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Family Planning Knowledge, Contraceptive Practice and Unmet Need among Married Women of Reproductive Age in Urban and Rural Areas of Karimnagar, Telangana: A Comparative Community-Based Cross-Sectional Study

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ABSTRACT :

Background: Family planning allows individuals and couples to decide freely and responsibly on the number and spacing of their children. Knowing about contraception does not automatically lead to its use; method preferences, fear of side effects, access, partner communication and counselling quality all play a part.

Objective: To compare family planning knowledge and contraceptive practice between urban and rural married women of reproductive age in Karimnagar, Telangana, and to identify factors associated with current modern contraceptive use.

Methods: A community-based cross-sectional study was conducted from October 2023 to May 2024 in the urban and rural field practice areas of a tertiary care hospital. Of 452 eligible married women aged 18–49 years, 400 were interviewed (response rate 88.5%; 200 urban, 200 rural) using a pretested structured questionnaire. Groups were compared with chi-square (continuity-corrected) or Fisher's exact tests and t-tests; proportions are given with Wilson 95% confidence intervals. Factors associated with current modern method use were examined by multivariable logistic regression.

Results: Awareness of at least one modern method was 96.8% overall, but current modern method use was 60.5% (95% CI 55.6–65.2), and a further 10.5% used traditional methods. Modern method use did not differ between urban (61.0%) and rural (60.0%) women ($p = 0.919$), although urban women had higher awareness and knowledge scores (mean 7.1 vs 6.5; $p < 0.001$). Unmet need (simplified definition) was 21.5% (95% CI 17.8–25.8). The commonest barriers among non-users of modern methods ($n = 158$) were fear of side effects (41.8%) and desire for pregnancy (36.7%). In the adjusted model (AUC 0.73), parity ≥2 (aOR 2.59; 1.18–5.68), secondary education or above (2.39; 1.42–4.04) and not wanting a child within two years (3.62; 2.00–6.56) were associated with modern method use, whereas adequate knowledge was not (0.93; 0.56–1.54).

Conclusion: High awareness coexisted with moderate use and substantial unmet need, a knowledge-to-practice gap driven more by fertility intention, parity and education than by knowledge itself. Programmes should pair awareness with individualised, non-coercive counselling that addresses side-effect concerns and involves partners, while respecting autonomy.

Keywords: Family planning; contraception; unmet need; knowledge–practice gap; reproductive health; cross-sectional study; Karimnagar; Telangana; India.

Key points

- **Known:** Awareness of contraception is high in India, yet unmet need and method-mix imbalance persist.
- **Added:** In Karimnagar, 96.8% knew a modern method but only 60.5% used one; urban and rural use was equal despite an urban knowledge advantage.
- **Implication:** Parity, education and fertility intention, not knowledge scores, predicted use; counselling reached only 47.2% of women.

1. Introduction

Family planning is a cornerstone of sexual and reproductive health. When services are voluntary, confidential, respectful and free from coercion, access to acceptable and effective contraception supports informed choice about whether and when to have children, enables birth spacing and reduces unintended pregnancy [1,6,20]. Investment in family planning is also recognised as a driver of progress towards several Sustainable Development Goals, including those on maternal and child health, education and gender equality [7,12].

Contraceptive behaviour is shaped by much more than awareness. Age, education, parity, fertility intention, socioeconomic circumstances, cultural norms, partner communication, perceived adverse effects, myths and the range of methods actually available all influence practice [6,8,21,25]. Men's participation can support shared decision-making, but contraceptive responsibility should not rest solely with women, and counselling should protect each person's autonomy [8,9,22].

India's National Family Health Survey (NFHS) provides the main population-level benchmarks, and national programme guidance is reviewed annually by the Ministry of Health and Family Welfare [1,11]. Nationally, unmet need for family planning fell from 20.6% in 1993 to 9.4% in 2021, yet an estimated 24 million women still had unmet need in 2021 [12]. In NFHS-5 (2019–21) the prevalence of any modern method among currently married women aged 15–49 years in Telangana was 66.7%, compared with 57.0% in NFHS-4, while unmet need for spacing was 2.8% [2] (Figure 1). Only 17.0% of female non-users reported that a health worker had ever talked to them about family planning [2]. A cross-sectional study of 306 women in urban and rural Telangana reported an overall unmet need of 18.6%, higher in urban (24.2%) than rural (13.1%) areas, pointing to a persistent knowledge–action gap [3].

