: (a) motivator, conducting home visits and follow-up for women who miss ANC; (b) facilitator, maintaining registries and immunisation tracking; (c) educator, delivering counselling on ANC schedules and maternal nutrition. However, recent evaluations in Indonesia show cadres often lack standardized competency assessment, timely refresher training, and reliable supervision, constraints that blunt their potential impact (2,12).

From a theoretical standpoint, cadre performance in community-based maternal programs can be viewed through motivational and behavioral lenses. Self-Determination Theory explains how intrinsic factors, such as altruism, competence, and relatedness, drive sustained cadre engagement beyond external incentives (13). Similarly, Social Cognitive Theory highlights the role of self-efficacy, observational learning, and reciprocal interactions between cadres and their communities in shaping effective health behavior delivery (14). Integrating these behavioral perspectives with organizational models such as Herzberg's Two-Factor Theory and Campbell's Model of Job Performance provides a comprehensive conceptual foundation for understanding and predicting cadre performance.

This study is conceptually anchored in Herzberg's Two-Factor Theory and Campbell's Model of Job Performance, which together provide a dual perspective on motivational and performance determinants. To capture the psychological mechanisms underlying cadre engagement, the model integrates Self-Determination Theory (SDT), emphasizing intrinsic motivation, competence, and relatedness, and Social Cognitive Theory (SCT), which explains how self-efficacy and social reinforcement shape behavioral performance. Collectively, these frameworks posit that competence and motivation serve as mediating pathways through which knowledge, skills, and social support influence overall cadre performance in early detection of maternal risks (11,15). This theoretical integration offers a comprehensive foundation for testing a structural model of cadre performance within community-based maternal health systems.

METHOD

This study adopted a systematic and rigorous methodological approach to ensure the validity and reliability of the findings. The methodological components are described as follows:

Population and Sample/Informants

The target population of this study comprised all active health cadres in Kediri Regency, East Java, Indonesia, totaling 12,629 individuals. Sample size was determined through a dual doctoral-level justification: (a) a priori power analysis for a multiple-predictor model ($\alpha = 0.05$, power = 0.80, medium effect size $f^2 = 0.15$), and (b) a minimum sample-to-parameter ratio of 10:1 consistent with SEM best practices.

Based on these criteria, the minimum sample size required was 150 participants. The final sample of 330 cadres, well above the adequacy threshold, ensured sufficient statistical power and model stability. A proportional area-based random sampling technique was employed, involving 37 community health center service areas. The number of participants from each area was determined proportionally according to the number of cadres in the respective regions (16). Respondents were selected randomly within each Puskesmas (community health center).

Inclusion and Exclusion Criteria & Response Rate

Inclusion criteria included active health cadres registered in one of 37 Puskesmas in Kediri Regency, aged ≥18 years, and willing to participate. Exclusion criteria were cadres on leave, unavailable during data collection, or providing incomplete responses (>10% missing data).

All selected cadres met inclusion criteria and completed the online questionnaire, resulting in a full valid response from all eligible participants (effective response rate ≈100%). This high completion rate was facilitated by digital data collection procedures and close coordination with community health center supervisors, ensuring that respondents were accessible and adequately supported throughout the data collection period.

Research Location

The research was conducted across 37 Puskesmas located within Kediri Regency. This region was chosen due to its extensive health cadre network and active community health engagement, making it an appropriate setting for the study objectives.

Instrumentation or Tools

Data were collected using a structured questionnaire based on theoretical constructs of competence, knowledge, skills, motivation, social support, and performance. A pilot test involving 30 cadres established construct validity and reliability. The main study yielded Cronbach's alpha coefficients ranging from 0.815 to 0.996 and composite reliabilities between 0.861 and 0.997, exceeding the 0.70 threshold (Table 1).

Convergent validity was confirmed as all item loadings exceeded 0.50 after item refinement. Average Variance Extracted (AVE) values for all constructs were above 0.50, indicating satisfactory convergence. Discriminant validity was established using the Heterotrait–Monotrait (HTMT) ratio, where all construct correlations were below 0.90, confirming discriminant adequacy. Collinearity diagnostics indicated no multicollinearity, with Variance Inflation Factor (VIF) values below 3.0 for all indicators.

