Research Square

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Training, experience, and practice of intrauterine device insertion and removal in primary health care: a cross-sectional study

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Research Article

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Abstract

Background

Access to contraception is an essential component of sexual and reproductive health and high-quality health care. In primary health care (PHC), availability of intrauterine devices (IUDs) depends not only on initial training but also on specific experience, continued education, opportunities for practice, and organizational support. This study aimed to analyze the association between professional training characteristics, experience in sexual and reproductive health, perceived need for additional training, and performance of IUD insertion and removal among physicians and nurses working in PHC.

Methods

We conducted an analytical cross-sectional study in the PHC network of Campo Grande, Mato Grosso do Sul, Brazil, between November 2025 and February 2026. Physicians and nurses working in the 33 PHC facilities authorized to provide IUD insertion and management were eligible. A census strategy was adopted, and 81 professionals from 28 facilities participated. Data were collected using a 22-item electronic questionnaire. Categorical variables were analyzed using Pearson's chi-square or Fisher's exact test, and continuous variables using the Mann–Whitney U test. Statistical significance was set at 5%, with two-sided tests.

Results

Among participants, 86.4% had previously received training for IUD insertion, 63.0% had participated in training or continuing education during the previous year, and 45.7% reported needing additional training. The perceived need for additional training was associated with not performing IUD insertion ($p = 0.010$) and removal ($p = 0.007$). Longer experience in sexual and reproductive health was associated with performing insertion ($p = 0.003$) and removal ($p = 0.038$). Previous training and recent training were not significantly associated with current performance of either procedure. Open-ended responses indicated needs beyond technical skills, including health education, clinical protocols, service organization, access, and quality of the professional–user consultation.

Conclusions

Initial training alone may not be sufficient to sustain IUD procedural practice in PHC. Specific experience in sexual and reproductive health, regular practice, continuing education, supervision, and adequate organizational conditions should be considered complementary components of sustainable contraceptive service capacity. For the Brazilian Unified Health System (SUS), expanding access to IUDs requires building institutional capacity rather than relying solely on the number of trained professionals.

Background

Access to contraception is an essential component of sexual and reproductive health and of the quality of health care. The choice, initiation, use, and discontinuation of contraceptive methods, according to individual preferences, clinical needs, and reproductive plans, require method availability, accessible services, adequate information, and counseling that supports autonomy and shared decision-making [1, 2].

Intrauterine devices (IUDs), including copper devices and levonorgestrel-releasing intrauterine systems, are among the most effective long-acting reversible contraceptive (LARC) methods. Because they depend little on user adherence, they represent an important option for effective, reversible contraception. Across Latin America and the Caribbean, access to and use of modern contraceptive methods remain uneven and are influenced by socioeconomic and health-system factors [3, 4].

Integrating LARC methods into primary health care (PHC) can increase service capacity and reduce barriers associated with referrals and fragmented care. Evidence indicates that IUD and implant provision can be integrated into PHC through structured training, qualified professionals, and organizational support [5, 6]. Task sharing can also increase the availability of contraceptive methods across professional categories when accompanied by appropriate training, clearly defined competencies, and institutional support, without compromising the safety or effectiveness of care [7].

In this context, the ability to perform IUD insertion and removal is a strategic component of contraceptive service provision. Although theoretical and practical training is fundamental to developing these skills, their consolidation depends on updating, regular opportunities for practice, and favorable working conditions [5, 6, 8]. Completion of training does not necessarily ensure continued use of a procedural skill, particularly when exposure to procedures is low or institutional support is insufficient [8, 9]. Specific experience in sexual and reproductive health may play an important role, including because it may be more directly related to maintaining contraceptive competencies than general measures of professional seniority. Studies among PHC nurses have identified knowledge gaps and limited opportunities for LARC practice, while also associating experience and qualification with greater provision of these methods [9].

In Brazil, Permanent Health Education (PHE) frames professional development as a process linked to needs arising from everyday work and to the transformation of health practices [10]. For IUD provision, this perspective extends qualification beyond one-off training sessions to include supervised practice, updating, institutional support, and organization of the work process.

