IJBMC International Journal of Body, Mind and Culture

Volume 13, Issue 5, Article e2026-1415
DOI: 10.61838/ijbmc.v13i5.1415

Article type:
Original Research

Midwives' Knowledge and Perceived Readiness for Preventing Mother-to-Child HIV Transmission in Luzon, Philippines: A Cross-Sectional Survey

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Article history:

Received 17 Feb 2026
Revised 22 Mar 2026
Accepted 01 Apr 2026
Published online 01 May 2026

How to cite this article:
Atendido, M. R. A. (2026). Midwives' Knowledge and Perceived Readiness for Preventing Mother-to-Child HIV Transmission in Luzon, Philippines: A Cross-Sectional Survey. International Journal of Body, Mind and Culture, 13(5), Article e2026-1415. https://doi.org/10.61838/ijbmc.v13i5.1415

ABSTRACT

Objective: This study assessed midwives' knowledge of prevention of mother-to-child transmission of HIV and perceived readiness to implement PMTCT measures in selected regions of Luzon, Philippines.

Methods and Materials: This cross-sectional analytic survey included 132 registered midwives from Region I, Region II, Region III, and the Cordillera Administrative Region of Luzon. Participants were recruited through convenience sampling from hospitals, rural health units, birthing centers, and clinics. Data were collected using a structured questionnaire including demographic and professional characteristics, a 20-item PMTCT knowledge test, and a 12-item Likert-scale readiness measure. Data were analyzed using descriptive statistics, Spearman's correlation, Mann–Whitney U tests, and multiple and hierarchical regression analyses.

Findings: The mean PMTCT knowledge score was 13.42 ± 2.51 out of 20, equivalent to 67.1% correct responses. Knowledge was higher in counseling and communication (77.3%), legal-ethical issues (74.5%), and transmission and epidemiology (70.6%), but lower in screening and diagnosis (54.0%) and antiretroviral-related interventions (59.3%). Overall perceived readiness was high (mean= 4.01/5), with motivational indicators exceeding structural support. Knowledge and readiness were not significantly correlated (ρ= 0.006, p= 0.947). Regression analysis showed that regular HIV training (β= −0.31, p=0.002) and direct HIV care exposure (β= −0.20, p= 0.030) significantly predicted readiness, while knowledge and years of experience did not.

Conclusion: Midwives showed moderate PMTCT knowledge and high perceived readiness, but readiness was driven more by training and clinical exposure than knowledge alone.

Keywords: HIV Infections, Midwifery, Health Knowledge, Attitudes, Practice.

Introduction

Eliminating mother-to-child transmission of human immunodeficiency virus (HIV) remains a global public health priority. Without effective intervention, HIV can be transmitted during pregnancy, childbirth, or breastfeeding, accounting for the majority of pediatric HIV infections worldwide. While high-income countries have largely achieved MTCT rates below elimination thresholds, low- and middle-income countries (LMICs) face persistent barriers that limit sustained implementation of prevention services (Kourtis et al., 2006).

The Philippines continues to face a rapidly growing HIV epidemic, with an estimated 189,000 people living with HIV (PLHIV) by the end of 2023, according to the Department of Health HIV & AIDS Surveillance report (Oct–Dec 2023), and only about 70,916 PLHIV on antiretroviral therapy (ART) by mid-2023 (59% of diagnosed cases) (Nkwo, 2012). Sexual transmission remains the dominant mode of HIV spread, while mother-to-child transmission continues to occur, with historical reports noting that only about 15% of pregnant women living with HIV were receiving ART for PMTCT as of early 2023 (Gangcuangco & Eustaquio, 2023). National HIV testing coverage among women and maternal populations remains low relative to UNAIDS targets, and gaps persist in early infant diagnosis and service linkage across the maternal continuum (UNAIDS, 2023).