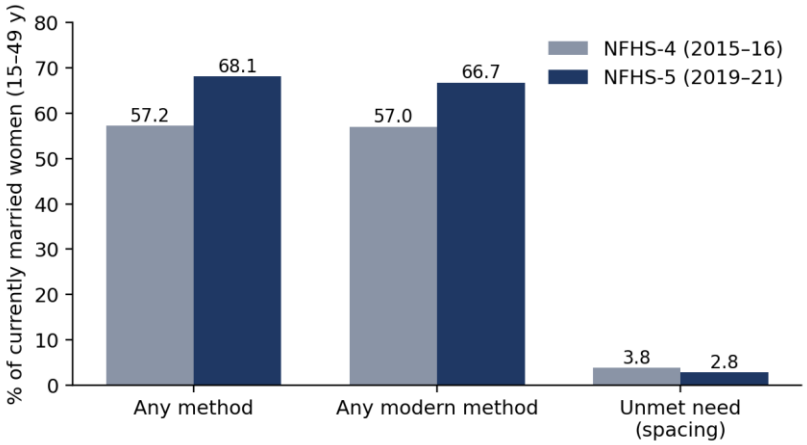


Figure 1. Family planning indicators for Telangana, NFHS-4 (2015–16) versus NFHS-5 (2019–21), currently married women aged 15–49 years. Source: reference [2].

Heavy reliance on female sterilisation, limited uptake of reversible spacing methods and the persistence of side-effect fears characterise India's method mix [13,15,17]. Because national and state surveys cannot show how women in a particular district make decisions, local community-level evidence is needed to guide counselling at primary health centres, health and wellness centres and outreach platforms [4,5,16]. This study therefore compared family planning knowledge and practice between urban and rural married women in Karimnagar, Telangana, and examined whether knowledge itself explains who uses a modern method.

2. Aim and objectives

Aim: To compare family planning knowledge and contraceptive practice between urban and rural married women of reproductive age in Karimnagar, Telangana.

- To describe sociodemographic and reproductive characteristics of participants.
- To assess awareness of spacing and limiting methods.
- To estimate current contraceptive use and the method mix, with clearly defined denominators.
- To compare knowledge and practice between urban and rural areas.
- To describe barriers, counselling exposure and partner communication.
- To identify factors associated with current modern method use.

3. Materials and methods

3.1 Study design and setting

A community-based cross-sectional study was conducted from October 2023 to May 2024 in the urban and rural field practice areas of a tertiary care hospital in Karimnagar, Telangana, India. The study is reported according to the STROBE statement [10,24]; the conceptual framework guiding variable

selection is shown in Figure 7.

3.2 Study population

Currently married women aged 18–49 years who had lived in the catchment area for at least one year and gave written informed consent were eligible. Women who were seriously ill, had a hearing or speech impairment preventing interview, or were not available after two visits were excluded. Non-users of contraception were not excluded.

3.3 Comparison groups

The prespecified comparison was between women in the urban field area (Group A) and the rural field area (Group B), defined before data collection.

3.4 Sample size

The sample size was calculated with the formula $n = Z^2pq/d^2$, assuming a current modern method prevalence of 60%, absolute precision of 7% and 95% confidence, which gives 188 women per area. Because households were sampled individually from a line list, no design effect was applied (design effect = 1); allowing for non-response of about 6%, the target was 200 per area (total 400).

3.5 Sampling and recruitment

In each area a household line list from the field practice register served as the sampling frame. Households were selected by systematic random sampling; one eligible woman per household was chosen (by lottery if more than one was eligible). Recruitment is summarised in the STROBE flow diagram (Figure 2).

