

ORIGINAL ARTICLE

Frequency of Secondary Infertility in Patients after Cesarean Section versus Normal Vaginal Delivery

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ABSTRACT

Background: Secondary infertility is a common issue in the reproductive age of a female. Various risk factors are involved in this disease including cesarean section.

Aim: The aim of this study was to find out the frequency of secondary infertility in patients after cesarean section versus normal vaginal delivery.

Material and Methods: The present cross-sectional study was conducted DHQ Hospital, Lakki from January 2023 to June 2023 after taking approval from the research committee of the hospital. Women of reproductive aged (18-40) visited with complaints of secondary fertility were included. A total of 202 individuals participated who were classified in to Group A (previous cesarean section) and Group B (previous vaginal delivery) with, each group had 101 individuals. The data was analyzed using SPSS 25.0.

Results: A total of 202 individuals were enrolled in this study. Mean age of individuals in A group was 29.4 ± 4.1 and B group was 28.8 ± 3.9 years. Mean infertility was 3.6 ± 1.2 years in group A and 3.4 ± 1.4 in group B. Secondary infertility was most prevalent in women who had history of cesarean sections 72(71.28%). Sonography results revealed that using trans-vaginal ultrasound 54(53.4%) cases had a cesarean scar niche in Previous cesarean section group while no cesarean scar was found in previous vaginal delivery Zero(0%)($p < 0.001$). Participants who done Hysterosalpingography with previous vaginal delivery had more bilateral tubal patency 60(71.4%) compared to previous cesarean section 48 (49.48%). In contrast to vaginal delivery, the cesarean group experienced more fallopian tube obstruction, either bilaterally or unilaterally.

Conclusion: Our study concluded that women with a previous Cesarean section had significantly high secondary infertility and cesarean scar defects compared to those with a previous vaginal delivery.

Keyword: Cesarean section, secondary infertility, cesarean scar vaginal delivery

INTRODUCTION

Secondary infertility is a condition in which the couple are unable to conceive following 12 months of consistent, unprotected sexual activity that has already become pregnant. There are many risk factor for this conditions including blockage of fallopian tubes, advance age, which impacts the number of eggs accessible for conception and cesarean section. Primary and secondary infertility is a public health problem, and delivery methods have been connected to future infertility.¹ Cesarean delivery is related with lower parity than vaginal birth. C-sections may have an impact on subsequent pregnancy due to subfertility, complicating conditions, or mother choice. Subfertility after C-section might be caused by infection at the surgical site or pelvic adhesion.² Confounding variables, such as advanced mother age, may also contribute to lower fertility following Cesarean vs vaginal birth. Alternatively, changes in family size following Cesarean vs vaginal birth might represent a variance in women's reproductive decisions.³ A recent research of US women discovered that women who choose reduced family sizes may be more likely to deliver via Cesarean. Cesarean deliveries may have an impact on the capacity to conceive due to mechanical and biological factors. Women with past CS were 9% less likely to become pregnant and 11% less likely to give birth than those who delivered vaginally.⁴ A prospective cohort from the multi-center First Baby Study found a reduced rate of births and reported pregnancies (CS Adjusted HR 0.85) within three years after first cesarean section compared to those who had vaginal deliveries.⁵ Pelvic adhesions, infections (enteric, abdominal, or wound), surgical tube damage, and cesarean-scar defects (isthmocoele or niche) can all hinder sperm transport, implantation, or embryo transfer during assisted reproduction.⁶ Recent reviews and meta-analyses of assisted reproduction and natural conception indicate that having a past cesarean surgery may result in a lower pregnancy rate, fewer live births, and more challenging embryo transfer. The epidemiological

trends in outcomes suggest biological plausibility.⁷ Despite an adequate quantity of data, judgments are constrained by study variety, confounding factors (especially by indication), and varying definitions of infertility. After correcting for confounding variables, some high-quality studies find lower or null results, while others report clinically significant outcomes.⁸ To accurately determine the frequency of secondary infertility following cesarean birth compared to vaginal births, well-structured comparative studies are crucial, given the large global rates of cesarean deliveries and the economic and societal consequences of infertility.⁹ The aim of this study was to find the frequency of secondary infertility in patients after cesarean section versus normal vaginal delivery.