Despite the Philippine HIV and AIDS Policy Act (RA 11166), which mandates universal access to HIV services and protects patient confidentiality, fragmented service delivery persists. Unequal diagnostic access between urban and rural facilities, stockouts of HIV rapid test kits and infant prophylaxis medications, and variable workforce preparedness continue to challenge effective PMTCT implementation. Rising HIV incidence among women of reproductive age further elevates the risk of vertical transmission, underscoring the need for a continuum-of-care approach that integrates maternal, intrapartum, postpartum, and infant-focused interventions (UNAIDS, 2023).

Midwives are central to PMTCT implementation in the Philippine decentralized health system. However, their specific roles and responsibilities vary substantially by facility type. In hospitals, midwives typically assist with intrapartum care, administer infant prophylaxis, and coordinate with physicians for ART initiation. In rural health units**,** midwives often serve as the primary—and sometimes only—maternal health provider, conducting antenatal counseling, offering HIV testing, and referring HIV-positive women to delivery facilities. In birthing centers, midwives manage low-risk deliveries independently but may lack immediate access to physicians or HIV specialists for complex PMTCT decisions. In geographically isolated and disadvantaged areas, midwives may function with minimal supervision, limited diagnostic supplies, and infrequent opportunities for refresher training. Recognizing these contextual differences is essential because a midwife's readiness to implement PMTCT may depend less on individual knowledge and more on the structural supports available within her specific facility type.

Beyond technical care, midwives deliver respectful, woman-centered, and stigma-sensitive services, making them pivotal to both clinical and humanistic aspects of HIV prevention. Evidence from Ghana shows that midwives' PMTCT knowledge is moderate and positively associated with age and educational attainment, highlighting the need for targeted professional development in LMIC contexts (Donkor & Senoo-Dogbey, 2023). International competency standards emphasize that effective PMTCT practice requires not only knowledge but also communication skills, confidence, supervision, and access to enabling resources (Midwives, 2019).

This study draws on three implementation science frameworks to interpret findings, rather than to operationalize formal analytic models. The Capability–Opportunity–Motivation–Behavior (COM-B) model posits that behavior is shaped by the interaction of capability (knowledge and skills), opportunity (physical and social environment), and motivation (automatic and reflective processes) (Michie et al., 2011). The Consolidated Framework for Implementation Research (CFIR) highlights the importance of inner setting (organizational context, resource availability, leadership engagement) and individual characteristics (self-efficacy, knowledge, beliefs) in successful intervention adoption (Damschroder et al., 2009). Organizational readiness theory further distinguishes individual competence from broader structural determinants such

as collective efficacy and contextual support (Weiner, 2020).

Importantly, this study does not operationalize all COM-B or CFIR constructs in a formal analytic model. Instead, these frameworks provide a conceptual lens for understanding why knowledge alone may be insufficient for readiness and how structural factors (training access, supervision, resources) may independently influence perceived preparedness. This approach is consistent with implementation science guidance that frameworks can be used for interpretive, rather than measurement, purposes (Nilsen, 2020).

Previous studies on PMTCT provider preparedness have largely focused on training and knowledge as determinants of performance (Horwood et al., 2010; Tessema et al., 2019). However, fewer studies have specifically examined midwives' readiness as a self-reported construct distinct from knowledge. Among those that have, findings suggest that readiness encompasses motivation, confidence, perceived organizational support, and access to resources—domains not captured by knowledge tests alone (Adawiyah et al., 2022). In Southeast Asia, evidence remains limited. A systematic contrast with existing regional studies reveals that most have assessed either patient-level service uptake or facility-level system readiness, with very few concurrently examining both midwife knowledge and self-perceived readiness. For example, studies from Indonesia and Thailand have documented PMTCT training coverage and knowledge gaps but have not measured perceived readiness as a distinct construct (Adawiyah et al., 2022). This gap is particularly relevant in decentralized service settings like the Philippines, where training access, supervision, and diagnostic availability vary by location, and an early-career workforce composition may influence both knowledge and readiness.