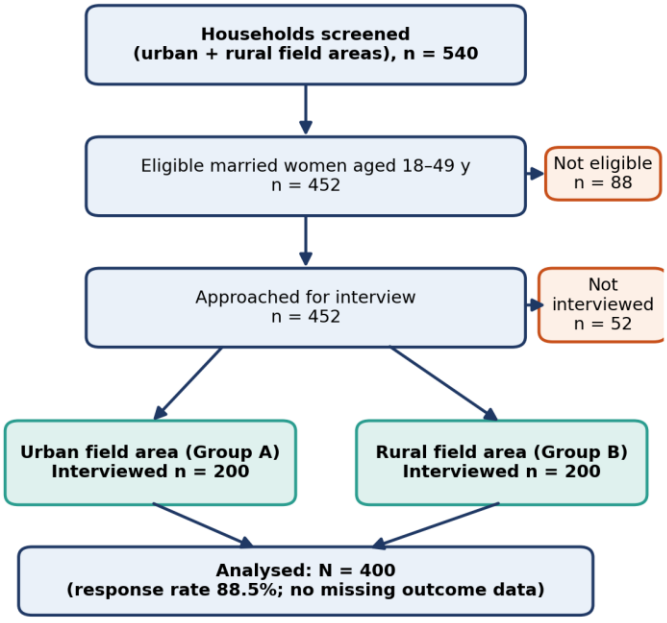


Figure 2. STROBE participant flow diagram. Of 540 households screened, 452 women were eligible and 400 were interviewed (200 urban, 200 rural; response rate 88.5%).

3.6 Data collection

Trained interviewers administered a structured questionnaire in Telugu, translated from English and back-translated, reviewed by two community medicine experts and pilot-tested on 20 women outside the sample. Interviews were conducted privately. Domains were age, education, parity, fertility intention, awareness of eight methods (prompted), current use, counselling, spousal discussion, barriers and decision-making. A 10-point knowledge score was built from correct answers on method awareness, effectiveness, side effects and eligibility.

3.7 Operational definitions

Table 1. Operational definitions

Term	Definition used in this study
Awareness	Prompted recognition of a named method
Adequate knowledge	Knowledge score ≥7 out of 10
Current modern method use	Use of condoms, pills, IUCD, injectables or female/male sterilisation at the time of interview
Current traditional method use	Use of withdrawal or rhythm method at the time of interview
Unmet need (simplified)	Not using a modern method, not wanting a child within two years, and fecund; a simplification of the DHS definition [5]
Partner communication	Discussed family planning with spouse in the last 12 months
Counselling	Spoke with a health worker about family planning in the last 12 months

3.8 Statistical analysis

Data were entered in a spreadsheet and analysed in Python (SciPy). Categorical variables are n (%) and continuous variables mean (SD). Groups were compared with the chi-square test (with Yates' continuity correction) or Fisher's exact test where any expected cell count was <5, and the independent t-test. Proportions are given with Wilson 95% confidence intervals [23]. Factors associated with current modern method use were examined by logistic regression with all eight prespecified covariates entered together; crude and adjusted odds ratios (aOR) are reported with 95% CI, and discrimination was summarised by the area under the ROC curve. Significance was set at $p < 0.05$.

3.9 Ethical considerations

Institutional Ethics Committee approval was obtained before commencement of the study. Written informed consent was obtained from all participants.

4. Results

4.1 Participants

Of 540 households screened, 452 women were eligible and 400 were interviewed (response rate 88.5%), 200 in each area (Figure 2). There were no missing data on the outcome.

4.2 Sociodemographic and reproductive characteristics

Urban and rural groups were broadly comparable in age, parity and fertility intention, but secondary or higher education was more common in urban women (68.0% vs 49.0%; Table 2).

Table 2. Characteristics of participants by area (N = 400)

Characteristic	Urban n (%)	Rural n (%)	Total n (%)	p-value
Participants included	200	200	400	—
Age group (years)				
18–24	46 (23.0)	43 (21.5)	89 (22.2)	0.509
25–29	74 (37.0)	66 (33.0)	140 (35.0)	
30–34	43 (21.5)	56 (28.0)	99 (24.8)	
35–49	37 (18.5)	35 (17.5)	72 (18.0)	
Education				
Below secondary	64 (32.0)	102 (51.0)	166 (41.5)	<0.001
Secondary or above	136 (68.0)	98 (49.0)	234 (58.5)	
Parity				
0–1	62 (31.0)	54 (27.0)	116 (29.0)	0.441

Characteristic	Urban n (%)	Rural n (%)	Total n (%)	p-value
2+	138 (69.0)	146 (73.0)	284 (71.0)	
Fertility intention				
Wants child within 2 y	39 (19.5)	37 (18.5)	76 (19.0)	0.899
No immediate wish	161 (80.5)	163 (81.5)	324 (81.0)	

Percentages are column percentages; p-values are from chi-square tests.

