

# Determinants of Clinical Instructor Service Quality in Healthcare Education: The Roles of Knowledge Management, Professional Commitment, Work Motivation, and Interpersonal Communication

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## ABSTRACT

This study investigates the structural determinants of Clinical Instructor (CI) service quality in Indonesian healthcare education through an integrated mixed-methods design grounded in the POP-SDM (Pemodelan dan Optimasi Penguatan Sumber Daya Manajemen) framework. The research model positions knowledge management (X1) as the exogenous variable, professional commitment (X2), work motivation (X3), and interpersonal communication (X4) as intervening variables, and CI service quality (Y) as the endogenous variable. Employing a sequential exploratory design, qualitative inquiry (12 informants across 30 healthcare clinics in Bekasi City) was first used to identify and validate the causal constellation, followed by quantitative path analysis with a sample of 144 clinical instructors drawn via proportional random sampling. Instruments were based on SERVQUAL (service quality), and validated theoretical frameworks for each independent variable, all measured on five-point Likert scales. Data were analyzed using SPSS v.29 with prerequisite tests for normality, homogeneity, linearity, multicollinearity, and heteroscedasticity. Results confirmed ten significant hypotheses: all four variables exert direct positive effects on CI service quality—interpersonal communication ( $\beta = 0.234$ ), work motivation ( $\beta = 0.212$ ), knowledge management ( $\beta = 0.208$ ), and professional commitment ( $\beta = 0.195$ ). Knowledge management exerts strong direct effects on all three intervening variables: interpersonal communication ( $\beta = 0.771$ ), work motivation ( $\beta = 0.737$ ), and professional commitment ( $\beta = 0.655$ ). Three significant indirect paths from knowledge management to service quality were confirmed via Sobel test, with interpersonal communication yielding the strongest indirect effect ( $\beta = 0.163$ ), followed by work motivation ( $\beta = 0.144$ ) and professional commitment ( $\beta = 0.136$ ). However, all three intervening variables function as partial rather than full mediators, since direct effects exceed indirect effects. SITOREM analysis identified 18 priority indicators for improvement across all variables. Findings provide a validated causal model with actionable optimization recommendations for clinical education policy and practice in Indonesia.

Keyword      SERVQUAL , Bekasi City, Knowledge Management, Professional Commitment, Work Motivation, and Interpersonal Communication

## Introduction

Clinical education constitutes a central pillar of health professional training in Indonesia, particularly within the Diploma III Midwifery program, which allocates 60% of curriculum hours to practical learning in clinical settings. The Clinical Instructor (CI) occupies the most

strategically important role in this process, guiding students through real-world care environments—from community health centers and private birthing units to hospitals—and directly shaping their clinical competence, professional disposition, and readiness for independent practice.

Service quality delivered by CIs is a multi-dimensional construct operationalized through the SERVQUAL framework (reliability, assurance, tangibles, empathy, responsiveness), which captures both the technical and relational dimensions of instructional excellence. Empirical evidence from Indonesia suggests persistent deficits in assurance, tangibles, and responsiveness dimensions of CI service, while strengths are concentrated in reliability and empathy. These gaps signal that the determinants driving CI service quality remain insufficiently understood and poorly targeted by existing policy and training programs.

Prior studies have examined single-variable relationships with CI quality—most commonly focusing on teaching method, clinical competence, or role modeling—while neglecting the organizational and motivational infrastructure that underpins instructional service. In particular, the joint and mediated effects of knowledge management, professional commitment, work motivation, and interpersonal communication have not been simultaneously examined in the Indonesian clinical education context. This study addresses this gap by developing and empirically testing a structural causal model in which:

- a) Knowledge Management (X1) serves as the exogenous variable—the upstream organizational driver that influences all other variables in the model;
- b) Professional Commitment (X2), Work Motivation (X3), and Interpersonal Communication (X4) serve as intervening (mediating) variables between knowledge management and service quality; and
- c) CI Service Quality (Y) serves as the endogenous variable—the ultimate outcome to be explained and optimized.

The research applies the POP-SDM mixed-methods framework and concludes with SITOREM-based optimization recommendations—providing both a validated causal model and practical, indicator-level improvement priorities for clinical education administrators, policymakers, and CI training programs.

