Original Article
DOI: https://doi.org/10.70749/ijbr.v3i4.997

INDUS JOURNAL OF BIOSCIENCE RESEARCH
https://induspublishers.com/IJBR
ISSN: 2960-2793/ 2960-2807

Fetomaternal Outcomes in Women with Cervical Cerclage Experience in Tertiary Care Hospital

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ARTICLE INFO

Keywords

Cervical Cerclage, Preterm Delivery, Spontaneous Abortion, Cervical Insufficiency.

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Declaration

Authors' Contribution: All authors equally contributed to the study and approved the final manuscript.*Detail is given at the end.

Conflict of Interest: No conflict of interest.

Funding: No funding received by the authors.

Article History

Received: 09-12-2025, Revised: 01-03-2025
Accepted: 02-04-2025, Published: 25-04-2025

ABSTRACT

Background: Cervical insufficiency is a significant cause of preterm delivery and spontaneous abortion in high-risk pregnancies. Cervical cerclage, a procedure to prevent premature cervical dilation, is commonly employed in such cases. However, its effectiveness in different demographic groups remains under debate. **Objective:** To determine the fetomaternal outcomes in women with cervical cerclage. **Study Design:** Descriptive observational study. **Duration and Place of Study:** The study was conducted at the Department of Obstetrics and Gynaecology, Khyber Teaching Hospital (KTH), Peshawar, from May 2023 to November 2023. **Methodology:** A total of 166 women aged 18-40 years, with a singleton pregnancy, gestational age ≤ 28 weeks, and diagnosed with cervical insufficiency, were enrolled. Cervical cerclage was performed under spinal anesthesia using McDonald technique. **Results:** The mean age of participants was 29.42 ± 5.69 years, with a mean gestational age of 21.86 ± 3.61 weeks. Spontaneous abortion occurred in 11.4% of cases, while 13.9% experienced preterm delivery. No significant associations were found between age, gestational age, or parity and the outcomes of spontaneous abortion or preterm delivery (p-value > 0.05). **Conclusion:** Cervical cerclage is an effective procedure in improving pregnancy outcomes for women with cervical insufficiency, though it does not eliminate the risk of spontaneous abortion or preterm delivery

INTRODUCTION

Cervical cerclage is pregnancy surgery to support the cervix, typically for women with cervical insufficiency or premature cervical dilatation.[1] Closing the cervix with stitches in the surgery provides mechanical support to avoid the premature opening of the cervix.[2] Cervical insufficiency has the potential to cause complications such as miscarriage or preterm birth, particularly in the second trimester.[3] Cerclage would typically be considered in the case of findings of short cervix, past mid-trimester losses, or pain-free cervical dilatation on examination. There are multiple cerclage operations, including the McDonald, Shirodkar, and transabdominal, each chosen according to the patient's specific clinical presentation.[4] While typically helpful, the placement of cervical cerclage must be weighed carefully against infection, bleeding, and trauma to the cervix risks.

One of the most significant fetomaternal benefits of cervical cerclage is that it may reduce the risk of second-trimester spontaneous abortion.[5] Spontaneous abortion, or pregnancy loss before the 20th gestational week, may occur due to cervical insufficiency if the cervix prematurely becomes dilated without contractions.[6] Cerclage prevents this by supporting the structural strength of the cervix, ensuring the uterine environment, and hence preventing miscarriage.[7] Studies have shown that cerclage decreases second trimester losses in women with previous cervical insufficiency who had cerclage compared to conservative management.[8] However, the success of cerclage in preventing second trimester abortion also depends on gestational age of procedure, etiology of the cervical deficiency, and the presence of other obstetric complications.[9] Though there are merits, some careful monitoring, and early intervention, are necessary to ensure its maximum benefit.