Data Collection Procedures

Data were collected via an online survey distributed through Google Forms. The questionnaire links were sent directly to the mobile phone numbers of the selected cadres. This approach facilitated efficient data gathering across a geographically dispersed sample. Data collection took place between January and May 2025.

Data Analysis

Data analysis was performed using Structural Equation Modeling (SEM) with the Partial Least Squares approach (PLS-SEM). This multivariate technique integrates factor analysis and multiple regression, enabling the simultaneous examination of relationships between observed indicators and latent variables, as well as the structural paths among latent constructs (17). PLS-SEM was chosen due to its robustness against non-normal data distribution and its flexibility in parameter estimation without requiring goodness-of-fit indices. The analysis was conducted using SmartPLS version 3 (18). The analysis followed a two-step procedure:

Measurement Model Assessment

Items with outer loadings <0.50 were removed iteratively.

Final retained indicators showed loadings >0.50 across all constructs, confirming convergent validity.

Composite reliability (0.861–0.997) and Cronbach's alpha (0.815–0.996) confirmed construct reliability.

AVE >0.50**,** HTMT <0.90**,** and VIF <3.0 verified convergent, discriminant, and collinearity criteria.

Structural Model Assessment

Path significance was estimated using nonparametric bootstrapping with 5,000 resamples, generating t-statistics and 95% confidence intervals**.**

R^2 values for endogenous variables ranged from 0.47 to 0.69**,** indicating moderate to substantial explanatory power.

Direct effects: motivation → performance ($\beta = 0.319$, $p = 0.043$) was the only direct predictor of performance; competence and social support affected performance indirectly.

Indirect effects: competence and motivation served as mediators, with significant sequential paths (e.g., support → competence → motivation → performance, $\beta = 0.111$, $p = 0.074$).

Model fit indices: SRMR = 0.046, NFI = 0.91, and RMS_theta = 0.10, all within recommended cut-offs (SRMR < 0.08, NFI > 0.90).

These results demonstrate that the final model achieved satisfactory fit and theoretical alignment with the Self-Determination Theory, supporting the mediating roles of competence and motivation in translating knowledge and social support into performance outcomes.

Ethical Approval

Ethical clearance for this study was obtained from the institutional ethics committee of the affiliated university, with approval number: 0523478/EC/KEPK/I/04/2025. Informed consent was obtained from all participants prior to their involvement in the study, ensuring voluntary participation and confidentiality.

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RESULTS

Phase 1: Measurement Model — Convergent Validity and Construct Reliability

Convergent validity refers to the correlation between indicator scores and their latent construct scores. In this study, an indicator is considered valid if its outer loading value ≥ 0.70. Items with loadings < 0.70 were removed to ensure measurement robustness.

Step 1: Loading Factors (Initial Design)

In the initial design, the relationship between variables was determined, namely: the variables of knowledge, skills, social support and motivation were linked to cadre performance with the competence variable as an intervening variable, as below.