4.3 Family planning knowledge

Awareness of at least one modern method was almost universal (urban 99.0%, rural 94.5%), but awareness of injectable contraception (39.0%) and emergency contraception (47.8%) was far lower (Table 3, Figure 3). Urban women had higher awareness of condoms, pills, female sterilisation and emergency contraception, and a higher mean knowledge score (7.1 vs 6.5; $p < 0.001$).

Table 3. Awareness of contraceptive methods and knowledge score by area

Indicator	Urban n (%)	Rural n (%)	Difference, % points (95% CI)	p-value
Aware of ≥1 modern method	198 (99.0)	189 (94.5)	4.5 (1.1 to 7.9)	0.020
Condoms	196 (98.0)	180 (90.0)	8.0 (3.4 to 12.6)	0.001
Oral contraceptive pills	183 (91.5)	162 (81.0)	10.5 (3.8 to 17.2)	0.004
Intrauterine contraception	147 (73.5)	145 (72.5)	1.0 (−7.7 to 9.7)	0.910
Injectable contraception	85 (42.5)	71 (35.5)	7.0 (−2.5 to 16.5)	0.183
Emergency contraception	107 (53.5)	84 (42.0)	11.5 (1.8 to 21.2)	0.028
Female sterilisation	192 (96.0)	175 (87.5)	8.5 (3.2 to 13.8)	0.004
Male sterilisation	115 (57.5)	113 (56.5)	1.0 (−8.7 to 10.7)	0.920
Adequate knowledge (score ≥7/10)	127 (63.5)	103 (51.5)	12.0 (2.4 to 21.6)	0.020
Knowledge score, mean (SD)	7.1 (2.0)	6.5 (1.6)	0.62	<0.001

Difference is urban minus rural; Fisher's exact test was used where any expected cell count was <5.

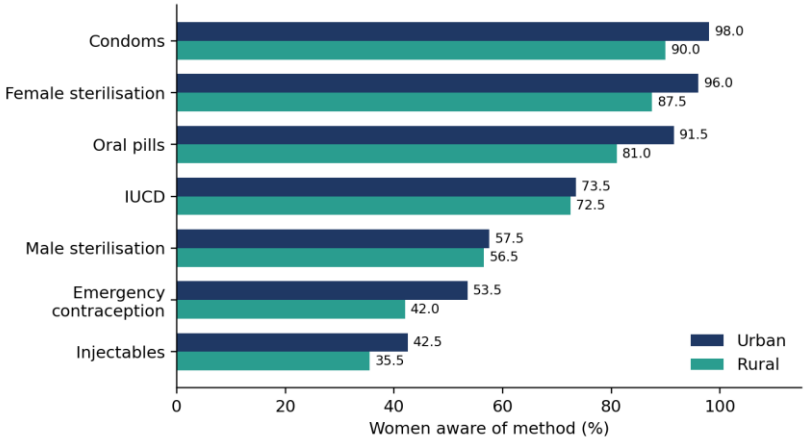


Figure 3. Awareness of individual contraceptive methods by area (% of 200 women per area).

4.4 Current practice and method mix

Current use of any method was 71.0% (284/400), of which modern methods accounted for 60.5% (242/400; 95% CI 55.6–65.2) and traditional methods for 10.5%. Modern method use was similar in urban (61.0%) and rural (60.0%) areas ($p = 0.919$). Female sterilisation was the leading method (22.5%), followed by condoms (17.5%); sterilisation was more frequent among rural women and condoms among urban women (Table 4, Figure 4). Unmet need was 21.5% (95% CI 17.8–25.8), with no significant urban–rural difference (urban 20.0%, rural 23.0%; $p = 0.543$).