Prevention of preterm delivery is one of the most significant fetomaternal benefit of cervical cerclage, an important cause of both illness and mortality in the neonate. Cervical insufficiency, the cervix cannot sustain the pregnancy to term, may lead to preterm delivery (before the completion of 37th gestational week).[10] Cerclage stabilizes the cervix to prolong

gestation and improve fetal maturity and thereby decrease neonatal mortality and perinatal morbidities associated with prematurity.[11] Cerclage appears to be beneficial most to women who have had preterm delivery or a short (<3cm) uterine cervical length by ultrasound measurement.[12] However, the procedure does not eliminate all risk and adjunctive therapy, such as progesterone supplementation or bed rest, may be used to help reduce preterm risk. Thus, ultimately, as demonstrated for cervical cerclage, some subset of high risk of pregnancy is benefited, but individualized care and multidisciplinary management of pregnancy remain the key to optimal maternal and neonatal health.[13]

A study conducted by Goddy B et al. demonstrated that the frequency of spontaneous abortion was 15.4%, while the rate of preterm delivery was 12.3% in women who underwent cervical cerclage.[14]

Cervical cerclage outcomes in women are not well defined and this study is required to further define the outcomes of cervical cerclage in relation to spontaneous abortion and preterm birth. By studying the incidence and possible risks of these outcomes, we can determine significant factors that bear upon the performance of the procedure. The objective of this research is to improve clinical practice, inform decision making and, ultimately, provide women with better care when undergoing cervical cerclage to avoid adverse pregnancy outcomes.

METHODOLOGY

This descriptive study was conducted at the Department of Obstetrics and Gynaecology, Khyber Teaching Hospital (KTH), Peshawar, from May 2023, to November 2023. A total of 166 participants were included, with the sample size determined using the WHO sample size calculator, considering a 95% confidence level, a 5% margin of error, and an anticipated frequency of preterm delivery of 12.3% in this cohort.[14]

The inclusion criteria were women aged 18 to 40 years, with a singleton pregnancy confirmed by ultrasound, a gestational age of ≤ 28 weeks, any parity, prolapsed membranes without chorioamnionitis, and undergoing cervical cerclage. Exclusion criteria involved patients with uterine contractions, active vaginal bleeding, chorioamnionitis, or premature rupture of membranes.

Demographic data, including age, gestational age, and parity, were recorded. Cervical insufficiency with prolapsed membranes was assessed through clinical examination using a speculum and visual inspection of the membranes. Spinal anesthesia was administered, and patient was positioned in the Trendelenburg position. McDonald cervical cerclage was performed using 1.0-mm Mersilene sutures, which involved placing a circular suture around the entire cervical circumference. For prolapsed membranes, the patient's head was lowered into a dorsal lithotomy position to expose a greater length of the cervix. The amniotic sac was returned to the uterine cavity before performing the procedure to reduce the risk of membrane rupture. A gloved finger filled with cotton pads was introduced into the cervical canal to gently push the prolapsed membranes back into the uterus. Once the suture was secured, the finger was removed. All patients remained in the hospital for one week for observation, infection prevention, and inhibition of uterine contractions. They were followed until delivery, and fetomaternal outcomes, including spontaneous abortion and preterm delivery, were recorded on a specially designed proforma.

Spontaneous abortion was defined as the termination of pregnancy before the 24th week of gestation, marked by sudden lower abdominal pain, uterine cramps, and the passing or presence of pregnancy products on physical examination or ultrasound. Preterm delivery was defined as the birth of a live baby between 24 to 32 weeks of gestation, based on the last menstrual period.

Data were analyzed using SPSS version 27. Categorical variables, including spontaneous abortion and preterm delivery, were presented as frequencies and percentages, while continuous variables such as age, gestational age, and parity were expressed as mean ± standard deviation. Stratification of fetomaternal outcomes was performed according to age, gestational age, and parity. The chi-square test was applied for post-stratification analysis, with a p-value of ≤ 0.05 considered statistically significant.

RESULTS

The mean age of the participants was 29.42 ± 5.69 years, with a mean gestational age of 21.86 ± 3.61 weeks and a mean parity of 2.16 ± 1.49, indicating a relatively young cohort with a moderate level of parity (as shown in Table-I).

