



# Uptake of Voluntary Surgical Contraception: A Five-Year Trend Analysis in Mobile Health Camps in Bardiya District, Nepal

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## ABSTRACT

**Background:** Voluntary surgical contraception (VSC) is a permanent family planning method, but uptake patterns between male and female differ significantly. Despite being safe and cost-effective, male sterilization remains underutilized, while female sterilization is still the most common method. Thus, this study aimed to describe a five-year trend in VSC service uptake through mobile health camps in Bardiya district, Nepal.

**Methods:** A retrospective descriptive trend analysis was conducted using register data of 1,506 clients who underwent VSC in mobile health camps between fiscal years 2020/21 and 2024/25. Socio-demographic characteristics and method choice (minilap vs vasectomy) were analyzed using descriptive statistics in SPSS version 25. Five-year trend was visualized with line graphs.

**Results:** Among 1506 clients over five years, minilap accounted for 97% of cases and vasectomy 3%. The mean age of client undergoing minilap and vasectomy were found to be 29 years and 37.2 years. Vasectomy was common in Brahmin/Chhetri (58.1%) and minilap was in Janjati women (79.3%). Most were literate and engaged in agriculture. Among the surgical contraception, about two third have at least two children both male and female. Prior contraceptive use was 45%, most commonly short acting reversible contraceptive method like injectable Depo-Provera. Over the five years, both methods showed declining trends, with vasectomy uptake remaining low, indicating a gender gap.

**Conclusion:** The uptake of vasectomy was very low, while minilap was significantly predominant. The overall declining trend in both methods highlights the need for targeted interventions, especially to address gender disparities and misconceptions regarding vasectomy.

**Keywords:** Voluntary surgical contraception, Uptake pattern, Nepal

## BACKGROUND

Family planning is widely recognized as an effective public health intervention for saving lives and improving the health and wellbeing of women, men and children (1). It plays a vital role in sexual and reproductive health care, as it allows couples to plan healthy

reproductive choices and contributes significantly to preventing unintended pregnancies (2).

Globally, out of 842 million women who were using the modern method of contraceptives, 219 million women relying on female sterilization (3), and male sterilization still remains

Received on: 19 August 2025  
Accepted on: 20 December 2025

### Check for updates

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underutilized constituting only about 2% of global contraceptive methods (4). In South Asia, female sterilization has played a central role in national family planning programs, with countries like India and Nepal implementing large-scale campaigns to promote its use (5). Despite these efforts, male sterilization remains low across the region, influenced by cultural norms, misconceptions, and gender roles in reproductive responsibilities (6).

According to Nepal's Annual Health Report 2080/81, 77.1% of permanent method users nationwide were females (5). Among modern method users during the same fiscal year, only 9.8% opted for male sterilization, while 33.5% chose female sterilization (7). Additionally, Nepal Demographic and Health Survey (NDHS) 2022 revealed that 13% of currently married women use female sterilization, while male sterilization accounts for less than 1% of contraceptive use (8).

To increase access to permanent methods in geographically challenged and underserved regions, mobile outreach camps, organized by the Family Welfare Division, offer sterilization services (both male and female), long-acting reversible contraceptives and FP counselling (9). Despite these continuous efforts, there is limited evidence on the utilization patterns, and trends in service delivery through these camps at the district level. Therefore, this study aimed to describe five-year trends in the service uptake by method (vasectomy, minilap), and demographic characteristics of service users can provide valuable insights into program performance and coverage.

## METHODS

This was a retrospective descriptive trend analysis of sterilization services provided through mobile health camps in Bardiya District of Lumbini province, Nepal. The study aimed to analyze the utilization patterns of male and female sterilization over a defined period and assess socio-demographic characteristics of clients. All the data were collected and analyzed from voluntary surgical Contraception outreach camps held between FY 2020/21–2024/25.

Sterilization services (both male and female) were performed by qualified and licensed obstetrics and gynecologist doctors during family planning mobile health camps organized by the Health Office Bardiya.

Standard clinical protocols and national guidelines were followed to ensure patient safety and procedural quality. Data on each sterilization procedure, including client socio-demographic information and previous history of FP devices were recorded in camp registers maintained by the Health Office.

Data was entered and cleaned using Microsoft Excel 2019 and analyzed using Statistical Package for Social Sciences (SPSS) version 25. Descriptive statistics including frequencies, percentages, means, and standard deviations were calculated. Trends in sterilization uptake over the five-year period were visualized with line graph. The validity of data was ensured by cross-verification with original camp records, and any discrepancies were resolved through consultation with program officer of Health Office, Bardiya.

The formal permission was obtained from the Lumbini provincial Health Directorate (Ref. No. 76-2025) to utilize the family planning service-related routine data. Ethical clearance was taken from the Nepal Health Research Council (Ref. No. 565-2025 NHRC). Confidentiality and privacy of client information were strictly maintained by anonymizing all records used in this analysis.