Table 4. Current contraceptive method mix by area

Current method	Urban n (%)	Rural n (%)	Total n (%)
No method	57 (28.5)	59 (29.5)	116 (29.0)
Condom	41 (20.5)	29 (14.5)	70 (17.5)
Oral pills	19 (9.5)	19 (9.5)	38 (9.5)
IUCD	17 (8.5)	17 (8.5)	34 (8.5)
Injectable	6 (3.0)	4 (2.0)	10 (2.5)
Female sterilisation	39 (19.5)	51 (25.5)	90 (22.5)
Traditional method	21 (10.5)	21 (10.5)	42 (10.5)

Categories are mutually exclusive; denominators are 200 per area and 400 overall.

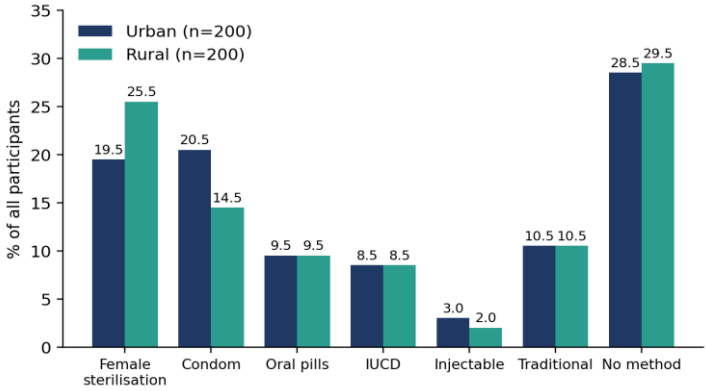


Figure 4. Current contraceptive method mix by area (% of all participants).

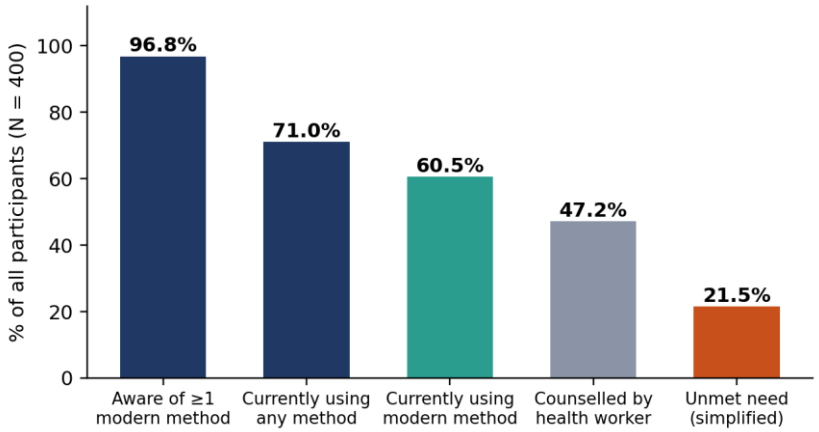


Figure 8. Knowledge-to-practice cascade among all 400 participants: awareness, use, counselling and unmet need. Unmet need uses the simplified definition (Table 1).

4.5 Barriers, counselling and partner communication

Among the 158 women not using a modern method, the commonest reasons were fear of side effects (41.8%), desire for pregnancy (36.7%) and insufficient information or misconceptions (30.4%); partner or family disagreement was reported by 22.8% (Table 5, Figure 5). Fewer than half of all women (47.2%) had been counselled by a health worker, and 53.5% had discussed family planning with their spouse.

Table 5. Barriers, counselling exposure and partner communication

Indicator	n	Denominator	% (95% CI)
Fear of side effects	66	158	41.8 (34.4–49.6)
Insufficient information / misconceptions	48	158	30.4 (23.7–37.9)
Partner / family disagreement	36	158	22.8 (16.9–29.9)
Access, cost or distance	28	158	17.7 (12.6–24.4)
Desire for pregnancy	58	158	36.7 (29.6–44.5)
Perceived low need (e.g. postpartum, breastfeeding)	28	158	17.7 (12.6–24.4)
Counselled by a health worker (all participants)	189	400	47.2 (42.4–52.1)
Discussed family planning with spouse (all participants)	214	400	53.5 (48.6–58.3)

Barriers allowed multiple responses, so percentages exceed 100% in total. Confidence intervals are Wilson intervals.

