

# Exploring the Psychological Impact of Female Sterilization

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**Keywords:** Tubal sterilization, contraception, psychological outcomes, depression, anxiety, regret

## Abstract

**Background:** Tubal sterilization is a prevalent method of contraception globally, recognized for its efficacy and safety. Despite its benefits, the long-term psychological effects, especially its relationship with depression and anxiety, remain inadequately explored.

**Aims and Objective:** This study aims to investigate the psychological outcomes of tubal sterilization, focusing on the prevalence of depression and anxiety among women who have undergone the procedure and identifying factors influencing these outcomes.

**Methods:** A descriptive cross-sectional design was employed, targeting women aged 18-50 years who had undergone tubal sterilization at least one year prior. Data were collected via structured questionnaires and semi-structured interviews,

assessing demographic, surgical, psychosocial variables, and psychological outcomes. Statistical analyses included chi-square tests and logistic regression.

**Results:** Of the 453 women approached, 289 participated. The prevalence of regret was 13.5%, with no significant correlation with age or parity. Anxiety and depression were present in 24.23% and 18% of participants, respectively. No significant association was observed between age and parity of the study participants and post-sterilization regret.

**Conclusion:** Tubal sterilization does not significantly affect long-term psychological outcomes in terms of regret, anxiety, and depression. However, a subset of women experience regret and psychological disturbances, underscoring the need for thorough preoperative counseling and follow-up.

## INTRODUCTION:

Globally, surgical sterilization stands as the predominant form of birth control, with an estimated 190 million women undergoing the procedure.<sup>1-4</sup> Tubal sterilization presents as a harmonized method of contraception, providing reliable prevention of pregnancy without the ongoing requirement for contraceptive supplies and is associated with

minimal risk of complications when performed to standard guidelines.<sup>3</sup> The procedure's convenience, efficacy, and safety make it a favorable long-term option for contraception.<sup>4</sup>

In developing nations, integrating sterilization with hospital stays for childbirth - either vaginal or via caesarean - optimizes resource use by consolidating the recovery periods and preventing the necessity

for subsequent hospital visits.<sup>5</sup> Despite contravening the recommended 40-day postpartum interval for sterilization, this approach is pragmatic, enhancing continuity of care and reducing the chances of subsequent high-risk pregnancies with potential complications. The preference for surgical sterilization over other contraceptive methods is influenced by several factors: the unsuitability of hormonal contraceptives for certain age groups, higher failure rates of other contraceptive methods, and the accessibility of sterilization procedures.<sup>5</sup> While the general health implications of sterilization are apparent, its long-term psychological effects, especially its association with depression, remain to be fully elucidated.<sup>6</sup> The pre-sterilization psychological state of women could be a crucial indicator of their eventual satisfaction with and the success of the procedure. Considering that depression ranks as one of the most common conditions affecting women and significantly influences the quality of life, its potential correlation

## MATERIAL AND METHODS

This study adopted a descriptive cross-sectional design to investigate the long-term psychological outcomes of tubal ligation in women. The primary aim was to explore the prevalence of psychological conditions such as depression and anxiety among women who have undergone tubal ligation and to identify factors that may influence these outcomes, including demographic, surgical, and psychosocial variables. The target population for this study comprised women of reproductive age (18-50 years) who have undergone tubal ligation at least one year prior to the study initiation. A consecutive non-probability sampling technique was employed to ensure representation across different age groups, socio-economic statuses, and geographical locations. We aimed to enroll all patients who had undergone permanent sterilization from January 2022 to December 2022 at Gynae Deptt Ayub Teaching Hospital to achieve statistically significant results. Inclusion criteria included women who have undergone tubal ligation, were willing to participate in the study, and could provide informed consent. Exclusion criteria included women who had undergone sterilization reversal procedures or who have significant psychiatric history prior to

with hormonal fluctuations — which might be altered by sterilization — warrants thorough investigation.

Many women experience regret after undergoing sterilization, especially those who are younger<sup>7,8</sup>, those who have the procedure during a Caesarean section<sup>9,10</sup>, those who have relationship issues before the surgery<sup>3,11</sup>, and those who request sterilization soon after making the decision.<sup>12</sup> Even with adequate preoperative counselling, the rates of regret are still high, and most primary care trusts do not cover the cost. Current research has insufficiently explored the psychosocial dimensions related to female sterilization. An examination of MEDLINE's database reveals an absence of qualitative investigations into the lived experiences of women post-sterilization. Therefore, this study's aim was to thoroughly explore the array of experiences encountered by women who have undergone tubal ligation, giving special consideration to the physical, psychological, and situational factors involved.