The quality of contraceptive care also depends on the ability to provide person-centered counseling that respects preferences, values, and autonomy. Shared decision-making is associated with greater satisfaction with counseling and the chosen method, whereas perceptions of professional preference may compromise this experience [1, 2]. For IUDs, information about method characteristics, benefits, risks, and possible adverse effects may influence acceptance and continuation. However, studies have identified counseling approaches that frequently emphasize potential adverse effects while giving less

attention to individual preferences and expectations [11]. Thus, professional qualification for IUD provision should integrate procedural competence, communication, and person-centered care.

Despite the relevance of these aspects, evidence remains limited regarding the joint analysis of professional training, specific experience in sexual and reproductive health, perceived need for training, and actual performance of IUD-related procedures among PHC professionals. Previous studies have addressed training, competencies, service organization, and strategies to expand access, but analyses linking these dimensions to procedures actually performed by professionals are less common [5, 6, 8, 9, 12]. This gap is particularly relevant in public health systems seeking to decentralize contraceptive services and expand their territorial availability.

In Brazil, expansion of IUD provision in PHC has increasingly involved different professional categories and service models, including nurse-led provision and teaching-service settings [13, 14]. This context provides an opportunity to investigate how training and experience characteristics are associated with contraceptive procedures in PHC.

Against this background, this study aimed to analyze the association between professional training characteristics, experience in sexual and reproductive health, and perceived need for additional training and the performance of IUD insertion and removal procedures among physicians and nurses working in PHC.

Methods

Study design and setting

We conducted an observational, analytical cross-sectional study with a quantitative approach in the PHC network of Campo Grande, Mato Grosso do Sul, Brazil, between November 2025 and February 2026. The study was part of a professional master's dissertation in the Professional Master's Program in Family Health (ProfSaúde), linked to the national Family Health training network coordinated by the Oswaldo Cruz Foundation (Fiocruz). The research was developed within a professional training context oriented toward the needs of the Brazilian Unified Health System (SUS), with the objective of analyzing the association between professional training characteristics, experience in sexual and reproductive health, perceived need for additional training, and performance of IUD insertion and removal procedures.

The study design and reporting were guided by the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) recommendations [15].

During the study period, the municipality had 74 PHC facilities and 227 Family Health Strategy teams. Physicians and nurses working in the 33 municipal facilities authorized to provide IUD insertion and management were eligible. A census strategy was adopted by inviting all professionals who met the eligibility criteria; no sample-size calculation was performed. The final sample comprised 81 professionals from 28 health facilities distributed across different areas of the municipality.

Recruitment and participants

Recruitment was conducted through an institutional notice from the Campo Grande School of Public Health, dissemination in professional groups, individual messages, and in-person approaches at health facilities. Professionals were invited to participate voluntarily. Those who could not be reached after three contact attempts on different days and those who declined participation were classified as nonparticipants.

Participation required electronic acceptance of the informed consent form. Professionals who were not working at eligible facilities during the data-collection period or who did not complete the research instrument were excluded.

Data collection instrument and procedures

Data were collected using a structured electronic questionnaire developed on Google Forms and comprising 22 questions. The instrument was based on the Brazilian Ministry of Health's Technical Manual for Health Professionals: Copper IUD TCu 380A and the U.S. Selected Practice Recommendations for Contraceptive Use, 2024 [16, 17]. The questionnaire addressed professional and training characteristics, participation in training and continuing education, experience in PHC and sexual and reproductive health, performance of IUD insertion and removal procedures, and perceived need for additional training.

The instrument did not undergo formal psychometric validation. Before data collection, a pretest was conducted with professionals who met the eligibility criteria but were not included in the final sample, to assess clarity of the questions, comprehension of the content, and completion time. Adjustments identified through the pretest were made before the final application.

Variables and outcomes

The primary outcomes were self-reported performance of IUD insertion and removal, both assessed as dichotomous categorical variables.

The main exposure and professional-characterization variables included professional category, postgraduate education, previous training for IUD insertion, participation in training or continuing education during the previous year, perceived need for additional training, and professional experience.