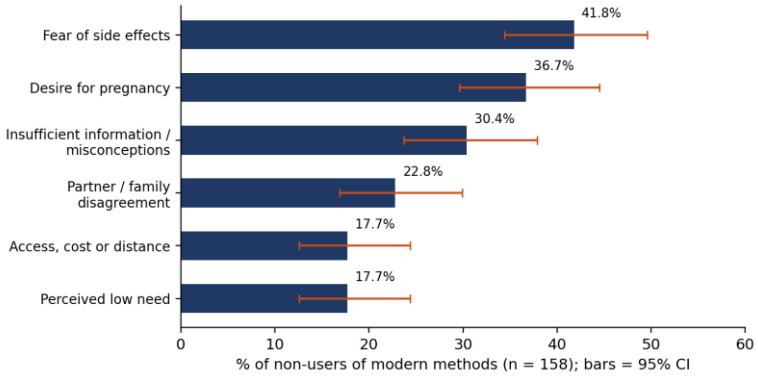


Figure 5. Reported barriers among women not using a modern method (n = 158), with 95% confidence intervals.

4.6 Factors associated with current modern method use

In the model (AUC 0.73), parity ≥2 (aOR 2.59; 95% CI 1.18–5.68), secondary education or above (2.39; 1.42–4.04) and not wanting a child within two years (3.62; 2.00–6.56) were independently associated with modern method use (Table 6, Figure 6). Age lost significance after adjustment because it is strongly related to parity. Adequate knowledge (aOR 0.93; 0.56–1.54), counselling, spousal discussion and rural residence were not independently associated, although the counselling and spousal discussion estimates were in the expected direction with wide confidence intervals.

Table 6. Crude and adjusted associations with current modern method use

Variable	Crude OR (95% CI)	Adjusted OR (95% CI)	p-value (adjusted)
Age ≥25 years (ref: 18–24)	3.27 (2.00–5.32)	1.16 (0.51–2.65)	0.724
Parity ≥2 (ref: 0–1)	3.39 (2.16–5.31)	2.59 (1.18–5.68)	0.018
Secondary education or above	1.78 (1.19–2.68)	2.39 (1.42–4.04)	0.001
Wants no child within 2 y (ref: wants child)	4.81 (2.80–8.26)	3.62 (2.00–6.56)	<0.001
Discussed with spouse	1.32 (0.88–1.97)	1.28 (0.81–2.03)	0.286
Counselled by health worker	1.38 (0.92–2.07)	1.44 (0.91–2.28)	0.121
Adequate knowledge (≥7/10)	1.34 (0.89–2.01)	0.93 (0.56–1.54)	0.786
Rural residence (ref: urban)	0.96 (0.64–1.43)	1.01 (0.64–1.59)	0.971

Outcome: current modern method use (yes/no). All variables entered simultaneously.

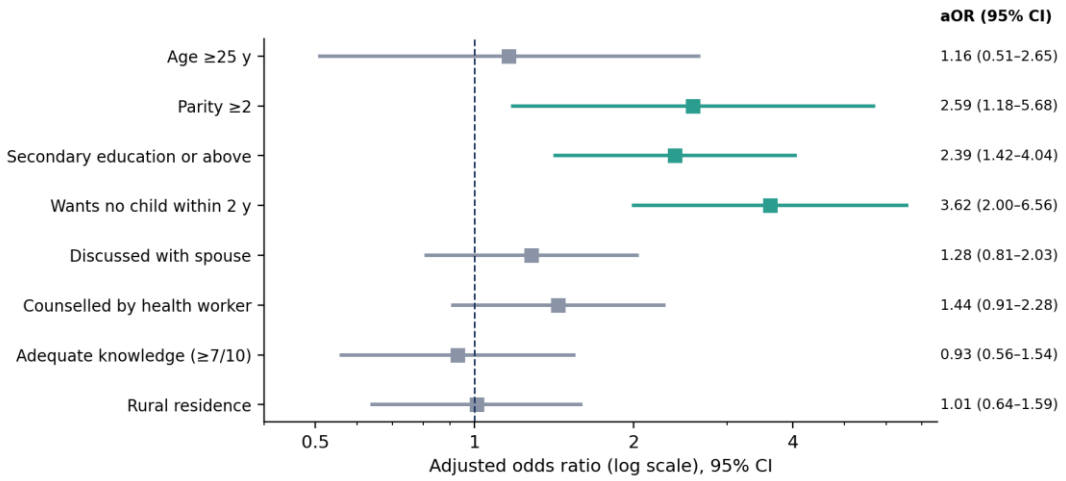


Figure 6. Forest plot of adjusted odds ratios for current modern method use. Teal indicates a 95% CI excluding 1.