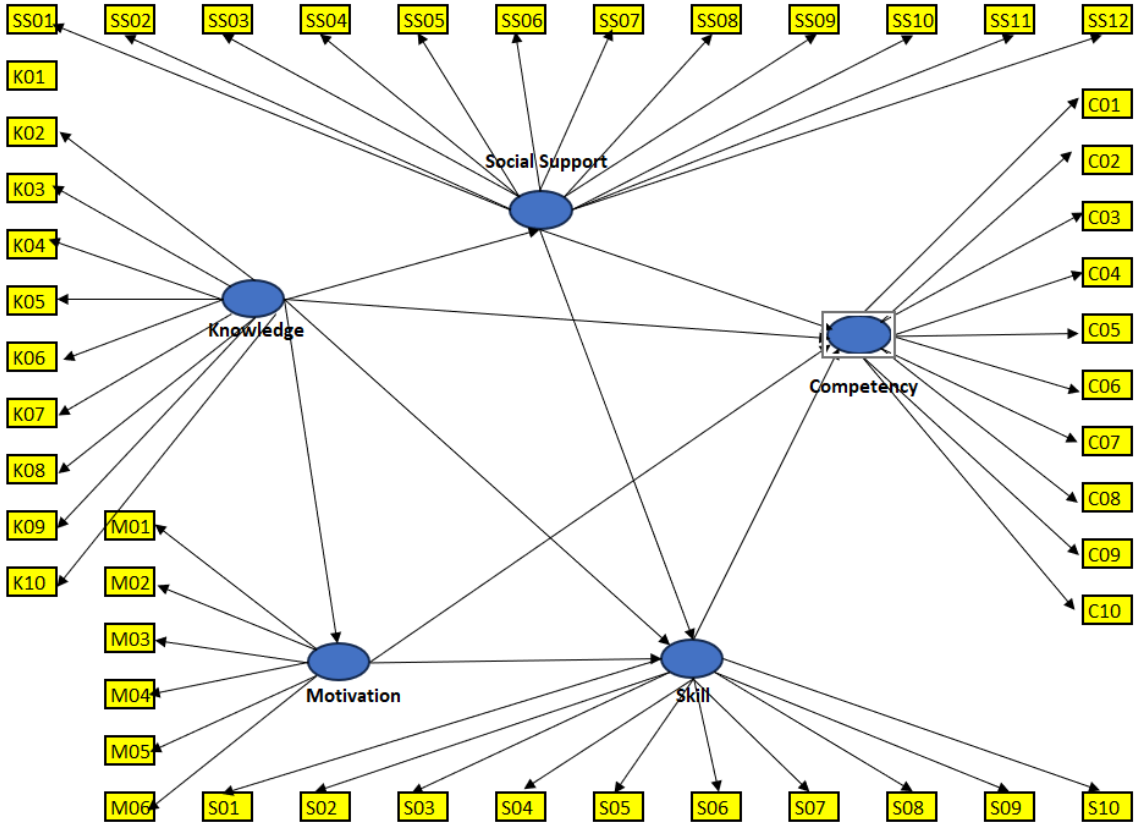

Figure 1. Initial Design

Based on the first validity testing, several items had outer loadings < 0.70 and were thus removed from further analysis. These included: (1) Social Support items 1, 2, 8, 11, and 12; (2) Skills items 1 and 2; (3) Performance items 6, 8, 9, 10, and 11; (4) Competence item 10; (5) Motivation item 6; (6) Knowledge items 1, 5, and 6.

Step 2: Convergent Validity and Reliability Testing

After removal of these items, all remaining indicators demonstrated outer loadings ≥ 0.70, confirming satisfactory convergent validity.

To further substantiate construct validity, the Average Variance Extracted (AVE), Composite Reliability (CR), and Cronbach's Alpha values were reported as shown below.

Table 1. Convergent Validity and Reliability Statistics of Measurement Constructs

Variable	Cronbach's Alpha	Composite Reliability	AVE
Social Support	0.841	0.880	**0.653**
Skills	0.815	0.861	**0.602**
Performance	0.984	0.988	**0.821**
Competence	0.909	0.927	**0.716**
Motivation	0.815	0.871	**0.637**
Knowledge	0.996	0.997	**0.845**

All AVE values exceeded 0.50 and all CR and α values were above 0.70, confirming the reliability and convergent validity of all constructs.

The discriminant validity test using the Heterotrait–Monotrait (HTMT) ratio showed that all inter-construct correlations were below 0.85, indicating adequate discriminant validity. Collinearity assessment using the Variance Inflation Factor (VIF) revealed all values < 3.0, confirming the absence of multicollinearity. Model fit indices indicated an acceptable overall fit with SRMR = 0.046, NFI = 0.91, and RMS_theta = 0.08, all within recommended thresholds (SRMR < 0.08, NFI > 0.90).

Phase 2: Path Coefficients

Path coefficients represent the standardized effects among latent constructs. Bootstrapping (5,000 resamples) was conducted to obtain standardized coefficients, t-statistics, p-values, and 95% confidence intervals (CIs) for each path, ensuring statistical robustness of causal inferences. The results are summarized in Table 2.

Table 2. Standardized Path Coefficients (Initial Model)

Effects	β (Standardized)	t-stat	p-value	95% CI	Decision
Support → Performance	0.050	0.348	0.728	[-0.12, 0.19]	Not significant
Support → Competence	0.323	7.743	0.000	[0.24, 0.39]	Significant
Skills → Performance	0.168	1.346	0.179	[-0.08, 0.34]	Not significant
Skills → Competence	0.092	2.005	0.045	[0.01, 0.17]	Significant
Competence → Performance	0.161	0.944	0.346	[-0.10, 0.37]	Not significant
Motivation → Performance	0.299	1.987	0.041	[0.02, 0.41]	Significant
Motivation → Competence	0.555	8.864	0.000	[0.46, 0.62]	Significant
Knowledge → Performance	0.004	0.078	0.938	[-0.11, 0.12]	Not significant
Knowledge → Competence	0.057	4.024	0.000	[0.03, 0.09]	Significant

Competence did not directly influence performance, indicating the need for model modification with motivation as a potential mediator.