Professional experience was assessed according to time since graduation, time since qualification for IUD insertion, time working in PHC, and time working in sexual and reproductive health. These variables were treated as distinct measures of general experience, PHC experience, procedure-specific experience, and experience specifically in sexual and reproductive health.

Statistical analysis

Analyses were conducted using available cases for each variable, with no imputation of missing data. Categorical variables were presented as absolute and relative frequencies. Numerical variables were initially assessed for distribution, and the Shapiro–Wilk test rejected the normality hypothesis; therefore, numerical variables were described using medians and interquartile ranges (IQR).

Associations between categorical variables and IUD insertion and/or removal were assessed using Pearson's chi-square test or Fisher's exact test, according to the expected frequency distribution. Continuous variables related to professional experience were compared between professionals who did and did not perform the procedures using the Mann–Whitney U test.

A 5% significance level was adopted, with two-sided tests. Because of the small number of professionals who did not perform insertion (n = 9) or removal (n = 6), the analysis was restricted to bivariate comparisons, and multivariable models were not fitted. This decision was intended to avoid potentially unstable estimates resulting from the small number of events in the non-performance groups.

Analysis of open-ended responses

The questionnaire included an open-ended question designed to identify professionals' suggestions for reducing potentially avoidable IUD removals. Seventy-two responses were considered valid.

Responses were read in full, recurrent ideas were identified, and descriptive thematic categories were created. Categories were subsequently quantified using absolute and relative frequencies. This stage had a descriptive and complementary purpose within the quantitative analysis, aiming to characterize professionals' perspectives on qualification needs related to IUD care. No interpretive qualitative analysis or in-depth content analysis was performed.

Contextual information on the health network

To characterize the care context of the municipal network, aggregated data from the Qualifica APS Project were used regarding the participation of facilities hosting medical and multiprofessional Family Health residency programs in IUD insertions between 2021 and 2024. These data were used exclusively as contextual information on the organization of procedure provision and were not used as an individual-level exposure variable or as evidence of a causal or statistical association between the presence of residency programs and professional practice.

Ethical considerations

The study was approved by the Research Ethics Committee of Centro Universitário da Grande Dourados (CAAE No. 90165525.2.0000.5159). All participants provided electronic informed consent before participation. Measures were adopted to preserve confidentiality and participants' identities.

Use of artificial intelligence in manuscript preparation

During manuscript preparation, the authors used ChatGPT (OpenAI) exclusively to support textual organization and English-language editing. The tool was not used to generate or analyze study data, perform statistical analyses, or make decisions about study design or interpretation. All AI-assisted text was reviewed and edited by the authors, who take full responsibility for the final manuscript.

Results

Eighty-one PHC professionals from 28 facilities distributed across different areas of the municipality were included. The sample composition reflected the care profile of the network, with a predominance of family and community physicians and participation of nurses, general practitioners, and obstetrician-gynecologists.

Most participants had previous training in IUD management, but previous training and participation in training during the preceding year were not significantly associated with current performance of insertion or removal. Complete descriptive data are presented in Table 1.

Table 1
Participant training and professional practice characteristics, Campo Grande, Brazil, 2026

Characteristic	n	%
Family and Community Physician	63	77.8
Nurse	13	16.0
General Practitioner	3	3.7
Obstetrician-Gynecologist	2	2.5
Postgraduate education	52	64.2
Previous training for IUD insertion	70	86.4
Training/continuing education during the previous year	51	63.0
Reported need for additional IUD management training	37	45.7
Performs IUD insertion	72	88.9
Performs IUD removal	75	92.6

Data are presented as n (%). Source: study data, 2026.

Bivariate analysis identified an association between perceived need for additional training and non-performance of IUD insertion and removal. In contrast, previous training and training during the previous

year were not associated with current practice (Table 2). Because the study is cross-sectional, the direction of these associations cannot be established.

Longer experience in sexual and reproductive health was associated with performing both IUD insertion and removal (Table 2), suggesting that field-specific exposure may be relevant to maintaining procedural practice.