Four Luzon regions—Region I (Ilocos), Region II (Cagayan Valley), Region III (Central Luzon), and the Cordillera Administrative Region (Essajee et al., 2017)—were selected for this study. These regions reflect diverse geographic and facility contexts, including urban tertiary hospitals, rural health units, private birthing centers, and isolated communities. PMTCT coverage varies across these areas, with maternal HIV testing rates ranging from 18% in some CAR municipalities to 34% in Central Luzon (Nkwo, 2012). The regions are also accessible for data collection while capturing the decentralized realities of Philippine maternal health services.

This study aimed to assess midwives' knowledge of PMTCT across five clinical domains: transmission and epidemiology, screening and diagnosis, antiretroviral interventions, counseling and communication, and legal-ethical considerations. It also evaluated midwives' self-perceived readiness to implement PMTCT measures, differentiating between motivational indicators (role perception, motivation, confidence) and structural indicators (training access, supervision, and resource availability). Finally, the study examined the association between knowledge and perceived readiness and explored predictors of readiness, including years of experience, prior HIV training, specialized PMTCT training, and direct exposure to HIV-positive clients, using regression-based analyses.

By distinguishing between descriptive and correlational aims, this study provides a clearer roadmap for readers and avoids overclaiming causal relationships. The findings are intended to inform targeted strategies for strengthening workforce preparedness in decentralized maternal HIV prevention.

Methods and Materials

Study Design

A cross-sectional analytic survey was conducted among registered midwives in Region I, Region II, Region III, and the Cordillera Administrative Region of Luzon, Philippines. These regions encompass a mix of urban hospitals, rural health units, birthing centers, clinics, and geographically isolated communities, providing a diverse context for examining PMTCT implementation in decentralized maternal care systems. The design enabled the simultaneous assessment of knowledge and self-reported readiness, as well as the exploration of their association within routine service delivery environments.

Participants and sampling

Eligible participants were registered midwives currently engaged in maternal and child health services and willing to participate voluntarily. Participants were recruited from hospitals, rural health units, and birthing centers. However, variability in roles related to PMTCT implementation across these facility types was not

formally controlled, and comparability of PMTCT - related responsibilities across settings was not verified. A convenience sampling approach was used to facilitate access to geographically dispersed participants across the four regions. Although practical for workforce-based research in decentralized systems, this approach does not ensure representativeness and introduces a risk of selection bias, thereby limiting the generalizability of the findings. Of 215 midwives approached, 132 completed the survey, yielding a completion rate of 61.4%. While this response rate is acceptable for survey-based studies, nonresponse bias cannot be excluded, as the characteristics of non-respondents were not assessed. The sample was predominantly early-career, with 60.6% reporting less than one year of experience and 26.5% reporting one to five years. This distribution may influence both knowledge and perceived readiness and may not fully represent more experienced segments of the midwifery workforce.

Instrument

Data were collected using a structured questionnaire consisting of three sections: (1) demographic and professional characteristics, (2) a 20-item dichotomously scored knowledge test, and (3) a 12-item readiness scale measured on a five-point Likert format. The knowledge test covered domains including transmission and epidemiology, screening and diagnosis, antiretroviral-related interventions, counseling and communication, and legal-ethical considerations. The readiness scale assessed role perception, motivation to update knowledge, confidence in counseling, awareness of guidelines, familiarity with testing and treatment, collaboration, and perceived organizational support, including supervision, training, and resource availability.

The instrument was developed based on international PMTCT guidelines, midwifery competency standards, and implementation science concepts. It underwent expert review and pilot testing; minor revisions were made following pilot feedback, and pilot participants were excluded from the final sample. Content validity was established through expert evaluation, yielding a Scale-Level Content Validity Index (S-CVI/Ave) of 0.96 and a Universal Agreement index (S-CVI/UA) of 0.85, indicating excellent agreement among experts. Internal consistency was acceptable for the knowledge test (KR-20 = 0.76) and high for the readiness scale (Cronbach's α = 0.89). The readiness measure reflects self-perceived readiness rather than objective performance and should be interpreted as a theory-informed exploratory measure.