Table I

Patient Demographics

Demographics	Mean ± SD / n (%)
Age (years)	29.421±5.69
Gestational age (weeks)	21.855±3.61
Parity	2.162±1.49

Regarding the fetomaternal outcomes, spontaneous abortion occurred in 19 patients (11.4%), and preterm delivery was recorded in 23 patients (13.9%) (as shown in Table-II).

Table II

Fetomaternal outcomes

Fetomaternal outcomes	Frequency	%age
Spontaneous Abortion	19	11.4%
Preterm Delivery	23	13.9%

For age, the outcome of spontaneous abortion was observed in 12 women (12.1%) in the 18-30 years group and in 7 women (10.4%) in the >30 years group, with a p-value of 0.740. Similarly, for gestational age, 9 women (12.9%) with a gestational age ≤20 weeks and 10 women (10.4%) with a gestational age >20 weeks experienced spontaneous abortion, with a p-value of 0.626. Additionally, for parity, 12 women (12.1%) with 0-2 children and 7 women (10.4%) with >2 children had spontaneous abortion, with a p-value of 0.740 (as shown in Table-III).

Regarding preterm delivery, 11 women (11.1%) in the 18-30 years age group and 12 women (17.9%) in the >30 years age group experienced preterm delivery, with a p-value of 0.213, suggesting no significant impact of age on preterm delivery. When considering gestational age, 6 women (8.6%) with a gestational age ≤20 weeks and 17 women (17.7%) with a gestational age >20 weeks experienced preterm delivery, with a p-value of 0.092, indicating no significant association. For parity, 11 women (11.1%) with 0-2 children and 12 women (17.9%) with >2 children had preterm delivery, with a p-value of 0.213, suggesting parity did not significantly affect the risk of preterm delivery (as shown in Table-III).

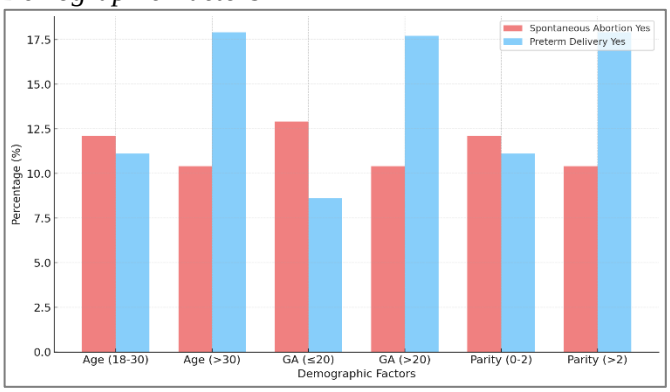
Table III

Association of Fetomaternal outcomes with Demographic Factors

Demographic Factors		Spontaneous Abortion		p-value
		YES n(%)	NO n(%)	
Age (years)	18-30	12(12.1%)	87(87.9%)	0.740
	>30	7(10.4%)	60(89.6%)	
Gestational Age (weeks)	≤20	9(12.9%)	61(87.1%)	0.626
	>20	10(10.4%)	86(89.6%)	
Parity	0-2	12(12.1%)	87(87.9%)	0.740
	>2	7(10.4%)	60(89.6%)	
Preterm Delivery				
Age (years)	18-30	11(11.1%)	88(88.9%)	0.213
	>30	12(17.9%)	55(82.1%)	
Gestational Age (weeks)	≤20	6(8.6%)	64(91.4%)	0.092
	>20	17(17.7%)	79(82.3%)	
Parity	0-2	11(11.1%)	88(88.9%)	0.213
	>2	12(17.9%)	55(82.1%)	

Graph I

Stratification of Fetomaternal outcomes with Demographic Factors



DISCUSSION

The results showed that spontaneous abortion occurred in 11.4% of the women and preterm delivery in 13.9% of the cohort. The results are consistent with the literature that while cervical cerclage can prevent preterm labor in a subset of high-risk pregnancies, it does not completely eliminate the risk of adverse outcomes. The study also looked at the correlation between demographic factors such as age, gestational age (GA), and parity and these outcomes.