## RESULTS

### Socio-demographic characteristics of respondents

The mean age of client undergoing Minilap and Vasectomy were found to be 29 (SD=4.49) years and 37.2 (SD=5.96) years, respectively. Majority of the participants were Janjati making 77.8% of the operated clients with only 0.1% Muslim. Vasectomy is more common among Brahmin/Chhetri (58.1%), while Minilap was the highest among Janjati women (79.3%). Most of the Minilap and Vasectomy clients were literate. Agriculture represented a significant portion among both vasectomy and Minilap participants. Residence of Rajapur and Barbardiya municipality had slightly higher cases of clients opted to surgical contraception. About two third (64%) clients have at least two children however 2% of clients opted surgical method with at least one child. Majority of client (70%) had both male and female children (Table 1).

Table 1. Sociodemographic characteristics of respondents

Characteristics	Category	Minilap		Vasectomy		Total VSC	
		n	%	n	%	n	%
Age group in year	17-24	195	13.3	0	0	195	12.9
	25-34	1044	71.4	17	39.5	1061	70.5
	35-44	222	15.2	24	55.8	246	16.3
	45-53	2	0.1	2	4.7	4	0.3
	Mean age (SD)	29(4.49)		37(5.96)		29(4.47)	
Ethnicity	Dalit	59	4	5	11.6	64	4.2
	Janjati	1160	79.3	12	27.9	1172	77.8
	Madhesi	139	9.5	1	2.3	140	9.3
	Muslim	1	0.1	0	0	1	0.1
	Brahmin/Chhetri	93	6.4	25	58.1	118	7.8
	Others	11	0.8	0	0	11	0.7
Occupation	Agriculture	765	52.3	25	58.1	790	52.5
	Housewife	682	46.6	0	0	682	45.3
	Daily Wages	0	0	7	16.3	7	0.5
	Business	10	0.7	5	11.6	15	1
	Salary/Job	6	0.4	6	14	12	0.8
Education status	Illiterate	148	10.1	2	4.7	150	10
	Literate	1315	89.9	41	95.3	1356	90
Residence	Badiyatal R-Mun.	97	6.6	5	11.6	102	6.8
	Bansgadhi Mun.	146	10	11	25.6	157	10.4
	Gularia Mun.	193	13.2	4	9.3	197	13.1
	Barbardiya Mun.	274	18.7	5	11.6	279	18.5
	Madhuban Mun.	137	9.4	9	20.9	146	9.7
	Thakurbaba Mun.	187	12.8	5	11.6	192	12.7
	Rajapur Mun.	279	19.1	1	2.3	280	18.6
	Geruwa R-Mun.	150	10.3	3	7	153	10.2
Residence	Rural	247	16.9	8	18.6	255	16.9
	Urban	1216	83.1	35	81.4	1251	83.1
No. of Child	1	28	1.9	2	4.7	30	2
	2	940	64.3	21	48.8	961	63.8
	3	325	22.2	15	34.9	340	22.6
	4 or more	170	11.6	5	11.6	175	11.6
Child Type	Male only	319	21.8	10	23.3	329	21.8
	Female only	118	8.1	4	9.3	122	8.1
	Both male & female	1026	70.1	29	67.4	1055	70.1

Note: R-Mun. = Rural Municipality, Mun= Municipality

## Respondents' Practice of spacing method before Voluntary Surgical Contraception

Prior to the sterilization, history was taken regarding use of spacing methods. About half (45%) of the clients practiced spacing methods. Among them, the most common (43%) method was Depo-Provera. Regarding Long-acting reversible contraceptive (LARC), only 27% utilized before surgical contraception (Table 2).

**Table 2. Practice of spacing method before surgical contraception**

Characteristics	Category	n (%)
History of using any spacing method	Yes	678 (45.0)
	No	828(55.0)
Types of spacing method (n=678)	LAM/Other Natural Method	21(3.1)
	Condom	97 (14.3)
	Pills	93 (13.7)
	Depo-Provera	283 (41.70)
	Implant	116 (17.1)
	IUCD	68 (10.0)
Categories based on duration (n=678)	SARC	494 (73.0)
	LARC	185 (27.0)

SARC= Short acting reversible contraceptive, LARC= Long-acting reversible contraceptive

## Distribution of respondents as per method of voluntary surgical contraception

Out of total 1506 individuals who underwent voluntary surgical contraception, a large majority 1463(97%) opted for Minilap while acceptance of Vasectomy was very low i.e.43(3%).