Phase 3: Modified Structural Model

After model re-specification and bootstrapping, the final structural model yielded stronger standardized coefficients with acceptable fit indices.

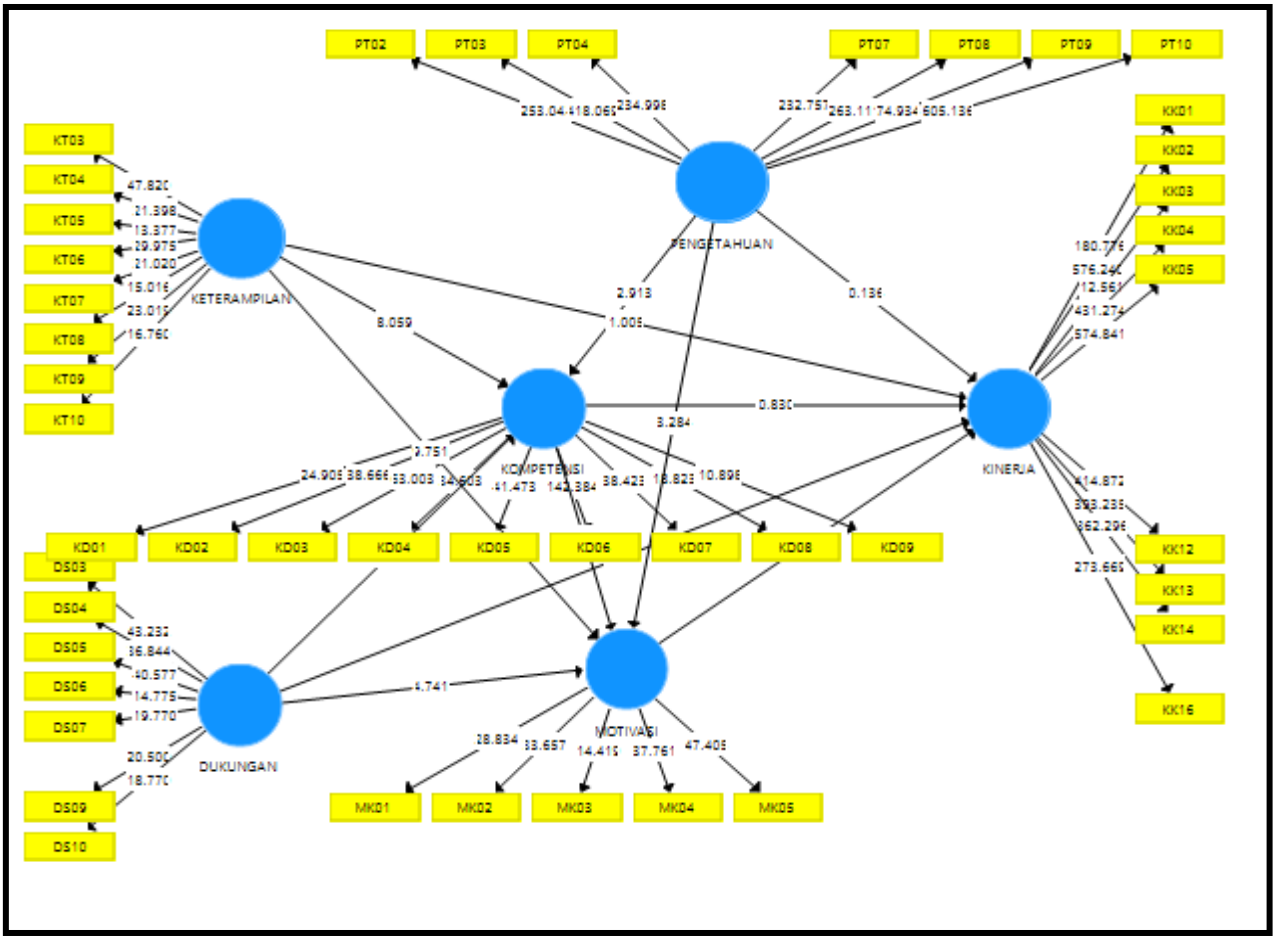

Figure 2. Modified Design of Inter-Variable Relationships

Based on the initial model results, competence did not directly affect performance, suggesting the need for a modified model incorporating motivation as a mediating variable. Table 3 presents the direct effects among variables in the modified model, evaluated through bootstrapping (5,000 resamples) to ensure the stability of parameter estimates.