## Literature Review

### Conceptual Framework: Variable Roles in the Model

The theoretical architecture of this study distinguishes three classes of variables. The endogenous variable—CI Service Quality (Y)—is the primary outcome. The exogenous

variable—Knowledge Management (X1)—is the primary upstream driver exerting both direct effects on service quality and indirect effects mediated through the three intervening variables. Professional Commitment (X2), Work Motivation (X3), and Interpersonal Communication (X4) occupy the intervening position: each is simultaneously endogenous relative to knowledge management (being influenced by it) and exogenous relative to service quality (influencing it). This structure reflects the POP-SDM logic of modeling how organizational knowledge resources cascade into individual motivational, relational, and commitment-based mechanisms that ultimately shape instructional service outcomes.

### **Endogenous Variable: Service Quality (Y)**

Service quality in clinical instruction derives from Parasuraman, Zeithaml, and Berry's SERVQUAL model, which identifies five dimensions: reliability (consistency), assurance (competence and confidence), tangibles (physical facilities), empathy (individualized attention), and responsiveness (willingness and speed). In CI contexts, service quality captures the totality of instructional and relational behaviors instructors exhibit toward student midwives and nurses. Sabog, Caranto, and David (2017) identified teaching effectiveness, clinical competence, and interpersonal skills as the dominant CI quality attributes as perceived by student nurses. Friscila, Achadiyani, and Surachman (2020) confirmed that CI characteristics significantly predict clinical skills scores. Hasnawati, Putra, and Karimah (2023) linked student perceptions of CI quality to clinical competency achievement in Indonesian nursing education.

### **Exogenous Variable: Knowledge Management (X1)**

Knowledge management—the systematic process of acquiring, storing, distributing, and applying organizational knowledge—functions as the foundational exogenous driver in this model. Theoretically, robust KM infrastructure equips CIs with current clinical knowledge, facilitates evidence-based instructional practices, and creates the organizational learning conditions under which commitment, motivation, and communication can flourish. Khammarnia, Bakhshi, and Setoodehzadeh (2023) documented a significant positive relationship between KM and healthcare service quality ( $\beta = 0.367$ ,  $p < 0.01$ ) in Iranian clinical settings. Hassan, Sabri, and Ahmad (2021) reported that knowledge storage accessibility correlated strongly with service quality perceptions among Malaysian clinical instructors ( $\beta = 0.421$ ,  $p < 0.001$ ). Zhang and Wu (2022) further demonstrated that technology-mediated KM platforms enhanced the speed, accuracy, and personalization of clinical service delivery in Chinese community health settings.

In the present model, KM also exerts direct effects on the three intervening variables: CIs with well-developed knowledge management practices are expected to show stronger

professional commitment (because mastery deepens professional identity), higher work motivation (because competence generates achievement-oriented drive), and richer interpersonal communication (because knowledge clarity enhances communicative precision and openness).

### **Intervening Variable: Professional Commitment (X2)**

Professional commitment, operationalized through Meyer and Allen's (1997) three-component model—*affective* (emotional attachment and pride), *continuance* (awareness of the cost of leaving), and *normative* (moral obligation to remain)—mediates between KM and service quality. Highly committed CIs are disposed to exceed minimum service standards, maintain relational integrity with students, and sustain quality under challenging conditions. Rezapour-Nasrabad and Mardanian-Dehkordi (2023) documented significant effects of professional commitment on clinical nursing instructor service quality ( $\beta = 0.412, p < 0.001$ ) using structural equation modeling among 290 instructors in Iran. Nguyen, Tran, and Le (2022) confirmed that committed Vietnamese community clinic instructors demonstrated higher service consistency and client satisfaction ( $\beta = 0.389, p < 0.01$ ). Ibrahim and Khamis (2021) found that commitment to professional ethics and self-development contributed positively to perceived service quality in Egyptian medical education contexts ( $\beta = 0.397, p < 0.01$ ).

### **Intervening Variable: Work Motivation (X3)**

Work motivation—comprising *intrinsic* motivators (achievement, recognition, responsibility, advancement) and *extrinsic* hygiene factors (compensation, working conditions, status, organizational procedures)—energizes, directs, and sustains CIs' instructional service behaviors. As an intervening variable, work motivation translates KM-derived competence into energetic, persistent, and goal-directed teaching behaviors. Al-Zoubi and Al-Dmour (2023), in a study of 275 Jordanian clinical instructors, found that intrinsic motivation exerted the strongest effect on service quality dimensions ( $\beta = 0.428, p < 0.001$ ). Wu, Zhang, and Liu (2022) established that work motivation both directly predicted clinical service quality ( $\beta = 0.401, p < 0.01$ ) and mediated the relationship between supportive work environments and service quality in Chinese clinical education settings. Ahmed, Qureshi, and Memon (2021) demonstrated that value-based motivation significantly predicted excellent service quality among Pakistani clinical training instructors.