5. Discussion

In this study, almost all women knew at least one modern method, yet only six in ten used one, and about one in five had unmet need (Figure 8). Use was shaped less by knowledge than by life-stage and intention factors (parity, wish for a child) and by education, while counselling reached fewer than half of women.

5.1 Comparison with existing evidence

The modern method prevalence of 60.5% is lower than the NFHS-5 estimate for Telangana (66.7%) [2] but above the all-India NFHS-5 figure of 56.5% for currently married women [1,12]. Comparisons should be made cautiously: our sample comprised women in two hospital field practice areas rather than a state-representative survey, and the denominator differs (women aged 18–49 years in our study versus 15–49 years in NFHS) (Table 7).

Table 7. Comparison of key indicators with published estimates

Indicator	This study	Published	Source and note
Any modern method use (%)	60.5	66.7 (Telangana)	NFHS-5 [2]; currently married, 15–49 y
Unmet need, total (%)	21.5*	6.4 (Telangana); 9.4 (India)	NFHS-5 analysis [12]; standard DHS definition
Unmet need, total (%)	21.5*	18.6 (Telangana)	Community study, n = 306 [3]
Unmet need for spacing (%)	not separated	2.8 (Telangana)	NFHS-5 [2]
Counselled by health worker (%)	47.2	17.0 (Telangana non-users)	NFHS-5 [2]; different denominator

**Simplified definition (Table 1); not directly comparable with the full DHS algorithm [5].*

Unmet need in our study (21.5%) is higher than the 18.6% reported in an earlier Telangana community study [3] and far above the NFHS-5-based state estimate of 6.4% and national estimate of 9.4% [12]. This gap is expected to be largely definitional: our simplified measure classifies as unmet need any fecund woman not using a modern method who does not want a child within two years, without the pregnancy, postpartum amenorrhoea and sexual-activity components of the full DHS algorithm [5]. The figure should therefore be read as an upper-bound indicator of unmet need rather than a standard prevalence.

The dominance of female sterilisation matches the long-standing method mix in India [1,2,11,13], and the multilevel evidence on why sterilisation has dominated over two decades [15] and on the low uptake of reversible limiting methods [17] is consistent with our finding that injectable and emergency contraception were the least known options. National analyses likewise show that spacing needs rise with education and that unmet need is concentrated among adolescents and poorer households [12,16,18], which suggests that district programmes need both a broader method basket and targeted outreach.