Readiness to implement PMTCT measures was measured using a 12-item Likert scale (1–5), and a composite mean score was calculated for each participant. Readiness levels were interpreted using equal-interval categories (4.21–5.00 = very high; 3.81–4.20 = high; 3.21–3.80 = moderate; 2.61–3.20 = low–moderate; 1.00–2.60 = low). These thresholds were applied for descriptive purposes and do not represent validated cutoffs. For descriptive interpretation, readiness items were grouped into professional motivation and structural support domains; these groupings were theory-informed and not subjected to psychometric validation.

Data collection

Data collection was conducted from January to June 2023 using both paper-based and electronic questionnaires to accommodate variations in internet access and facility conditions. Participants were informed of the study's purpose, procedures, and ethical safeguards prior to participation. Written informed consent was obtained from all participants. Completed questionnaires were reviewed for completeness before inclusion in the dataset. While the use of mixed data collection modes increased accessibility and participation, potential mode effects on responses were not formally assessed.

Data analysis

Data were analyzed using IBM SPSS Statistics (Version 31). Prior to analysis, the dataset was screened for completeness, accuracy, and consistency. Non-analytical variables were removed, and cases with missing values in key variables (knowledge and readiness scores) were excluded, resulting in a final sample of 132 participants. All variables were coded and prepared for analysis.

Descriptive statistics were used to summarize participant characteristics and study variables. Frequencies and percentages were reported for categorical variables, while means and standard deviations were calculated for continuous variables. Knowledge of PMTCT was assessed using a 20-item dichotomous scale (range: 0–20), and domain-level performance was expressed as percentage scores.

Inferential analyses were conducted to examine relationships and group differences. The association between knowledge and readiness was assessed using Spearman's rank-order correlation, given the ordinal scaling of readiness and potential non-normality of the data. Differences in knowledge and readiness across binary variables (e.g., training exposure and HIV care experience) were evaluated using Mann–Whitney U tests. To identify predictors of readiness, multiple linear regression analysis was performed with readiness as the dependent variable and knowledge score, years of experience, prior HIV training, specialized PMTCT training, and exposure to HIV-positive clients as independent variables. Model assumptions, including linearity, independence, homoscedasticity, and absence of multicollinearity, were assessed and met.

Hierarchical multiple regression analysis was further conducted to examine the incremental contribution of explanatory variables. Variables were entered in blocks: Model 1 included knowledge; Model 2 added years of experience; and Model 3 incorporated structural and experiential variables (regular HIV training, specialized training, and HIV care exposure). Changes in explained variance (ΔR^2) were evaluated to determine the relative contribution of each block. All statistical tests were two-tailed, with statistical significance set at $p < 0.05$. An a priori sample size calculation, based on detecting a small-to-moderate correlation ($r = 0.25$) with $\alpha = 0.05$ and power = 0.80, indicated a minimum sample size of 123 participants.

Table 1

Demographic and Professional Characteristics (N = 132)

Variable	Category	n (%)
Gender	Female	124 (93.9)
	Male	8 (6.1)
Age	18–24 years	59 (44.7)
	25–34 years	53 (40.2)
	≥35 years	20 (15.1)
Years of Experience	<1 year	80 (60.6)
	1–5 years	35 (26.5)
	>5 years	17 (12.9)
Facility Type	Hospital	55 (41.7)
	Rural Health Unit	34 (25.8)
	Birthing Center	18 (13.6)
	Clinic	14 (10.6)
	Others	11 (8.3)
Educational Attainment	Diploma/Certificate	90 (68.2)
	Bachelor's Degree	34 (25.8)
	Other	8 (6.0)
Regular HIV Training	Yes	35 (26.5)
	No	97 (73.5)
Specialized PMTCT Training	Yes	20 (15.2)
	No	112 (84.8)
Direct Care of HIV-Positive Clients	Yes	47 (35.6)
	No	85 (64.4)

Ethical considerations

The study was approved by an ethics review board (Approval No. 2023-164) and adhered to the principles of the Declaration of Helsinki. Participation was voluntary, informed consent was obtained, and all responses were anonymized. No personally identifiable information was collected, and participants were free to withdraw at any time without penalty.