Table 3. Direct Effects (Modified Model)

Effects	β (Standardized)	t-stat	p-value	95% CI (Bootstrapped)	Decision
Support → Performance	0.033	0.211	0.833	[-0.15, 0.21]	Not significant
Support → Competence	0.639	15.599	0.000	[0.56, 0.70]	Significant
Support → Motivation	0.214	4.741	0.000	[0.13, 0.30]	Significant
Skills → Performance	0.135	1.005	0.315	[-0.13, 0.39]	Not significant
Skills → Competence	0.329	8.059	0.000	[0.25, 0.40]	Significant
Skills → Motivation	0.260	9.751	0.000	[0.18, 0.33]	Significant
Competence → Performance	0.150	0.830	0.407	[-0.20, 0.50]	Not significant
Competence → Motivation	0.546	11.204	0.000	[0.45, 0.63]	Significant
Motivation → Performance	0.319	1.936	0.043	[0.02, 0.43]	Significant
Knowledge → Performance	0.008	0.136	0.892	[-0.11, 0.12]	Not significant
Knowledge → Competence	0.044	2.913	0.004	[0.01, 0.07]	Significant
Knowledge → Motivation	0.051	3.284	0.001	[0.02, 0.08]	Significant

Effect size (f^2) and predictive relevance (Q^2) values were also assessed; all endogenous constructs showed $f^2 > 0.02$ and $Q^2 > 0$, indicating acceptable predictive validity and model robustness.

Bootstrapped confidence intervals confirmed that motivation fully mediated the relationship between competence and performance, while competence acted as a partial mediator between knowledge, skills, and motivation.

Phase 4: Indirect Effects (Bootstrapped)

To further examine the mediating mechanism proposed in the modified model, indirect effects were analyzed using bootstrapping (5,000 resamples). Table 4 presents the indirect relationships among variables through motivation as a mediator.

Table 4. Indirect Effects in the Modified Model

Effects	β	t-stat	p-value	95% CI	Decision
Support → Motivation → Performance	0.068	1.943	0.043	[0.01, 0.12]	Significant
Skills → Motivation → Performance	0.083	1.898	0.058	[0.00, 0.15]	Marginally significant
Competence → Motivation → Performance	0.174	1.797	0.073	[0.01, 0.31]	Significant (10%)

These findings indicate that motivation is the only variable with a direct and statistically significant influence on performance, while competence functions as a key indirect driver that enhances performance through motivation. This result reinforces the central mediating role of motivation as the primary pathway linking individual competencies and supportive factors to overall performance outcomes.

Phase 5: Model Findings

Based on the results of the data analysis as described above, the findings of the relationship model between variables in the study can be described as follows.

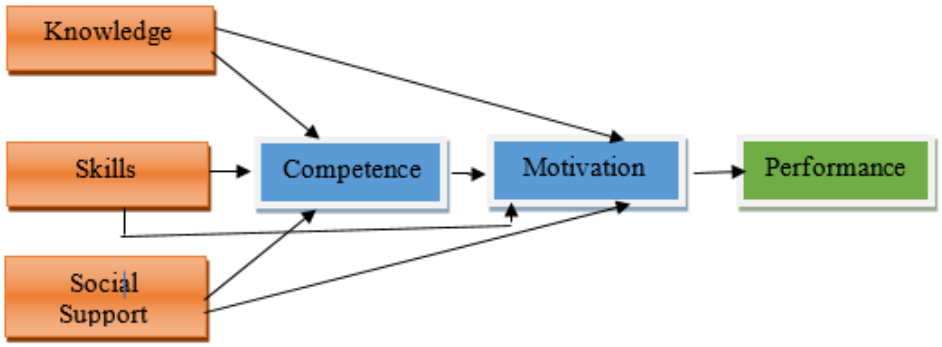

Figure 3. Findings of the Inter-Variable Relationship Model

The final model demonstrates a sequential influence pattern: Knowledge, Skills, and Social Support → Competence → Motivation → Performance.