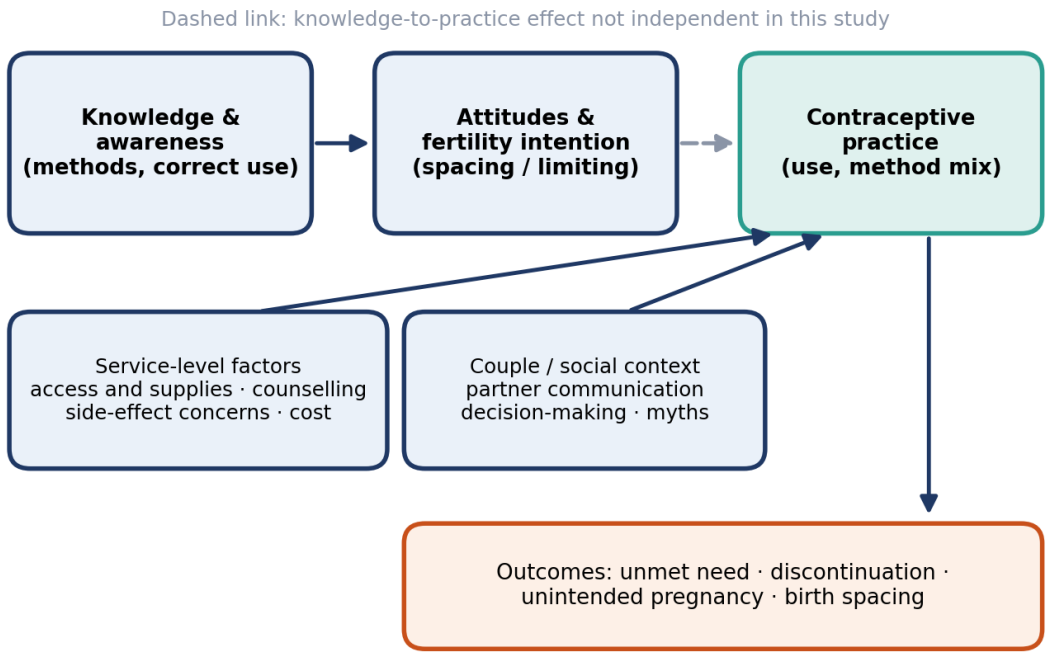


Figure 7. Conceptual framework: knowledge and attitudes feed into practice, shaped by service-level and couple-level factors. The results support the idea that knowledge alone is not sufficient.

5.2 Why knowledge did not predict use

Adequate knowledge was associated with modern method use in the crude analysis (OR 1.34) but not after adjustment (aOR 0.93). Parity, education and the wish for a further child absorbed that association, supporting the view that, in this population, knowing about methods is necessary but not sufficient. Fear of side effects and desire for pregnancy were the leading barriers, which underlines that non-use is not always a problem: it may reflect a wish for pregnancy or an informed preference, and programmes should not treat all non-use as failure [8,9,14,19]. Distinguishing supply-side from demand-side unmet need is particularly important in settings where sterilisation is common and coercion has been documented [9,14].

Only 47.2% of women had been counselled by a health worker. High-quality contraceptive counselling, with attention to individual preferences and shared decision-making, is a recognised determinant of satisfaction and continued use [8,22]. Programme implications are person-centred counselling on side effects and the full method range, respectful engagement of partners and families without compromising women's confidentiality, and reliable supplies [4,8,9,22].

5.3 Strengths and limitations

Strengths include a prespecified comparison, a defined sampling frame, a high response rate (88.5%), multivariable adjustment for confounding and adherence to STROBE [10,24] (Table 8). Limitations, which apply equally to many cross-sectional studies, are that associations cannot establish temporality or causation, self-reported behaviour may be affected by social desirability, unmet need was measured with a simplified definition, only one woman per household was interviewed, and findings from two field practice areas of one hospital may not generalise beyond the study area.

6. Conclusion

High awareness of contraception coexisted with moderate modern method use and substantial unmet need. Fertility intention, parity and education, rather than knowledge scores, were associated with use, pointing to the value of individualised counselling that addresses side effects and involves partners while preserving women's autonomy.

7. Recommendations

- Strengthen individualised counselling on the full range of methods, including injectables and emergency contraception, covering effectiveness, correct use and side effects [4,8,22].
- Offer voluntary, informed, shared decision-making; avoid targets or messaging that pressure women toward a method [9,14].
- Create safe opportunities for spousal communication while protecting confidentiality and women's autonomy.
- Address side-effect fears and misconceptions through trained frontline workers, ensuring reliable supplies and referral pathways.
- Use routine data to monitor counselling coverage and unmet need by area, using the full standard definition where possible [5,12].

Declarations

Ethics approval: Institutional Ethics Committee approval was obtained before commencement of the study.

Consent: Written informed consent was obtained from all participants.

Funding: None.

Conflicts of interest: None.

Author contributions: AGA: conceptualisation, study design, supervision, data analysis, manuscript drafting. AA: data interpretation, literature review, manuscript revision. Both authors approved the final manuscript.

Data availability: De-identified data are available from the corresponding author on reasonable request.

Table 8. STROBE items and where they are reported in this manuscript

STROBE item	Where reported
Study design, setting, dates	Section 3.1
Participants, eligibility, sources	Sections 3.2, 3.5; Figure 2
Variables and definitions	Sections 3.6–3.7; Table 1
Sample size	Section 3.4
Statistical methods, missing data	Sections 3.8, 4.1
Participant numbers at each stage	Figure 2; Section 4.1
Main results with confidence intervals	Tables 3–6; Figures 3–6
Comparison with other studies	Table 7; Section 5.1
Limitations, interpretation, generalisability	Section 5.3
Ethics, funding	Section 3.9; Declarations

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