Findings and Results

Participant Characteristics

A total of 132 midwives participated, predominantly female (93.9%) and aged 18–34 years (84.9%). Most were early-career practitioners, with 60.6% reporting less than one year of experience. Participants were primarily employed in hospitals (41.7%) and rural health units (25.8%) and held diploma-level qualifications (68.2%). Access to HIV-related training was limited: 26.5% reported regular training, 15.2% specialized training, and 35.6% had direct experience caring for HIV-positive or at-risk pregnant women (Table 1). The sample profile highlights a workforce largely early in their careers with limited specialized PMTCT exposure.

Knowledge of PMTCT

The mean knowledge score was 13.42 out of 20 (SD = 2.51), corresponding to 67.1% correct responses. This was interpreted as moderate based on general descriptive convention, not a validated classification framework. Domain-specific performance varied: counseling and communication (77.3%), legal-ethical and professional issues (74.5%), and transmission and epidemiology (70.6%) showed higher knowledge, whereas screening and diagnosis (54.0%) and antiretroviral-related interventions (59.3%) scored lower. Item-level analysis revealed marked gaps in technically complex areas, including timing of early infant diagnosis (14.4%) and interpretation of early HIV test accuracy (16.7%), as well as breastfeeding recommendations (43.9%), duration of prophylaxis (50.8%), and antiretroviral regimens (53.0%) (Table 2). These findings indicate stronger conceptual and counseling knowledge relative to technical, protocol-driven competencies. Small subgroup sizes precluded formal cluster analyses by training or clinical exposure, limiting explanatory inferences regarding knowledge variability.

Table 2

Knowledge Levels of Midwives on Prevention of Vertical Transmission of HIV (N=132)

Domain	Topic / Focus Area	Correct Responses (n)	Correct Rate (%)	Domain Average (%)
Transmission & Epidemiology	Partner Involvement in Prevention	131	99.2	**70.6**
	Routes of Mother-to-Child Transmission	96	72.7	
	Risk Factors for Vertical Transmission	76	57.6	
	Timing of HIV Transmission Risk	70	53.0	
Screening & Diagnosis	Informed Consent in HIV Testing	130	98.5	**54.0**
	HIV-Exposed Infants Screening	114	86.4	
	Accuracy of HIV Tests in Early Infection	22	16.7	
	Timing of Early Infant HIV Diagnosis	19	14.4	
Medical Interventions (ART)	Intrapartum Interventions	118	89.4	**59.3**
	Antiretroviral Drugs for PMTCT	70	53.0	
	Duration of Antiretroviral Prophylaxis	67	50.8	
	Breastfeeding Recommendations	58	43.9	
Counseling & Communication	Role of Midwives in Patient Education	126	95.5	**77.3**
	Midwives' Role in Prevention Success	117	88.6	
	Goal of Pre-Conception Counseling	91	68.9	
	Essential Components of Antenatal Counseling	74	56.1	
Legal, Ethical & Professional	Confidentiality and HIV Status	130	98.5	**74.5**
	Objective of HIV Prevention in Pregnancy	100	75.8	
	Legal Rights of HIV-Positive Pregnant Women	97	73.5	
	Methods for Preventing Vertical Transmission	66	50.0	

Overall Knowledge Score	Value	Standard Deviation (SD)	2.51
Mean Score (out of 20)	13.42		

Readiness to implement PMTCT measures

Overall perceived readiness was high (M = 4.01). Item-level analysis showed that motivational indicators—professional identity (M = 4.58), motivation to update knowledge (M = 4.45), and perceived organizational encouragement (M = 4.45)—were rated highest. Structural indicators, including familiarity with protocols (M = 3.80), access to supervision/feedback (M = 3.54), resources (M = 3.50), and training/support (M = 3.46), scored lower. Grouping items descriptively, motivational scores (M = 4.21, SD = 0.34) exceeded structural scores (M = 3.66, SD = 0.41), suggesting stronger intrinsic than system-level readiness. These results should be interpreted cautiously, as readiness was self-reported and may reflect normative responding, and domain groupings were theory-informed rather than psychometrically validated. COM-B and CFIR mappings support conceptual interpretation but do not indicate formal measurement (Table 3).