### **Intervening Variable: Interpersonal Communication (X4)**

Interpersonal communication—encompassing openness to feedback, empathy, positive regard for others, interpretive accuracy, and supportive relational behavior—is the proximal relational mechanism through which CI expertise and commitment are expressed in

instructional interaction. As the intervening variable most directly linked to service quality perception, interpersonal communication mediates the translation of KM-derived knowledge into relational instructional service. Strong communicative CI behavior enables effective knowledge transfer, builds student trust, and enhances the empathy and assurance dimensions of SERVQUAL. Dewanti (2017) found that CI behavioral modeling, communicated through clear feedback and role demonstration, positively influenced students' clinical performance in Indonesian nursing education.

## **Methods**

### **Research Design and Framework**

This study applied the POP-SDM (Pemodelan dan Optimasi Penguatan Sumber Daya Manajemen) sequential exploratory mixed-methods framework, which consists of three integrated phases: (1) Pre-Modeling (qualitative exploration to empirically derive and validate the research variable constellation); (2) Model Testing (quantitative path analysis to test hypothesized causal relationships); and (3) Optimization (SITOREM analysis to generate prioritized, indicator-level improvement recommendations).

In Phase 1, semi-structured interviews were conducted with 12 purposively selected informants (clinic directors, senior CIs, academic supervisors, and student representatives) across Bekasi City. Data were subjected to thematic coding, classification, triangulation, and expert judgment validation, yielding the causal constellation that positioned knowledge management (X1) as the exogenous variable; professional commitment (X2), work motivation (X3), and interpersonal communication (X4) as intervening variables; and service quality (Y) as the endogenous variable.

### **Population and Sample**

The study population comprised 225 clinical instructors distributed across 30 licensed healthcare clinics in Bekasi City, Indonesia. Using the Yamane formula with error tolerance  $e = 0.05$ , a sample of 144 respondents was calculated and drawn via proportional random sampling from all 30 clinics. Inclusion criteria: current CI status, minimum one year of clinical instruction experience, and written consent. Data collection occurred from October 2025 to January 2026.

### **Instrumentation**

Five validated instruments, each on a five-point Likert scale (1 = Never to 5 = Always), were administered. (Y) Service Quality: 30 items across five SERVQUAL dimensions—reliability, assurance, tangibles, empathy, responsiveness. (X1) Knowledge Management: 30

items across six dimensions—knowledge acquisition, processing/creation, storage, distribution/sharing, application, and evaluation. (X2) Professional Commitment: 30 items across affective, continuance, and normative commitment. (X3) Work Motivation: 30 items covering motivator factors (achievement, recognition, responsibility, advancement) and hygiene factors (working conditions, organizational procedures, compensation, status, progress). (X4) Interpersonal Communication: 30 items addressing openness, empathy, positive attitude, supportiveness, and equality. All instruments underwent content validity by expert panel and empirical calibration: items with  $r \geq 0.30$  and Cronbach's  $\alpha \geq 0.70$  were retained.

### Data Analysis

Quantitative data were analyzed using SPSS v.29. Prerequisite tests conducted: (1) Liliefors normality test on residual series; (2) Bartlett homogeneity of variance test; (3) VIF multicollinearity test; (4) Glejser heteroscedasticity test; (5) linearity test (deviation from linearity F-test). Path analysis was then conducted across four structural sub-models, followed by Sobel tests for indirect effects, and SITOREM analysis for indicator optimization.