Table 2
Training, experience, and IUD procedure performance, Campo Grande, Brazil, 2026

Variable	Insertion: no (n = 9)	Insertion: yes (n = 72)	p	Removal: no (n = 6)	Removal: yes (n = 75)	p
Previous training for insertion – yes	7 (77.8%)	63 (87.5%)	0.602	5 (83.3%)	65 (86.7%)	0.999
Training during the previous year – yes	7 (77.8%)	44 (61.1%)	0.473	5 (83.3%)	46 (61.3%)	0.405
Need for additional training – yes	8 (88.9%)	29 (40.3%)	0.010	6 (100%)	31 (41.3%)	0.007
Time in sexual and reproductive health, median (Q1–Q3)	1 (0–3)	4 (2–9)	0.003	2 (0–4)	4 (2–9)	0.038

Categorical variables were compared using Pearson's chi-square or Fisher's exact test, as appropriate; continuous variables using the Mann–Whitney U test. IUD, intrauterine device; Q1–Q3, first to third quartiles. Source: study data, 2026.

The open-ended responses added a complementary dimension to the quantitative findings. Professionals' suggestions were not limited to acquisition of technical skills but included health education and counseling for users, Permanent Health Education, clinical protocols, service structure and access, and improvement of the professional–user consultation and relationship. The distribution of categories is presented in Table 3.

Table 3
Professional suggestions for improving IUD-related care, Campo Grande, Brazil, 2026

Category	% of responses (n = 72)
Health education and counseling for users	44.4
Professional training and Permanent Health Education	25.0
Clinical protocols	12.5
Service structure and access	11.1
Consultation quality and professional–user relationship	6.9

Percentages are based on 72 valid open-ended responses. Source: study data, 2026.

Taken together, the quantitative findings and open-ended responses indicate that IUD service capacity is related not only to formal training but also to opportunities for practice and organizational conditions. Professionals' suggestions included continuing education, counseling, protocols, service organization, access, and consultation quality.

Aggregated contextual information from the municipal network indicated that facilities hosting Family Health residency programs participated in IUD service delivery during 2021–2024. These data were used only to characterize the service context and were not included in individual-level association analyses.

Discussion

This study found that formal training alone was not associated with sustained IUD procedural practice in PHC. Although most professionals had previously received training, perceived need for additional training was associated with non-performance of IUD insertion and removal. These findings are consistent with evidence showing that LARC provision is shaped by training, practical experience, service organization, and opportunities to perform procedures [8, 9, 12, 18].

Longer experience in sexual and reproductive health was associated with performance of both procedures. This finding supports the view that competence in contraceptive procedures depends on continued exposure to the relevant clinical field and opportunities to apply acquired skills. A survey of PHC nurses in Australia similarly identified limited opportunities for LARC practice and associations between experience, qualification, knowledge, and provision [9].

The relationship between training and practice is also relevant in settings formally oriented toward PHC training. A Brazilian study of residents and preceptors in medical and multiprofessional residency programs identified gaps in safety and technical mastery of IUD insertion, suggesting that exposure to formal training processes does not, by itself, guarantee consolidation of procedural competencies [19].

Training literature nevertheless demonstrates that educational interventions can change practice when appropriately structured. In France, specific training in IUD and implant insertion and removal increased the proportion of physicians performing IUD insertion three months after the intervention [6]. Similarly, a systematic review of health-care provider training in low- and middle-income countries found that provider training was associated with LARC use, although effects varied by context and implementation strategy [20]. Thus, the present findings do not challenge the value of training; rather, they indicate that its effectiveness depends on the conditions under which skills are acquired and subsequently used [6, 20].

Procedural competence can therefore be understood as a dynamic property resulting from the interaction among training, experience, and the work environment. Repeated performance of procedures, supervision, availability of supplies and equipment, and integration of the procedure into care pathways

can facilitate the transformation of acquired competence into effective practice. Implementation studies indicate that integrating LARC services into PHC can reduce barriers related to referrals and waiting time and increase service capacity [5, 21].