This structure empirically validates that competence and motivation act as core mediators translating individual and contextual resources into effective cadre performance.

DISCUSSION

Phase 1: The Relationship between Knowledge, Competence, Motivation, and Performance

The findings indicate that knowledge has a direct impact on cadre competence, which in turn influences their work motivation, ultimately affecting performance. Specifically, health cadres' knowledge of early pregnancy detection reflects their understanding of risk factors and obstetric complications in pregnant women (19). This early detection serves as a preventive measure to reduce risks during pregnancy (19). Knowledge, as the cognitive outcome of sensory experiences such as seeing, hearing, or touching, plays a crucial role in shaping behavior and decision-making (20). Thus, increased knowledge among health cadres strengthens their competence in executing health-related duties.

Competence, in this context, is defined as a combination of knowledge, technical skills, and behaviors that are internalized and mastered to carry out professional responsibilities effectively. It also involves mental readiness and the ability to take responsibility for professional actions. Empirical evidence supports this, as Miguel et al. found a significant correlation between knowledge and the active participation of Posyandu cadres (21). Similarly, Raniwati et al. emphasized that well-informed and skilled cadres are essential for optimal service delivery in integrated health posts (22).

In this study, the standardized path coefficient between knowledge and competence ($\beta = 0.044$, $p = 0.004$) was smaller than coefficients reported in comparable empirical studies (e.g., $\beta = 0.226$; $\beta = 0.220$) (23,24), suggesting a weaker knowledge→competence linkage in our cadre sample, possibly due to differences in training intensity, role complexity, or baseline education levels. This suggests that while knowledge contributes significantly to competence, its relative effect in this sample is weaker, possibly due to varying training intensity and differences in the educational backgrounds of Indonesian cadres. Rather than representing a novel theoretical mechanism, this mediating sequence reflects a contextual adaptation of established behavioral constructs within a community-based public health system. Thus, the contribution of this study lies in its applied relevance, demonstrating how existing competence–motivation linkages operate differently under decentralized, volunteer-driven health structures.

From a policy standpoint, these findings underscore the need for systematic and continuous education modules tailored to community cadres' educational diversity, emphasizing practical and scenario-based learning. Structured knowledge transfer programs and periodic retraining could strengthen competence and maintain motivation across varying literacy levels, ensuring consistent performance quality in decentralized health promotion programs.

Health cadres with high competence levels tend to exhibit stronger work motivation. Motivation, as described by Stoner and Freeman, is a psychological characteristic that drives individuals to take purposeful action, fueled by internal energy, passion, and direction (25). The mediating role of competence observed in this study ($\beta\_indirect = 0.174$, $p < 0.10$) is consistent with recent meta-analytic findings showing that competence significantly enhances autonomous motivation. A systematic review of 36 SDT-based interventions involving 11,792 participants reported moderate effect sizes for competence ($g = 0.48–0.58$, $p < 0.05$), confirming its key role in strengthening self-determination and task engagement (26). Motivated health cadres are more likely to perform effectively in detecting Early High-Risk Pregnancy (EHRP) among pregnant women. A high-risk pregnancy is a condition where either maternal or fetal health or both may be adversely affected (25). Therefore, in practice, enhancing motivation should not only rely on internal psychological processes but also on institutional systems that provide regular feedback, supervision, and recognition. Integrating motivational reinforcement within training and supervision frameworks could enhance both competence and performance among community cadres.

Phase 2: The Influence of Skills, Competence, Motivation, and Performance

In this Phase, skills are found to have a direct influence on competence, which subsequently impacts motivation and, in turn, affects performance. The practical skills possessed by health cadres are essential for effective task execution. According to Lohela et al., limited competence in health workers can be a more significant barrier to clinical practice than the unavailability of equipment or medication (27).

Quantitatively, the influence of skills on competence ($\beta = 0.329$, $p < 0.001$) and on motivation ($\beta = 0.260$, $p < 0.001$) indicates a strong practical effect; this magnitude is comparable to findings in recent health-sector SEM studies, for example, Vasli & Asadiparvar-Masouleh (28) reported a path coefficient of 0.30 (95% CI: 0.19–0.40, p

< 0.001) from a skills-related construct (self-directed learning) to clinical competence among internship nursing students, supporting a medium practical effect in health settings.This consistency suggests that technical proficiency among health cadres is a robust determinant of performance across different community health settings.