**Table Variable Roles in the Structural Model**

Variable	Role	Position in Model
Y	CI Service Quality	Endogenous (outcome)
X1	Knowledge Management	Exogenous (upstream driver)
X2	Professional Commitment	Intervening (mediator)
X3	Work Motivation	Intervening (mediator)
X4	Interpersonal Communication	Intervening (mediator)

### Path Analysis Sub-models

Four structural sub-models were tested:

Sub-structure 1 (direct effects on endogenous Y):  $X1+X2+X3+X4 \rightarrow Y$

Sub-structure 2 ( $X1 \rightarrow X2$ ): Knowledge Management  $\rightarrow$  Professional Commitment

Sub-structure 3 ( $X1 \rightarrow X3$ ): Knowledge Management  $\rightarrow$  Work Motivation

Sub-structure 4 ( $X1 \rightarrow X4$ ): Knowledge Management  $\rightarrow$  Interpersonal Communication

Indirect effects ( $X1 \rightarrow X2 \rightarrow Y$ ,  $X1 \rightarrow X3 \rightarrow Y$ ,  $X1 \rightarrow X4 \rightarrow Y$ ) were tested using the Sobel test.

SITOREM analysis weighted each indicator by cost, urgency, benefit, and importance to generate a prioritized improvement sequence.

## Result

### Descriptive Statistics

**Table Descriptive Statistics of Research Variables (N = 144)**

Variable (Role)	Mean	SD	Min– Max
Service Quality – Y (Endogenous)	133.11	10.33	104– 170
Knowledge Mgmt – X1 (Exogenous)	144.04	14.78	88–180
Prof. Commitment – X2 (Intervening)	144.79	13.38	97–180
Work Motivation – X3 (Intervening)	143.65	12.95	100– 175
Interpersonal Comm. – X4 (Intervening)	146.25	13.04	100–180

*Note. Highest mean among intervening variables: Interpersonal Communication (X4 = 146.25). Lowest mean: Endogenous Service Quality (Y = 133.11), indicating room for improvement.*

### Prerequisite Tests

All seven residual series passed the Liliefors normality test ( $L_{calc} < L_{table}$ ,  $\alpha = 0.05$ ). Bartlett tests confirmed homogeneous variance across all variable pairs. VIF values ranged 1.06–1.82, confirming absence of multicollinearity. Glejser tests confirmed homoscedasticity. All variable pairs exhibited significant linear relationships (F-deviation from linearity  $p > 0.05$ ). Pearson correlations among all pairs were significant ( $p < 0.01$ ), confirming path analysis appropriateness.

### Path Analysis: Direct Effects on Endogenous Variable (Y)

Sub-structure 1 yielded the following structural equation for the endogenous variable:

$$\hat{Y} = 0.208X_1 + 0.195X_2 + 0.212X_3 + 0.234X_4 + \varepsilon_1$$

All four predictors demonstrated significant direct positive effects on CI Service Quality (Y) at  $\alpha = 0.05$  ( $t_{calc} > t_{table} = 1.976$ ). Interpersonal communication (X4) yielded the strongest direct effect ( $\beta = 0.234$ ), followed by work motivation ( $\beta = 0.212$ ), knowledge management ( $\beta = 0.208$ ), and professional commitment ( $\beta = 0.195$ ).

### Path Analysis: Exogenous Variable Effects on Intervening Variables

Sub-structures 2, 3, and 4 confirmed that the exogenous variable knowledge management (X1) exerts strong direct positive effects on all three intervening variables:

$$\hat{X}_2 = 0.655X_1 + \varepsilon_2 \text{ (X1} \rightarrow \text{X2: KM} \rightarrow \text{Prof. Commitment)} \quad \hat{X}_3 = 0.737X_1 + \varepsilon_3 \text{ (X1} \rightarrow \text{X3: KM} \rightarrow \text{Work Motivation)}$$

$$\hat{X}_4 = 0.771X_1 + \varepsilon_4 \text{ (X1} \rightarrow \text{X4: KM} \rightarrow \text{Interpersonal Comm.)}$$

The strongest exogenous effect was observed for interpersonal communication ( $\beta = 0.771$ ), indicating that knowledge management most powerfully influences CIs' communicative behaviors. Work motivation followed ( $\beta = 0.737$ ), then professional commitment ( $\beta = 0.655$ ).