MATERIALS AND METHODS

The present cross-sectional study was conducted DHQ Hospital, Lakki from January 2023 to June 2023 after taking approval from the research committee of the hospital. Women of reproductive aged (18-40) visited with complaints of secondary fertility were included. Secondary infertility is defined as the inability to conceive after 12 months of unprotected sexual intercourse following a live delivery. While individuals with incomplete clinical records diabetes endometriosis and malignancy were excluded from the study. To increase risk assessment throughout the gestational period, the study included women whose sole delivery occurred at least two years prior to recruitment. To eliminate confounding variables, the study included inclusion criteria such as no history of primary infertility, didn't history of uterine or tubal surgeries other than the index Cesarean, as well as no diagnosis of male factor infertility (defined by abnormal semen parameters according to World Health Organization criteria). Data was collected using a non-probability, sequential sampling approach. A total of 202 individuals participated who were classified in to Group A (previous cesarean section) and Group B (previous vaginal delivery) with , each group had 101 individuals. Data was collected by face-to-face interviews utilizing a pre-designed proforma based on literature research and study goals. This tool was employed to obtain data on each participant's sociodemographics, obstetric as well as gynecological

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history, last delivery type and date, present infertility period length, menstrual cycle history, and other relevant medical/surgical history. Participants agreed to have a secondary infertility assessment as per the study's goals before enrolling. The secondary infertility examination began with a trans-vaginal pelvic ultrasound. This procedure was used to assess the participants' uterine anatomy, lining, and ovaries. The examination focused on identifying any defects or niches in the Cesarean section scar, particularly among Group A individuals. Further investigations, including HSG for tubal permeability and diagnostic laparoscopy, followed established hospital protocols and clinical reasons. Results were recorded for subsequent examination. To standardize diagnosis results, the cesarean scar niche was identified on trans-vaginal ultrasonography as an anechoic triangular or semicircular defect at the position of the old lower uterine segment cesarean scar, with measured depth into the myometrium. During hysterosalpingography, tubal obstruction was defined as a failure of contrast to spill through the fallopian tubes, either unilaterally or bilaterally, depending on the afflicted side. Hydrosalpinx is defined as the distal blockage of the fallopian tubes with an inflated contrast -filled tube on HSG. Bilateral tube patency was defined as free contrast leakage in each tube within the peritoneal cavity. The data was analyzed using SPSS 25.0. The research groups' demographic or clinical data were summarized via descriptive statistics and examined for means, standard deviations, counts, and percentages. The primary outcome, secondary infertility rates, were evaluated between the experimental (Cesarean) versus control (Normal Vaginal Delivery) groups employing Chi-square analysis. The study used a p-value of 0.05 to determine statistical significance.

RESULTS

A total of 202 individuals were enrolled in this study. They were equally divided in to two groups . Group A (previous cesarean section) and Group B (previous vaginal delivery). The mean BMI of participants in group A was 26.6 ± 3.2 and in group B was 25.8 ± 3.5 kg/m². Mean age of individuals in A group was 29.4 ± 4.1 and B group was 28.8 ± 3.9 years. Mean infertility was 3.6 ± 1.2 years in group A and 3.4 ± 1.4 in group B as shown in table 1. Secondary infertility was most prevalent in women who had history of cesarean sections 72(71.28%) and no other cause as compared to women who had previous normal vaginal delivery 45 (44.55%). This difference was statistically significant ($p < 0.001$) as presented in table 2. Sonography results revealed that using trans-vaginal ultrasound 54(53.4%) cases had a cesarean scar niche in Previous cesarean section group while no cesarean scar was found in previous vaginal delivery Zero(0%)($p < 0.001$). Participants who done Hysterosalpingography with previous vaginal delivery had more bilateral tubal patency 60(71.4%) compared to previous cesarean section 48 (49.48%). In contrast to vaginal delivery, the cesarean group experienced more fallopian tube obstruction, either bilaterally or unilaterally. In the subset of women who had laparoscopy, pelvic adhesions were similarly more common in the cesarean group as shown in table 3.

Table 1: Demographic features of the study population

Features	Group A	Group B	Value of P
Mean BMI in Kg/m ²	26.6 ± 3.2	25.8 ± 3.5	0.226
Mean time since last delivery in years	4.7 ± 1.5	4.6 ± 1.7	0.187
Mean duration of infertility in years	3.6 ± 1.2	3.4 ± 1.4	0.286
Mean age in years	29.4 ± 4.1	28.8 ± 3.9	0.313

Table 2: Mode of previous delivery and its relation to secondary infertility

Group	Secondary infertility/n/percentage	P value
Previous cesarean section (group A)	72(71.28%)	<0.001
previous vaginal delivery(group B)	45(44.55%)	
Total	117(58%)	