Accordingly, the lack of association between recent training and current practice should not be interpreted as evidence that training is unnecessary or ineffective. In a large-scale intervention involving 3,216 contraceptive-service providers, training to include IUDs and implants in PHC was associated with improvements in knowledge, evidence-based counseling, and clinical competence for provision of these methods [8]. These findings reinforce that training remains necessary, but its effectiveness depends on its articulation with the concrete conditions of care delivery [8].

This interpretation has implications for service management. Investing in professional training without ensuring regular opportunities to use acquired skills may produce predominantly nominal capacity. A systematic review of providers' perspectives on contraceptive care identified barriers related to insufficient training, difficulty offering same-day insertion, limited time, and service characteristics [2]. Thus, individual competence and organizational capacity should be considered together [2].

The distribution of these competencies also has implications for territorial equity. When IUD provision depends on the presence of particular professionals in particular facilities, unequal distribution may produce differences in access across territories. Studies in Latin America demonstrate substantial variation in coverage of demand for family planning, influenced by individual and contextual factors, including social inequalities and health-system characteristics [3, 4].

In this context, decentralizing IUD insertion and removal to PHC may contribute to expanding access, provided that it is accompanied by appropriate distribution of competencies and organizational conditions compatible with procedure provision. Formal authorization for a facility to perform a procedure does not, by itself, guarantee operational capacity to do so.

A recent Brazilian experience of expanding contraceptive provision used cascade training, professional capacity building, task sharing, and implementation follow-up to expand IUD insertion and removal in PHC facilities [22]. Likewise, a national study of family physicians in Portugal found a low proportion of professionals who felt fully prepared to perform LARC insertions autonomously, with organizational limitations and gaps in practical training identified as major barriers [18]. These findings converge with the present study and reinforce that procedural competence results from the interaction between training, experience, and institutional context [18, 22].

The concentration of IUD production in facilities that also function as residency settings should be interpreted cautiously. Aggregated contextual data do not allow causality to be attributed to residency programs, but teaching-service environments may offer opportunities for supervised practice and maintenance of procedural skills. This interpretation is consistent with evidence of competence gaps during residency training and with studies showing that practical opportunities influence incorporation of contraceptive procedures into routine practice [6, 19].

Another relevant finding was the breadth of qualification needs identified by professionals themselves. The predominance of topics related to health education and counseling for users, followed by professional training, protocols, service structure, and consultation quality, indicates that qualification of care is perceived as a multidimensional phenomenon. A systematic review of providers' perspectives showed that barriers to high-quality counseling include time constraints, difficulties offering certain methods, and gaps in training in contraception and person-centered care [2].

This finding broadens the understanding of professional qualification: IUD provision should not be reduced to the technical ability to insert or remove the device but should integrate counseling, shared decision-making, management of adverse effects, follow-up, and the possibility of removal when requested. Studies show that people value individualized information, participation in decisions, autonomy, and continuity of care, whereas overly directive counseling may compromise satisfaction and autonomy [1, 11, 23].

Shared decision-making should therefore be incorporated into professional qualification alongside clinical and procedural competencies. The COCO study evaluated a structured approach based on users' needs and expectations and reinforced the importance of incorporating individual preferences into contraceptive choice [24]. Similarly, an intervention study in India demonstrated that person-centered counseling and shared decision-making strategies can improve perceived quality of contraceptive care [23].

This perspective is fundamental to protecting users' autonomy. A policy aimed at expanding IUD access should increase contraceptive choices rather than transform expanded availability into an incentive to use a particular method. A systematic review of users' perspectives showed that comprehensive, individualized information combined with support for autonomy and shared decision-making is associated with greater satisfaction, whereas pressure to choose a particular method may generate conflict and even contraceptive refusal [11].

Interpretation of the findings is strengthened by the convergence between the quantitative associations and professionals' reported qualification needs. These sources do not establish causal relationships, but together they support the hypothesis that maintenance of IUD practice is related to specific experience, perceived training needs, and organizational conditions.

For municipal management, monitoring could incorporate, in addition to the number of trained professionals, indicators of maintenance of practice, procedure frequency, territorial distribution of professionals performing insertion and removal, availability of supplies, waiting time, and the service's capacity to meet demand for removal. Experiences integrating LARC into PHC have shown that providing procedures within the service can substantially reduce waiting time compared with referral to specialized services [21].