sterilization that could confound the study outcomes. Data was collected through a combination of structured questionnaires and semi-structured interviews. The questionnaire included demographic information, details of the sterilization procedure, psychosocial background, and a standardized tool for assessing psychological outcomes, such as the Beck Depression Inventory (BDI) for depression and the General Anxiety Disorder-7 (GAD-7) scale for anxiety. Semi-structured interviews further explored participants' experiences, satisfaction levels, and any regrets regarding tubal ligation, allowing for a deeper understanding of the psychosocial aspects of sterilization. Descriptive statistics was used to summarize the demographic and clinical characteristics of the study population. The prevalence of depression and anxiety was calculated as percentages. Chi-square tests was used to explore the association between psychological outcomes and categorical variables, while logistic regression analysis was used to identify factors independently associated with adverse psychological outcomes. All analyses were conducted using SPSS v 23, with a p-value of less than 0.05 considered statistically significant. This study was conducted in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki

declaration and its later amendments. Informed consent was obtained from all individual participants included in the study. Confidentiality and anonymity of the participants was maintained throughout the research process.

## RESULTS

In this study, 453 women underwent bilateral tubal ligation, of which 289 consented to participate in further interviews and complete questionnaires designed to evaluate their psychological well-being post-sterilization. The average age at the time of sterilization was 31.47 years, with a standard deviation of 3.67 years, ranging from 25 to 44 years. Of these women, 126 (43.6%) were under the age of 30, while 163 (56.4%) were 30 years or older. The minimum number of living children among the sterilized women was two. Marital status was consistent across participants, with all women being married at the time of the procedure. The sample was diverse, representing various social classes and educational backgrounds (Table-1).

Table 2 and 3 delineate the characteristics of the women who underwent sterilization. The analysis of regret as a post-sterilization outcome, stratified by age and parity, revealed no significant correlations ( $p$ -values  $> 0.05$ ). The initiation of the sterilization procedure was influenced by family planning personnel in 29.3% of cases. In most instances, the decision to proceed with sterilization was made by the couple themselves (74.7%). The primary reasons for choosing sterilization included grand multigravidity (53%), history of multiple cesarean sections (21%), and other medical indications such as transverse fetal lie and secondary contracted pelvis (13%). Additional factors included previous

contraceptive failure (6.7%), co-morbid conditions (4.3%), and the desire to not have more children (2%).

Among the women who had the sterilization, 39 (13.5%) later expressed regret or dissatisfaction with their decision. A small proportion sought information about sterilization reversal (3.11%), although none underwent the reversal procedure. The specific reasons cited for regret included menstrual irregularities ( $n=22$ ), decreased libido ( $n=8$ ), and medical issues believed to be related to the sterilization ( $n=9$ ). The participants were also assessed for anxiety and depression using validated scales, including the Generalized Anxiety Disorder Scale-7 and the Beck Depression Inventory.

Within the study's demographic profile encompassing 289 participants, the age distribution was such that 56.40% were older than 30 years, whereas 43.60% were aged up to 30 years. Focusing on fertility patterns, participants with 0 to 2 living children constituted 28.37% of the sample, those with 3 to 4 children represented 39.10%, and a substantial 32.53% had more than 5 children at the time of sterilization.

The educational attainment among participants was diverse, with 23.53% having no formal education, 39.45% having reached matriculation level, and 37.02% possessing an FSc degree or higher. In terms of employment status, a significant majority of the participants, 73.36%, were housewives, while the remaining 26.64% were in employment. Income status was reported as sufficient by 63.67% of the participants, whereas 36.33% perceived their income as insufficient. The results are summarized in table-1.

Characteristics	Number	Percent
<b>Age (years)</b>		
Upto 30 years	126	43.60
More than 30 years	163	56.40
<b>Number of alive children at the time of sterilization</b>		
0-2	82	28.37
3--4	113	39.10
>5	94	32.53
<b>Education</b>		
Illiterate	68	23.53
Matriculation	114	39.45
FSc and more	107	37.02
<b>Occupation</b>		
Housewife	212	73.36
Employed	77	26.64
<b>Income status</b>		
Sufficient	184	63.67
Insufficient	105	36.33

The study evaluated the incidence of regret following sterilization among 289 women, categorized by age and parity. In the age-based analysis, 21 out of 120 women (17.5%) under the age of 30 reported regret, while 18 out of 169 women (10.65%) aged over 30 did so, resulting in an overall regret rate of 13.5% across the sample. However, statistical analysis indicated no significant association between age at the time of sterilization and regret, with a p-value of 0.93.

When considering parity, 22 out of 165 women (13.33%) with a parity of 3 or less experienced regret post-sterilization, compared to 17 out of 124 women (13.71%) with a higher parity (more than 3 children). The aggregated data revealed a consistent regret rate of 13.5% among the participants, regardless of parity, with a p-value of 0.92, suggesting that parity at the time of sterilization was not significantly correlated with the expression of regret (Table-2).