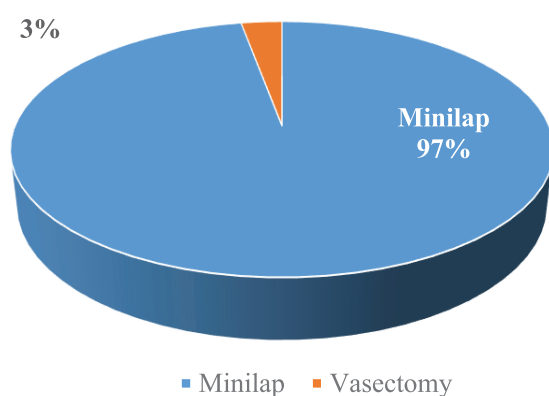


Figure 1. Type of voluntary surgical contraception

## Trend Analysis of voluntary surgical contraception (FY2020/21–2024/25)

The figure 2 shows the trend analysis of voluntary surgical contraception in the family planning outreach camp over the past five years (FY 2020/21 to 2024/25). Minilap continued to be the most chosen method, starting at 352 in FY2020/2021 and reaching 390 in FY 2021/2022, before steadily declining to 142 by FY2024/2025. Vasectomy uptake, on the other hand, remained low throughout this period, increasing marginally from 6 in FY 2020/2021 to 14 in FY 2022/2023 then falling to just 4 in FY 2024/2025. Vasectomy uptake has been consistently low, indicating a gender gap in permanent contraceptive choices, and overall, both methods have shown a declining trend in recent years.

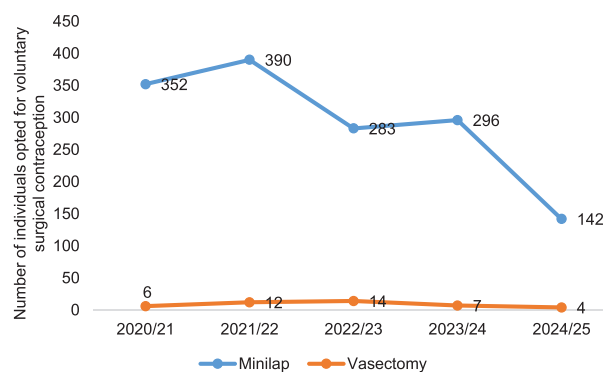


Figure 2. Trend Analysis of voluntary surgical contraception

## DISCUSSION

This five-year trend analysis from Bardiya district reveals a stark and growing gender disparity in the uptake of voluntary surgical contraception, characterized by the overwhelming predominance of female sterilization (minilap) and a critically low, declining rate of male sterilization (vasectomy). The findings underscore a significant programmatic challenge in achieving gender-equitable family planning in this specific context.

The study revealed that most of the respondents, i.e. 97, undergo Minilap. This is consistent with study conducted in India in which majority of women were using female sterilization (75.5%) and only 0.6% male sterilization (10). However, studies in Bangladesh (2.8%) and Uganda (1.8%) reported very low proportion of women opting for female sterilization (11,12). These inconsistent results might be due to the differences in study setting and the target groups. The study findings highlighted only 3% of the respondents undergoes for Vasectomy. Similar finding was observed in a nationwide survey of India which reported only 3.2% underwent male sterilization (13). Such consistently low



uptake of vasectomy may be attributed to widespread misconceptions and fears, including anxieties about side effects and entrenched social stigma surrounding male sterilization. Qualitative studies from India have highlighted that men often dominate household decision-making yet avoid taking responsibility for contraception (14). Similarly, qualitative research conducted in Eastern Nepal reported that men commonly believe vasectomy causes physical weakness, which is particularly concerning for those engaged in labor-intensive work. Additionally, men perceive themselves as primary earners and fear that sterilization may compromise their ability to support their families (15).

The study showed the declining trend of both vasectomy and minilap over the period of FY2020/21 and FY 2024/25. A US based studies reported similar findings where annual male sterilization decreased over 2009-2014 (16). Another study in India also highlighted that the number of vasectomies continue to remain low (17). Additionally, the minilap service utilization showed a downward trend in recent years which aligns with the findings of previous studies (18). The sharp decline in both minilap and vasectomy over the five-year period is alarming. While factors like increased use of spacing methods and male out-migration for foreign employment may play a role, this trend likely also reflects a broader failure of the current outreach model to adequately address deep-seated misconceptions and the evolving needs of the community. The temporary nature of mobile camps may be insufficient to build the sustained trust and provide the repeated counseling necessary for such a permanent decision, especially for men.

Our study found that women underwent minilap at a mean age of 29 years, significantly younger than men opting for vasectomy (mean 37.2 years), a pattern consistent with regional studies conducted in India where mean age of female was 30.0 years (17) and Pakistan in which the mean age of male was found to be 36.13 years (19). The late age for vasectomy, however, points to significant hesitation and a delay in male acceptance, reinforcing the notion that male sterilization is often a last-resort option rather than a planned choice, contributing to the vast gender gap in uptake.