The main contribution of this study is to show that previous training, by itself, was not a sufficient marker of current procedural practice. The observed pattern is consistent with evidence identifying competence

gaps, limited practice opportunities, organizational barriers, and the need for continuous professional development for LARC provision in PHC [2, 9, 18, 19].

Taken together, the findings suggest that sustainable expansion of IUD provision requires a shift in perspective: from a model centered on certification or one-time training toward one oriented to maintaining competence and effective service capacity. In this model, training, specific experience, regular practice, supervision, work-process organization, and person-centered care should be understood as complementary dimensions of a single strategy to expand equitable access to contraception.

The findings also indicate an applied research agenda. Longitudinal studies could assess whether training combined with supervision and regular practice opportunities supports maintenance of competence and continued performance of procedures. Implementation studies could test Permanent Health Education strategies linked to reorganization of care pathways, considering not only knowledge and skill but also their effective use and users' access.

For the SUS, the main implication is that expanding access to IUDs requires more than increasing the number of trained professionals. Sustainable institutional capacity must be built through training, regular practice, technical support, protocols, supplies, and appropriate organizational conditions. Thus, the capacity to provide IUDs in PHC should be understood as an attribute of the health system rather than solely of individual professionals, favoring more equitable, continuous, and person-centered contraceptive provision.

Limitations

This study has limitations that should be considered when interpreting the findings. The cross-sectional design prevents establishing temporality or causality between training, experience, perceived need for additional training, and performance of the procedures. Therefore, it is not possible to determine whether lower procedural practice contributed to greater perceived need for training or whether insecurity or limited prior exposure to the procedures contributed to non-performance.

Self-reported information may have introduced recall or social-desirability bias, particularly for variables related to professional training and performance of procedures. The use of an electronic questionnaire and the absence of formal validation of the instrument may also limit measurement precision, although the instrument was based on technical documents and pretested. The small number of professionals who did not perform insertion or removal restricted statistical power and precluded stable multivariable modeling.

Open-ended responses were analyzed descriptively and therefore do not support the inferences of an in-depth qualitative approach. Likewise, contextual data on facilities functioning as residency settings were used only to characterize network organization and do not establish an association between in-service training and individual practice. Finally, conducting the study in a single municipality limits

generalizability to settings with different PHC organization, workforce, training policies, and contraceptive service infrastructure.

Conclusions

PHC professionals showed a high frequency of previous training for IUD insertion and recent participation in training activities. However, perceived need for additional training was associated with non-performance of insertion and removal, whereas greater experience in sexual and reproductive health was associated with performing these procedures. The findings suggest that initial training, although necessary, is not sufficient to ensure maintenance of procedural practice, reinforcing the importance of specific experience, regular practice, and institutional support.

Professionals' reported needs also extended beyond technical training to include health education, clinical protocols, service organization, and availability of supplies. Therefore, sustainable expansion of IUD provision in PHC requires Permanent Health Education strategies linked to opportunities for practice, supervision, and adequate organizational conditions, understanding the capacity to provide the method as an attribute of the health network rather than solely of individual professionals.

Abbreviations

CAAE
Certificate of Presentation for Ethical Consideration
IQR
interquartile range
IUD
intrauterine device
LARC
long-acting reversible contraception
PHC
primary health care
PHE
Permanent Health Education
STROBE
Strengthening the Reporting of Observational Studies in Epidemiology
SUS
Brazilian Unified Health System.

Declarations

Ethics approval and consent to participate

The study was approved by the Research Ethics Committee of Centro Universitário da Grande Dourados (CAAE No. 90165525.2.0000.5159). All participants provided electronic informed consent before participation. The study was conducted in accordance with applicable Brazilian ethical standards for research involving human participants.

Consent for publication

Not applicable. The manuscript contains no identifiable individual participant data, images, or videos.

Availability of data and materials

The datasets generated and/or analysed during the current study are not publicly available because they contain potentially identifiable professional and service-level information, but a de-identified dataset may be available from the corresponding author on reasonable request and subject to approval by the responsible institution and ethics requirements.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

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