Characteristics	N	Regret (%)	p value
<b>Age (years) at time of sterilization</b>			
Less than 30	120	21(17.5%)	p=0.93
More than 30	169	18 (10.65%)	
Total	289	39 (13.5%)	
<b>Parity at the time of sterilization</b>			
Para 3 or less	165	22 (13.33%)	p =0.92
More than Para 3	124	17 (13.71%)	
total	289	39 (13.5%)	

The distribution of anxiety prevalence among the study population of 289 women post-sterilization

was assessed. It was observed that the majority, 219 women (75.77%), reported no anxiety following the

procedure. Mild anxiety was experienced by 44 women (15.23%), while moderate anxiety was reported by 17 women (5.88%). A smaller subset, 9 women (3.12%), experienced severe anxiety.

Collectively, these findings account for the total sample, with the percentage of women experiencing some form of anxiety post-sterilization summing up to 24.23% (Table-3).

Anxiety	Number	Percent
No anxiety	219	75.77%
Mild Anxiety	44	15.23%
Moderate Anxiety	17	5.88%
Severe Anxiety	9	3.12%
Total	289	100%

An analysis of the study population (n=289) regarding the prevalence of depression after sterilization was conducted. The results indicated that a substantial majority, 237 participants (82.00%), did not exhibit depressive symptoms. Mild depression was reported by 28 participants (9.69%), while moderate depression was noted in 17

participants (5.89%). A smaller proportion of the sample, 7 participants (2.42%), experienced severe depression. The cumulative percentage of participants reporting some level of depression was 18.00%, confirming that the vast majority of the sample did not suffer from post-sterilization depression (Table-4).

Depression	Number	Percent
None depressive	237	82.00%
Mild Depression	28	9.69%
Moderate Depression	17	5.89%
Severe Depression	7	2.42%
Total	289	100%

The study investigated the incidence of regret following sterilization among women, categorized by age. Out of the 120 women under the age of 30, 21 (17.5%) reported regretting their decision, whereas among the 169 women aged over 30, 18 (10.65%) expressed regret. Overall, out of the total study population of 289, 39 women (13.5%)

reported regret. However, the association between age and regret was not statistically significant (p-value of 0.93), suggesting that age may not be a determining factor in regret after sterilization. The majority of participants, 250 (86.5%), did not report regret regardless of age (Table-5).

Table-5: Stratification of post-sterilization regret with parity of study participants								
	regret decision	their	Dont decision	regret	their	Marginal Totals	Row	p value
Parity upto 3	22		143			165		0.92
Parity more than 3	17		107			124		
Marginal Totals	39	Column	250			289		

The correlation between parity and the regret of the sterilization decision was examined in a cohort of 289 women. Among women with a parity of up to 3, 22 out of 165 (13.33%) expressed regret about their sterilization decision. In contrast, for women with a parity greater than 3, 17 out of 124 (13.71%) reported regret. Overall, the total number of women experiencing regret was 39 (13.5%). The statistical

analysis indicated no significant difference in regret between the two parity groups, with a p-value of 0.92. Consequently, the data suggests parity does not significantly impact the likelihood of regretting the decision to undergo sterilization, with the vast majority of participants, 250 (86.5%), not expressing regret (Table-6).

Table-6: Stratification of post-sterilization regret with age of study participants								
	regret decision	their	Dont decision	regret	their	Marginal Totals	Row	p value
age less than 30	21		99			120		0.93
age more than 30	18		151			169		
Marginal Totals	39	Column	250			289		

## DISCUSSION

Permanent sterilization is a highly sought-after and widely utilized contraceptive method by women worldwide who do not wish to conceive in the future.<sup>13</sup> Tubal ligation (TL) stands as the most common form of permanent contraception in many regions, often selected by women who have completed their families or decided to limit family size.<sup>14</sup> While TL enjoys substantial popularity, recent studies indicate that a fraction of women may experience regret following the procedure over the subsequent years.<sup>15</sup>

The phenomenon of post-tubal ligation regret has been increasingly documented, with some research indicating that the incidence of regret after sterilization can vary between 0.9% to 26%.<sup>16,17</sup> In Iran, the reported regret among sterilized women fluctuates between 6% and 12.5%<sup>18</sup>, while a study from Karachi Pakistan reported no post-sterilization regret in females opting for permanent sterilization.<sup>19</sup> However, it must be noted that there was no long-term follow up in the latter study. It is important to note that the definition of regret can

differ across studies, potentially affecting the reported rates.<sup>20</sup> Regret is typically associated with feelings of sadness, distress, anxiety, and dissatisfaction. However, certain studies define "clear regret" specifically as the expressed wish and intent to seek a reversal of sterilization surgery.<sup>21</sup> Furthermore, the time span between experiencing regret after sterilization and the eventual request for a reversal procedure has been found to differ across various research findings.<sup>22,23</sup>