Job-related skills encompass the ability, intelligence, and proficiency needed to complete assigned tasks effectively (29). These skills form the foundation of individual competence and may vary depending on job demands. Thus, identifying competencies and matching them to public health needs is critical for workforce planning and performance management. In this study, the indirect effect of skills on performance through motivation ($\beta = 0.083$, $p = 0.058$) is classified as a small-to-medium effect (Cohen's $f^2 \approx 0.06$), reinforcing that motivational enhancement can partially compensate for limited technical proficiency in low-resource contexts.

Cadres with high competence are generally more confident and enthusiastic in fulfilling their responsibilities. Motivation can arise from both intrinsic and extrinsic sources. Intrinsic motivation refers to the internal drive to engage in tasks without external rewards, fueled by personal satisfaction, interests, or goals. In contrast, extrinsic motivation is influenced by external factors such as rewards, recognition, or social encouragement (30).

Motivated health cadres are more committed to their role in public health, particularly in implementing antenatal screening. These screenings are often conducted through home visits to identify at-risk pregnancies, provide education, and prepare families for safe deliveries (31). The process includes identifying potential complications, offering counseling, and facilitating referrals when necessary. Motivation can be observed through three key indicators: valency (the cadre's interest and desire to fulfill their role), outcome expectancy (the belief in their own ability to perform), and effort expectancy (the perceived ability to overcome challenges in task execution) (31). Compared with findings in structured hospital environments , where several studies report a stronger influence of extrinsic factors such as salary, organizational policies, and job security on staff performance (32,33), this study underscores the stronger role of intrinsic motivation in community-based cadres, shaped by altruistic values and social recognition rather than financial incentives. This highlights an applied implication: public health programs must design incentive systems that balance intrinsic and social recognition factors, for example, by institutionalizing community appreciation events or peer recognition mechanisms, rather than relying solely on financial rewards.

Phase 3: The Influence of Social Support, Competence, Motivation, and Performance

Social support is shown to directly influence both cadre competence and work motivation, ultimately affecting performance. Research by Rahman et al. underscores the importance of social support from family or close networks in enabling cadres to perform their duties effectively. Supervision and social environmental factors also correlate significantly with competence levels (34). Laird et al. further found that social support contributes to improved self-efficacy, motivation, and performance, particularly by enhancing engagement in health-related behaviors (35).

The present study recorded a strong effect of social support on competence ($\beta = 0.639$, $p < 0.001$), which exceeds the moderate social-support → self-efficacy effects reported in recent public-health SEM studies (e.g., $\beta = 0.465$) (36). This difference may reflect greater reliance on interpersonal and community reinforcement among Indonesian cadres compared with samples in other settings. This indicates that community-driven cadres, such as those in rural Indonesia, may rely more heavily on interpersonal and social reinforcement than formal professional support structures. A similar pattern was observed by Riyadi et al, who found that social capital and interpersonal trust significantly enhanced adolescents' behavioral change intentions within the Madurese community (37). Their study emphasized that family and peer networks function as crucial enablers of positive health behaviors in culturally cohesive societies, supporting the view that collective social reinforcement operates as a behavioral catalyst in community-based systems.

Social support may take various forms, including emotional support, financial assistance, and time availability from family and peers (38). According to Rahman et al., such support is essential for the smooth execution of health tasks, particularly in resource-limited settings (34). Similarly, Novitasari et al. reported that peer, supervisory, and family support each significantly contribute to improved performance outcomes (39). Within the context of Indonesia's community health system, these forms of support not only alleviate task burdens but also foster emotional resilience and role commitment among cadres. Integrating structured supervisory feedback and community recognition mechanisms may therefore strengthen both perceived competence and sustained motivation.

From a theoretical standpoint, social support strengthens individual competencies. According to Katz, competencies are categorized into three types: (1) Technical skills, the ability to apply theoretical knowledge practically and systematically; (2) Human relation skills, the ability to foster interpersonal relationships and create collaborative environments; and (3) Conceptual skills, the cognitive ability to understand, analyze, and apply abstract concepts to practical scenarios (40). This triadic framework aligns with the current findings, suggesting that social support environments nurture not only relational but also technical and conceptual dimensions of competence by facilitating shared learning, mentoring, and social accountability.