Table 3

Widwives' Readiness to Prevent Mother-to-Child HIV Transmission: Mapping to COM-B and CFIR Frameworks

Readiness Indicator	Mean	SD	Interpretation	COM-B Domain	CFIR Domain	CFIR Construct
Belief that PMTCT is part of my role	4.58	0.62	Very High	Motivation (Reflective)	Characteristics of Individuals	Knowledge & Beliefs
Motivation to update knowledge/skills	4.45	0.71	Very High	Motivation (Reflective)	Characteristics of Individuals	Individual Stage of Change
Perceived organizational support	4.45	0.68	Very High	Opportunity (Social)	Inner Setting	Implementation Climate
Comfort discussing sensitive topics	4.29	0.82	Very High	Capability (Psychological)	Characteristics of Individuals	Self-Efficacy
Collaboration with HCPs	4.07	0.79	High	Opportunity (Social)	Inner Setting	Networks & Communication
Awareness of barriers	4.06	0.84	High	Capability (Psychological)	Characteristics of Individuals	Knowledge & Beliefs
Awareness of local guidelines	4.05	0.88	High	Capability (Psychological)	Characteristics of Individuals	Knowledge of Intervention
Confidence in counseling	3.89	0.91	High	Capability (Psychological)	Characteristics of Individuals	Self-Efficacy
Familiarity with testing/treatment	3.80	0.95	Moderate	Capability (Psychological)	Characteristics of Individuals	Knowledge & Beliefs
Access to resources	3.50	1.08	Moderate	Opportunity (Physical)	Inner Setting	Available Resources
Access to supervision/feedback	3.54	1.02	Moderate	Opportunity (Social)	Process	Reflecting & Evaluating
Receipt of training/support	3.46	1.12	Moderate	Opportunity (Social)	Process	Training & Education

Association between knowledge and readiness

Spearman's correlation indicated no significant association between knowledge and readiness (ρ = 0.006, 95% CI [−0.16, 0.17], p = 0.947), suggesting that knowledge and self-perceived readiness represent distinct dimensions of workforce preparedness. The sample size exceeded the minimum required for detecting a small-to-moderate correlation, reducing the likelihood that the null finding reflects insufficient power. No subgroup analyses by training, experience, or HIV care exposure were conducted for the correlation.

Table 4

Correlation Between Knowledge and Readiness

Variables	ρ	p
Knowledge vs Readiness	0.006	.947

Group Differences in Knowledge and Readiness

Mann–Whitney U tests examined differences by training and HIV care exposure. Knowledge scores did not differ significantly by regular HIV training (p = .173), specialized PMTCT training (p = .360), or direct HIV care exposure (p = .613). In contrast, readiness scores were higher among midwives with regular HIV training (M = 4.32 vs. 3.89; p < .001) and those with direct HIV care experience (M = 4.27 vs. 3.87; p < .001). Differences by specialized training were not statistically significant (p = .073) (Table 5). These findings highlight the importance of practical exposure and ongoing training for perceived readiness.

Table 5

Group Differences in Knowledge and Readiness (Mann–Whitney U Test)

Variable	Outcome	Mean (Yes)	Mean (No)	p
Regular HIV Training	Knowledge	13.91	13.23	.173
	Readiness	4.32	3.89	< .001
Specialized Training	Knowledge	13.85	13.35	.360
	Readiness	4.20	3.97	.073
HIV Care Exposure	Knowledge	13.56	13.35	.613
	Readiness	4.27	3.87	< .001

Multiple Linear Regression Analysis

Multiple linear regression analysis was conducted to identify predictors of readiness. The overall model was statistically significant, $F(5,126) = 5.12$, $p < .001$, explaining 16.9% of the variance in readiness ($R^2 = .169$; adjusted $R^2 = .136$).