Certain determinants, including the age at which sterilization is conducted, mortality among offspring, the familial size at the point of tubal ligation (TL), subsequent marriage, shifts in economic standing, and an insufficiency of details concerning the sterilization process, have been implicated in the onset of remorse following sterilization procedures.<sup>15</sup> Proactive identification of these determinants before the execution of TL has the potential to mitigate instances of subsequent regret among women who undergo this procedure.<sup>20</sup> In our study, post-sterilization regret was observed in 13.5% of respondents. This is in line with the

findings reported in literature as mentioned above. However, we did not find any statistically significant association of post-sterilization regret with age or parity of the respondents.

Several investigations have identified psychological disturbances, particularly depression and anxiety, as a common occurrence following surgical procedures. The incidence of postoperative psychiatric issues is often linked to the presence of psychiatric conditions before the surgery.<sup>24</sup> In a multi-center research project orchestrated by the World Health Organization, no substantial disparities were found in the prevalence of mental health problems when comparing individuals who underwent sterilization and those who did not. This observation held regardless of the sterilization timing, whether it was during an interval, postpartum, or post-abortion period.<sup>25</sup> Conversely, additional research has suggested an elevated risk of depression and anxiety subsequent to tubal ligation, with a higher susceptibility noted among older individuals, those with advanced education, and those belonging to higher income brackets. This same study also highlighted a correlation between these adverse psychological outcomes and deficient communication from the professionals performing the sterilization. Furthermore, other studies have posited that preoperative depression levels are indicative of an increased risk for postoperative psychiatric conditions.<sup>26</sup> Observations from certain studies suggest that psychiatric disturbances tend to be less prevalent in urban populations.<sup>27</sup>

In our study, the prevalence of anxiety and depression was 24.23% and 18% respectively. Only 9 (3.12%) and 7 (2.42%) patients were found to have severe anxiety and depression, respectively. However, it must be kept in mind that the patients were interviewed within a year of their surgery and therefore long-term prevalence rates of anxiety and depression may vary.

A study from Iran reported a combined prevalence of 14.5% for post-sterilization anxiety and depression in women, with significantly higher scores for anxiety and depression in women who regretted their decision.<sup>17</sup> Similar findings have been reported by Kelekçi et al., who observed a significantly higher anxiety and depression scores in women who regretted their decision to get sterilized permanently.<sup>26</sup> We didn't measure compare the

anxiety and depression levels between women who regretted their decisions and those who didn't regret. A study from Denmark reported regret in 5% of their study cohort, however the cohort had been followed up for a media duration of 50 months in that particular study.<sup>12</sup> In contrast, the median observation time in our study was 4 months.

## CONCLUSION

This study contributes to the understanding of the psychological impacts of tubal sterilization, demonstrating that a majority of women do not experience significant psychological disturbances post-procedure. The observed regret rate aligns with existing literature, and the incidences of anxiety and depression are notable but not overwhelmingly prevalent. Our findings suggest the importance of comprehensive preoperative counseling and the potential for targeted follow-up to address and mitigate regret and psychological distress in susceptible individuals. Despite limitations, such as the cross-sectional design and the lack of a control group, this research offers valuable insights into the psychosocial aspects of tubal sterilization, paving the way for improved patient care and informed decision-making in contraceptive practices.

## Limitations

The cross-sectional nature of this investigation presents an inherent limitation in determining the causal relationships between tubal ligation and subsequent psychological conditions. The potential for recall bias cannot be discounted, as it may impact the veracity of the participants' recounted psychosocial experiences and surgical histories. To mitigate these constraints, future research endeavors should employ a longitudinal approach, thereby offering a more robust framework for assessing the enduring psychological impacts of tubal ligation. The intent of this research is to shed light on the intricate psychological sequelae post-sterilization and to furnish meaningful contributions to the ongoing dialogue concerning women's reproductive health interventions. Such insights hold the promise of refining clinical protocols and shaping policies that support enhanced postoperative care and counseling services.

Moreover, the absence of long-term follow-up represents a gap in the current study, limiting the observation of prolonged psychological effects. The

lack of a preoperative psychiatric evaluation and the omission of family psychiatric history are additional factors that restrict the study's comprehensiveness. Furthermore, the exclusion of a control group in this study constrains the comparative analysis, which is essential for validating the specific outcomes associated with tubal ligation.

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