**Table Full Hypothesis Testing Summary**

Path (Variable Roles)	$\beta$	t-calc	Decision
H1: X1(Exog.) $\rightarrow$ Y(Endog.) Direct	0.208	2.262	H <sub>0</sub> rejected $\checkmark$
H2: X2(Interv.) $\rightarrow$ Y(Endog.) Direct	0.195	2.196	H <sub>0</sub> rejected $\checkmark$
H3: X3(Interv.) $\rightarrow$ Y(Endog.) Direct	0.212	2.201	H <sub>0</sub> rejected $\checkmark$
H4: X4(Interv.) $\rightarrow$ Y(Endog.) Direct	0.234	2.498	H <sub>0</sub> rejected $\checkmark$
H5: X1(Exog.) $\rightarrow$ X2(Interv.)	0.655	10.336	H <sub>0</sub> rejected $\checkmark$
H6: X1(Exog.) $\rightarrow$ X3(Interv.)	0.737	13.108	H <sub>0</sub> rejected $\checkmark$
H7: X1(Exog.) $\rightarrow$ X4(Interv.)	0.771	14.480	H <sub>0</sub> rejected $\checkmark$
H8: X1 $\rightarrow$ Y via X2 (Indirect)	0.136	Sobel sig.	H <sub>0</sub> rejected $\checkmark$
H9: X1 $\rightarrow$ Y via X3 (Indirect)	0.144	Sobel sig.	H <sub>0</sub> rejected $\checkmark$
H10: X1 $\rightarrow$ Y via X4 (Indirect)	0.163	Sobel sig.	H <sub>0</sub> rejected $\checkmark$

Note. t-table = 1.976 ( $\alpha = 0.05$ ,  $df = 143$ ). All hypotheses supported.

### Indirect Effects and Mediation Analysis

Sobel tests confirmed three significant indirect paths from exogenous X1 to endogenous Y, all mediated through intervening variables. The indirect effect via X4 (interpersonal communication) was the largest ( $\beta = 0.163$ ), followed by X3 (work motivation,  $\beta = 0.144$ ), and X2 (professional commitment,  $\beta = 0.136$ ). Critically, all three indirect effects were smaller than the corresponding direct effects from X1 on Y ( $\beta = 0.208$ ), confirming partial rather than full mediation. This means that professional commitment, work motivation, and interpersonal communication each partially mediate the exogenous–endogenous relationship, while knowledge management also exerts an independent direct effect on service quality. Table 4 summarizes the mediation pattern.

**Table Direct vs. Indirect Effects: Mediation Summary**

Intervening Variable	Direct X1 $\rightarrow$ Y	Indirect Effect	MediationType

X2: Professional Commitment	0.208	0.136	Partial
X3: Work Motivation	0.208	0.144	Partial
X4: Interpersonal Communication	0.208	0.163	Partial

### SITOREM Optimization Results

SITOREM analysis identified 18 indicators requiring priority improvement across all variables. For the endogenous variable (Y), improvement priorities include: Assurance (20.74%), Tangibles (20.01%), and Responsiveness (19.26%); indicators to sustain: Reliability (21.48%) and Empathy (18.51%). For exogenous X1, weak indicators include knowledge storage, collection, application, and distribution/sharing; strengths are knowledge creation and acquisition. For intervening X2, priorities include continuance-dimension indicators (individual valuation of leaving, job attachment) and normative indicators (responsibility for professional values, job love); strengths are lack of alternatives, moral obligation, drive to continue, and dedication. For intervening X3, compensation, advancement, status, and recognition require improvement; working conditions, responsibility, achievement, and organizational procedures are sustained. For intervening X4, openness to feedback, interpretive accuracy, and positive regard for others are priority improvements; empathy, supportiveness, and equality are sustained.

## Discussion

### Knowledge Management as Exogenous Driver

The finding that knowledge management (X1) simultaneously drives all three intervening variables and exerts an independent direct effect on service quality (Y) positions KM as the most structurally influential variable in the model. This is consistent with organizational behavior theory (Robbins & Judge, 2019), which posits that KM creates the informational and relational substrate from which professional identity, motivation, and communication excellence emerge. The strong exogenous paths from KM to interpersonal communication ( $\beta = 0.771$ ), work motivation ( $\beta = 0.737$ ), and professional commitment ( $\beta = 0.655$ ) suggest that investments in KM infrastructure—knowledge sharing platforms, documentation systems, evidence-based protocol libraries—generate cascading benefits across all intervening mechanisms.

The SITOREM finding that knowledge storage, collection, application, and distribution are the weakest KM indicators points to specific operational deficiencies in Bekasi's clinic ecosystem. These are precisely the KM dimensions that require institutional support—server infrastructure, documentation policies, and regular knowledge-sharing

sessions—rather than individual-level behavioral change alone. This suggests a structural rather than merely motivational intervention is needed at the exogenous level.