Table 6

Multiple Linear Regression Predicting Readiness

Predictor	B	SE B	β	t	p
Constant	4.30	0.33	—	12.96	< .001
Knowledge	0.014	0.023	0.05	0.61	.544
Experience	0.015	0.071	0.02	0.21	.832
Regular HIV Training	-0.412	0.127	-0.31	-3.24	.002
Specialized Training	0.002	0.152	0.00	0.01	.989
HIV Care Exposure	-0.273	0.124	-0.20	-2.20	.030

Note: Binary variables (Regular HIV Training, Specialized Training, HIV Care Exposure) were coded as 0 = Yes, 1 = No. Therefore, negative coefficients indicate higher readiness scores among midwives who reported having training or clinical exposure.

Table 7

Hierarchical Multiple Regression Predicting Readiness

Model	Predictors	R^2	ΔR^2	Adjusted R^2	F	p
Model 1	Knowledge	0.000	—	-0.008	0.004	.947
Model 2	Knowledge, Experience	0.008	0.008	-0.007	0.536	.587
Model 3	Knowledge, Experience, Training, Specialized, Exposure	0.169	0.161	0.136	5.118	.0003

Hierarchical Regression Analysis

A hierarchical regression analysis was performed to examine the incremental contribution of structural and experiential variables beyond knowledge. The addition of structural variables significantly improved the model, increasing explained variance by 16.1%. Knowledge and experience did not contribute meaningfully, whereas training and clinical exposure accounted for the majority of the explained variance. The results demonstrate that while midwives possess moderate knowledge and high perceived readiness, knowledge alone does not predict readiness. Instead, readiness is strongly influenced by structural and experiential factors, particularly access to training and direct clinical exposure.

Discussion and Conclusion

This study assessed knowledge of prevention of mother-to-child transmission of HIV (PMTCT) and perceived implementation readiness among midwives in Luzon, Philippines. Knowledge varied across domains, with stronger performance in conceptual, counseling, and ethical areas compared with technically complex, protocol-driven components. Perceived readiness was generally high, with motivational indicators exceeding structural support. Integrated analyses showed that knowledge was not significantly associated with readiness, whereas prior training and direct clinical exposure were significant predictors. Readiness was self-reported, and knowledge was measured via a structured test, which may not fully reflect applied clinical competence.

High performance in counseling, informed consent, confidentiality, and professional roles aligns with international midwifery competencies and rights-based care standards (Midwives, 2019; Organization, 2022). Lower scores in early infant diagnosis, HIV testing, breastfeeding guidance, and antiretroviral protocols highlight gaps in technically complex content, consistent with other low- and middle-income settings (Essajee et al., 2017; Horwood et al., 2010). These results suggest priority areas for targeted capacity-building to improve PMTCT outcomes.

Structural and experiential factors, rather than knowledge or years of experience, predicted perceived preparedness. Midwives with regular HIV training and direct HIV care exposure demonstrated higher readiness. Within the COM-B framework, capability and opportunity are necessary for behavior enactment, even

when motivation is high (Michie et al., 2011). Implementation research emphasizes the importance of organizational context, leadership, and resources in shaping readiness (Damschroder et al., 2009; Weiner, 2020).

The lack of association between knowledge and readiness underscores the distinction between cognitive competence and perceived ability to implement care. Experiential learning, structured training, and supportive environments appear more influential than knowledge alone in shaping preparedness (Organization, 2022). High self-rated motivation may also reflect social desirability and professional norms rather than actual capacity (Paulhus, 1991).