Table 3: findings of diagnostic assessment

Tests/results	A group n=101	B group n=101	P value
Cesarean niche(USG)	54(53.4%)	Zero (0%)	<0.001
Hysterosalpingography (HSG)			
Bilateral tube patency	48(49.48%)	60(71.4%)	0.003
Unilateral tube blockage	23(23.7%)	12(14.2%)	0.034
bilateral tube blockage	20(20.6%)	8(9.5%)	0.008
Hydro-salpinx	6(6.1%)	4(4.7%)	0.303

DISCUSSION

Secondary infertility is a condition in which the couple are unable to conceive following 12 months of consistent, unprotected sexual activity that has already become pregnant. There are many risk factor for this conditions including blockage of fallopian tubes, advance age, which impacts the number of eggs accessible for conception and cesarean section.¹ The aim of this study was to find the frequency of secondary infertility in patients after cesarean section versus normal vaginal delivery. A total of 202 individuals were enrolled in this study. They were equally divided in to two groups . Group A (previous cesarean section) and Group B (previous vaginal delivery). The mean BMI of participants in group A was 26.6 ± 3.2 and in group B was 25.8 ± 3.5 kg/m². Mean age of individuals in A group was 29.4 ± 4.1 and B group was 28.8 ± 3.9 years. Mean infertility was 3.6 ± 1.2 years in group A and 3.4 ± 1.4 in group B . Secondary infertility was most prevalent in women who had history of cesarean sections 72(71.28%) and no other cause as compared to women who had previous normal vaginal delivery 45 (44.55%). This difference was statistically significant ($p < 0.001$). Our study findings are comparable to the study conducted by Nawaz et al ⁹. They reported that a lower frequency of secondary infertility was noted in vaginal delivery 44.2% as compared to C-section 71.6%. the mean age of the study participants was also similar to our findings .our study results are also comparable to the meta-analysis by Sima et al ¹¹ in which cesarean deliveries resulted with a 9% decrease in succeeding pregnancies & an 11% decrease in subsequent births. Although our impact size was larger than theirs, their finding that previous cesarean section may impair fertility is consistent with our findings. The research's observational approach allowed for restricted causal conclusions due to study bias and design variables. Wang et al. found that women with prior cesarean sections had lower clinical pregnancy rates (9%), live birth rates (13%), and implantation rates (11%), as well as greater difficulty with embryo transfers in assisted reproductive.¹¹ In our study cesarean scar niche was present in 53.7% of women with a previous Cesarean delivery. Unilateral blockage 22.6% Vs 10.5%, bilateral blockage 19% vs 6.6% were noted in the Cesarean group. These findings are similar to the study performed by Nawaz et al et al.⁹ Mechanistically, the uterine niche, cesarean scar niche, has been suggested as one mechanism explaining the impairment of fertility after a Cesarean delivery, Vissers et al reviewed the impact of the Cesarean scar niche on fertility in detail ¹². Tower et al¹³ found that women with uterine scar defects had a lower pregnancy rate (58.7%) after a cesarean, indicating a decrease in fertility ¹³. Possible explanations include menstrual debris while fluid accumulation, bacterial colonization, compromised endometrial function, and sperm/embryo transport obstruction.¹⁴ However, there are differences in available evidence that need to be considered. Hsu et al observed no difference in future infertility between cesarean vs vaginal birth in their cohort study.¹⁵ Variations in research population, clinical grounds for cesarean section, targeted reproductive outcomes, and infertility assessment methodologies may all contribute to impact modification. Our study participants who had done Hysterosalpingography with previous vaginal delivery had more bilateral tubal patency compared to previous cesarean section. In contrast to vaginal delivery, the cesarean group experienced more fallopian tube obstruction, either bilaterally or unilaterally. In the subset of women who had laparoscopy, pelvic adhesions were similarly more common in the

cesarean group. These findings are similar to the previous study.⁹ Our study findings highlight the need for careful consideration of the mode of delivery as well as prompt fertility assessment in women with a history of Cesarean section who subsequently present with secondary infertility. What sets our study apart is the methodological strength in comparing two distinct modality of delivery along with additional structural investigations (ultrasound angio-niche mapping, HSG tubal study). There are certain limitations which needs to be addressed, including a single tertiary care center with a modest sample size over a fixed study period, which may limit the generalizability of the findings

CONCLUSION

Our study concluded that women with a previous Cesarean section had significantly high secondary infertility and cesarean scar defects compared to those with a previous vaginal delivery.

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