Minilap is most common in Janjati which is 79.3% while Vasectomy is significantly higher among Brahmin/Chhetri i.e. 58.1%. This result was similar to another study conducted in Nepal which also showed that male sterilization was more common in Brahmin/Chhetri

and Janjati women were more likely of using modern contraception (including sterilization) (20, 21). It may be due to higher educational attainment and greater social capital among Brahmin/Chhetri group, which could facilitate modest departures from the pervasive norm of limited male participation in permanent contraception. The concentration of minilap uptake among Janjati women must be interpreted in the context of Bardiya's demographics, where Janjati groups, primarily the Tharu community, constitute the majority of the population. Our study also demonstrated that only 1 Muslim client opted for VSC over the five years period, as noted in other settings, religious doctrines and a preference for pronatalism can significantly restrict the acceptance of permanent contraceptive methods within Muslim communities, a dynamic that appears to be at play in Bardiya as well (3,22).

The study revealed literate individuals are more inclined to do vasectomy, indicating that education plays an important role in choosing sterilization method. This study findings align with previous research conducted in Ethiopia (23). Likewise, in this study majority of female client were literate. This corresponds with the study conducted in Nigeria (24). A study conducted in Western Nepal highlighted modern contraceptive use is positively associated with education and specific caste/ethnic groups in which Janjati women have shown higher utilization of modern methods compared to Brahmin/Chhetri groups. This finding implies that similar educational and cultural factors might encourage the use of surgical methods in our setting and context (25).

Our study showed that the respondents who undergoes for voluntary surgical contraception, majority of both female and male clients were engaged in agriculture. Previous research conducted in Nepal showed similar findings where more than half of the female were involved in family farm (26). Moreover, the finding was consistent to the study conducted in Nepal where 63% of men engaged in agricultural activities (27). In Bardiya's agrarian context, where 52.5% of clients depend on agriculture, economic anxieties are paramount. The fear of lost wages and inability to perform physically demanding labor during post-operative recovery presents a tangible, context-specific barrier that is more salient than abstract fears.

Our findings reveal that son preference acts not merely as a cultural influence but as a structural barrier to equitable family planning. The overwhelming majority of clients in Bardiya over three-quarters of women and men would only consider permanent contraception after securing at least one male child. These results were

consistent with the findings of the study conducted in Maharashtra, India (28). On contrary to these, the further analysis of NDHS 2011 revealed that the vasectomy use in mobile clinics were higher among those couples with three or more sons or those with only daughters (29). This variation suggests that although fertility norms have shifted toward smaller families, the desire for a son remains strong and, in some cases, even more concentrated. Persistent emphasis on male children reflects deep-rooted patriarchal norms that continue to influence reproductive decision-making.

This is one of the first studies to analyze a five-year trend of voluntary surgical contraception uptake through mobile health camps at the district level in Nepal, providing comprehensive insights into the existing uptake patterns of voluntary surgical contraception. The use of program-based service delivery data ensured that the findings reflect real-world utilization patterns. As the study relied on secondary data based on completeness and accuracy of camp registers, it may have had reporting gaps. The program included individuals who voluntarily attended the mobile health camps and did not include all eligible individuals in the catchment areas, which may reduce the generalizability of the findings. Only, the socio-demographic and method-related information were assessed and thus could not address societal factors such as cultural beliefs, gender norms, or individual factors for accepting or rejecting sterilization.

## CONCLUSION

This five-year analysis from Bardiya district provides compelling evidence of a significant and persistent gender disparity in the uptake of voluntary surgical contraception, marked by the overwhelming predominance of minilap and a critically low utilization of vasectomy, both exhibiting a concerning decline. To effectively reverse this trend and promote equitable family planning, a strategic recalibration of programmatic efforts is essential. Future interventions must prioritize the integration of targeted family planning counseling that addresses pervasive misconceptions regarding the side effects of vasectomy. Concurrently, strengthening collaborative partnerships with local cultural leaders and ensuring the year-round availability of services are vital to address the underlying socio-cultural norms and programmatic gaps that perpetuate this imbalance. The adoption of these targeted strategies is crucial for advancing reproductive equity and improving access to permanent contraceptive methods in Nepal.

## Acknowledgement

We would like to acknowledge Health Directorate, Lumbini Province for granting the permission to conduct this study. We also extend our gratitude to obstetrician/Gynecologist and the health facility staff involved in the mobile health camps for their invaluable support in VSC service delivery. Most importantly, we thank all the participants who voluntarily attended the camps, without whom this study would not have been possible.

## Conflict of Interest

The authors declare no conflict of interest.

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