Despite rising HIV incidence, access to maternal HIV services remains uneven, with antenatal testing coverage ranging from 18% to 34% across regions and limited early infant diagnosis in rural facilities (Organization, 2022). The pattern of high motivation but constrained readiness indicates that midwives are willing but not fully supported. Strengthening PMTCT requires integrated approaches addressing training, clinical exposure, and system-level support (Proctor et al., 2011).

Limitations include self-reported readiness, potential social desirability bias, structured knowledge assessment that may not reflect applied performance, predominance of early-career midwives, convenience sampling, and cross-sectional design. Future research should employ larger, representative samples with longitudinal and objective measures of implementation outcomes (Shadish et al., 2002). Knowledge and perceived readiness are distinct yet complementary dimensions of workforce preparedness. Optimizing PMTCT implementation requires integrated strategies encompassing structured training, experiential learning, and system-level support.

Limitations

Several limitations should be considered when interpreting these findings. The study employed convenience sampling, and the sample was predominantly early-career midwives, which limits generalizability to the broader Philippine midwifery workforce. Its cross-sectional design precludes causal inference regarding PMTCT knowledge, perceived implementation readiness, or actual service delivery. The readiness instrument, though internally consistent and informed by theory, was developed specifically for this study and has not undergone full psychometric validation. Importantly, it captures only self-reported perceptions rather than observed PMTCT implementation behaviors, and actual clinical performance, adherence to PMTCT protocols, and patient-level outcomes were not assessed. Self-reported measures may also be influenced by social desirability bias, potentially inflating ratings of motivation, confidence, or perceived readiness. Potential confounders, including years of experience, prior HIV training, specialized PMTCT training, and direct exposure to HIV-positive clients, were not analyzed using multivariable modeling, and subgroup differences were not explored. The completion rate of 132 out of 215 approached by midwives introduces the possibility of nonresponse bias. Data collection utilized both paper-based and electronic questionnaires, which may have influenced response patterns. Taken together, these limitations indicate that the findings primarily reflect descriptive, self-reported perceptions among a predominantly early-career cohort. Future research should employ larger, more representative samples, incorporate objective measures of PMTCT service delivery and implementation fidelity, and use fully validated instruments to elucidate how knowledge, motivation, and structural factors interact to influence PMTCT practice over time.

In this sample of Luzon midwives, PMTCT knowledge was moderate, with stronger performance in counseling, ethical, and conceptual domains than in technical, protocol-dependent areas, particularly early infant diagnosis and ART-related interventions. Self-perceived readiness was generally high, driven by professional motivation and role alignment, yet structural support—including training, supervision, and resources—remained moderate. Knowledge and years of experience did not significantly predict readiness, whereas regular HIV training and direct clinical exposure emerged as the primary structural and experiential determinants, accounting for most of the explained variance. The absence of a significant correlation between knowledge and perceived readiness underscores that workforce preparedness is multidimensional and heavily influenced by experiential and organizational factors rather than knowledge alone. Strengthening PMTCT implementation in decentralized health systems may

therefore require integrated strategies: targeted technical capacity-building for midwives alongside system-level investments to enhance training, supervision, and resource availability. Future research should employ larger, representative samples, validate readiness instruments, and assess how knowledge, motivation, and structural factors translate into actual PMTCT practices and patient outcomes.

Acknowledgments

The author gratefully acknowledges all participants for their valuable time and contribution to this study.

Declaration of Interest

The author declares no conflict of interest. Any opinions, findings, and conclusions expressed are solely those of the author.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants. Ethical considerations in this study were that participation was entirely optional.

Transparency of Data

All data supporting results are available from the author upon reasonable request. The study followed research transparency principles, with analyses using standard, reproducible statistical procedures.

Funding

This study was supported by the Ilocos Sur Polytechnic State College (ISPSC). The funder had no role in study design, data collection, analysis, interpretation, or manuscript preparation.

Authors' Contributions

The author solely conceived, designed, conducted, analyzed, and wrote the entire study.

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