### **Professional Commitment as Partial Mediator**

Professional commitment (X2) exerts a significant direct effect on service quality ( $\beta = 0.195$ ) and partially mediates the KM–quality relationship ( $\beta = 0.136$ ), but as a partial mediator, it adds value to the explanatory model without fully absorbing KM's direct effect. The SITOREM analysis reveals that continuance commitment indicators—individual valuation of leaving and job attachment—are the weakest, suggesting that many CIs remain in clinical instruction due to limited alternatives rather than deep vocational identification. This profile risks fragility: when alternative opportunities become available, continuance-dominant commitment offers little protective buffering against turnover or disengagement. Strengthening affective and normative commitment through professional recognition programs, peer mentoring communities, and CI career pathways is therefore strategically important.

### **Work Motivation as Partial Mediator**

Work motivation (X3) exerts the second-strongest direct effect on service quality ( $\beta = 0.212$ ) and partially mediates the KM–quality relationship ( $\beta = 0.144$ ). SITOREM findings align with Herzberg's two-factor theory: motivator indicators (achievement, working conditions, responsibility, advancement) are the current strengths, while hygiene factors (compensation, recognition, status, progress) are the priorities for improvement. The presence of unmet hygiene needs likely creates motivational friction that limits the ceiling of instructional quality even when intrinsic motivation is present. Targeted incentive structures, clear advancement pathways, and formal recognition mechanisms for CI excellence are recommended to address these deficits.

### **Interpersonal Communication as Strongest Direct Predictor**

Interpersonal communication (X4) emerged as both the strongest direct predictor of CI service quality ( $\beta = 0.234$ ) and the most strongly influenced intervening variable from exogenous KM ( $\beta = 0.771$ ). These dual findings establish interpersonal communication as the critical proximal mechanism through which both knowledge competence and organizational motivation are ultimately expressed in instructional interaction. The SITOREM priority indicators—openness to feedback, interpretive accuracy of student verbal and non-verbal cues, and positive self-regard toward others—identify specific communicative competencies that CI pre-service and in-service training should target. These are relational skills amenable to structured communication training, peer coaching, and reflective practice modules.

### **Partial Mediation Implications**

The finding that all three intervening variables function as partial rather than full

mediators has a critical practical implication: knowledge management strengthening will improve service quality both through its direct effect and through each of the three mediated pathways, making KM investment multiply beneficial. However, organizations cannot rely solely on KM improvement to drive service quality—parallel strengthening of professional commitment, work motivation, and interpersonal communication through targeted institutional interventions is necessary to fully realize the model's optimization potential.

## Conclusions

This study successfully developed and validated a comprehensive structural model of CI service quality determinants in Indonesian healthcare education, with the following theoretical and practical contributions. Theoretically, the study provides the first simultaneously validated causal model positioning knowledge management as exogenous, professional commitment, work motivation, and interpersonal communication as intervening variables, and CI service quality as the endogenous outcome in the Indonesian clinical education context. The POP-SDM framework's sequential exploratory design ensured the model was empirically grounded in local organizational dynamics rather than imported from unvalidated grand theory.

Practically, all ten hypotheses were confirmed: four direct effects ( $X1 \rightarrow Y: \beta=0.208$ ;  $X2 \rightarrow Y: \beta=0.195$ ;  $X3 \rightarrow Y: \beta=0.212$ ;  $X4 \rightarrow Y: \beta=0.234$ ), three exogenous-to-intervening effects ( $X1 \rightarrow X2: \beta=0.655$ ;  $X1 \rightarrow X3: \beta=0.737$ ;  $X1 \rightarrow X4: \beta=0.771$ ), and three indirect effects ( $X1 \rightarrow X2 \rightarrow Y: \beta=0.136$ ;  $X1 \rightarrow X3 \rightarrow Y: \beta=0.144$ ;  $X1 \rightarrow X4 \rightarrow Y: \beta=0.163$ ), all significant. Partial mediation was confirmed for all three intervening variables.

For policy and practice: Ministry of Health and clinic administrators should prioritize (1) KM infrastructure development—as the exogenous driver producing cascading improvements; (2) communication training programs targeting the three weakest interpersonal indicators; (3) incentive redesign to address unmet motivational hygiene needs; and (4) professional identity development initiatives to cultivate affective and normative commitment. Future research should examine gender and tenure moderation effects, test the model in hospital-based versus community clinic settings, and assess whether longitudinal KM and communication interventions produce durable service quality improvements.

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