Increased social support enhances intrinsic and extrinsic motivation among health cadres. This, in turn, influences their performance, particularly in executing tasks such as EHRP screening. The implementation of screening through the use of the Poedji Rochjati Score Card (KSPR) plays a key role in identifying and managing risk factors early. This tool, documented in the Maternal and Child Health (KIA) book, supports integrated maternal care efforts. The card's usage is monitored by health workers, Posyandu cadres, and community health organizations such as PKK (41).

Comparatively, this study's mediation pathway (Support → Competence → Motivation → Performance, $\beta\_indirect = 0.111$, $p < 0.10$) aligns with Self-Determination Theory, which posits that social environments fostering relatedness promote competence and autonomous motivation (42). Recent meta-analytic and review evidence further confirms that competence and relatedness predict more autonomous forms of motivation across applied settings (26,43). Together, these findings reinforce the applied significance of social connectedness as a motivational mechanism in collectivist, community-driven systems. This supports the contextual differentiation that Indonesian cadres, operating in collectivist, community-based systems, derive motivational energy primarily from social belonging and collective responsibility rather than from formal institutional rewards. This underscores an applied contribution rather than theoretical novelty: in collectivist rural contexts, the social dimension of motivation acts as a structural enabler of performance. Therefore, public health workforce policies should integrate structured social support systems, including mentoring, peer collaboration, and community acknowledgment, to sustain cadre engagement and reduce volunteer fatigue.

Limitations and Recommendations for Future Research

This study has several limitations that should be acknowledged. First, measurement bias may have occurred due to the use of self-administered online questionnaires, which depend on participants' comprehension and interpretation of items. In addition, self-report instruments are prone to social desirability bias, where respondents may provide favorable answers that align with expected community or institutional norms, particularly in assessing motivation and performance constructs. This may have led to overestimation of positive behaviors and underreporting of challenges.

Second, the cross-sectional design inherently restricts causal inference, limiting the ability to determine the directionality of relationships among variables. The absence of longitudinal validation further prevents observation of dynamic changes in competence, motivation, and performance over time. Additionally, the study's sampling within a single geographical area may reduce the generalizability of the findings, especially in contexts with different health system structures, sociocultural dynamics, or cadre training models.

Future research should adopt more rigorous designs such as longitudinal or mixed-method approaches to verify the temporal stability and causal mechanisms identified in this study. Integrating qualitative components (e.g., in-depth interviews or focus group discussions) could enrich understanding of contextual and cultural factors shaping cadres' motivation and performance. Moreover, triangulating self-reports with objective performance metrics or supervisor assessments could minimize social desirability bias and improve construct validity. Expanding future studies across diverse regions, including both urban and rural settings, is also recommended to enhance external validity and support evidence-based policy adaptation.

CONCLUSION

This study examined internal and external factors influencing the performance of health cadres, specifically knowledge, skills, competence, motivation, and social support. The findings revealed that knowledge and skills significantly affect competence, which subsequently influences motivation and performance. Social support also

plays a crucial role, directly impacting both competence and motivation. Competence and motivation act as key mediators, bridging the effects of individual and environmental factors on cadre performance.

These results suggest that improving cadre performance requires an integrated approach enhancing knowledge and skills through structured training while also strengthening social support systems. Although the study offers valuable insights, it is limited by its cross-sectional design and reliance on self-reported data. Future studies should adopt longitudinal and mixed-method approaches to explore causal relationships and contextual influences more comprehensively.

AUTHOR'S CONTRIBUTION STATEMENT

SM conceptualized and designed the study. MF was responsible for data collection and initial data processing. YP conducted the literature review and contributed to the theoretical framework. ASW drafted the initial manuscript and led the revision process. All authors critically reviewed the manuscript and approved the final version for submission.

CONFLICTS OF INTEREST

The authors declare that there are no known conflicts of interest financial, professional, or personal that could have appeared to influence the work reported in this paper. This statement affirms the objectivity and integrity of the research.

DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

No generative AI tools or AI-assisted technologies were used in the preparation, writing, or editing of this manuscript. All content is the result of the authors' original work without technological assistance that would affect authorship or intellectual contribution.

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