The lack of significant associations between these demographic factors and the fetomaternal outcomes may indicate that the effectiveness of cervical cerclage in preventing preterm birth and spontaneous abortion is not significantly influenced by these factors. This can be due to the mechanism of the procedure, which is the avoidance of cervical insufficiency, one of the significant etiologies of preterm birth, regardless of maternal age or parity. In addition, the findings that young and old women, and women of varying parity, respectively, had similar outcomes may be a reflection of the fact that the benefits of cerclage are more dependent on the presence of cervical insufficiency and prolapsed membranes, and not on maternal factors.

Our results showed the age of the women to be 29.42 ± 5.69 years, 21.86 ± 3.61 as the gestational age at cerclage, and 2.16 ± 1.49 as the mean parity, reflecting a moderately young population who had moderate parity. This is comparable to the population in Adebisi et al.'s study, where the mean age of the women was 33.6 years, and most were nulliparous (47.7%).[15] The focus on young women in the two studies may be explained by societal pressures surrounding childbearing, particularly in poor environments, where early intervention is encouraged so as to avert risks of cervical incompetence.

In terms of fetomaternal outcomes, spontaneous abortion occurred in 19 patients (11.4%) and preterm delivery in 23 patients (13.9%) in our study. These rates are similar to those observed by Okusanya et al., who observed a 5.6% repeat spontaneous miscarriage rate following cerclage insertion, and a 30% preterm birth rate in their population.[16] The similar rates of spontaneous abortion may possibly indicate a common underlying risk factor for cervical incompetence, i.e., previous cervical trauma or congenital abnormalities, which were prevalent in both our study population and their population.

Additional breakdown of age, gestational age, and parity in our population did not reveal differences in the incidence of spontaneous abortion. More specifically, spontaneous abortion was seen in 12 women (12.1%) in the 18-30 years age group and in 7 women (10.4%) in the >30 years group, p-value 0.740. This is approximately in line with the findings of Huang et al., who suggested that demographic factors such as

maternal age did not have a significant influence on pregnancy outcomes in their investigation of ultrasound vs. physical examination-indicated cerclage.[17] The lack of significant associations throughout these demographic factors speaks to the complexity of cervical incompetence and its multifactorial nature. For preterm delivery, our study found that 11 women (11.1%) in the 18-30 years age group and 12 women (17.9%) in the >30 years age group experienced preterm delivery, with a p-value of 0.213, suggesting that age did not play a significant role in this outcome. In concordance with this, Huang et al. suggested that pregnancy outcomes did not differ significantly by maternal age, reinforcing the notion that variables aside from age, including cervical length and history of miscarriages, are of greater importance.[17]

The evidence from the systematic review of Alfirevic et al. reaffirms that cervical cerclage can be an effective intervention in the prevention of preterm birth in singleton pregnancy. The review underscores individualized care and monitoring for optimal outcomes, and this is corroborated by our evidence of 81% success rate following cerclage.[18] Furthermore, Manzoor et al. highlighted the benefit of cervical cerclage in improving pregnancy outcome in cervical incompetence, and this validates the clinical utility of the procedure.[19]

The results of our study contribute to the body of evidence that cervical cerclage can lead to successful pregnancy outcomes, particularly in women with a history of prior mid-trimester losses due to cervical incompetence. That 81% of our cases had a successful pregnancy outcome is a reflection of reports by Adebisi et al., where 81.5% of cases were favorable.[15] While our results demonstrate that fetal salvage rates were better after cerclage, the fact that complications in the form of spontaneous abortions and preterm deliveries occurred means that vigilance and individualized patient management must be practiced.

The findings of our study illustrate the effectiveness of cervical cerclage for improving pregnancy outcome in the setting of cervical incompetence. Comparing our results with the literature, we highlight the need for continued research and clinical vigilance in the treatment of threatened pregnancy. The heterogeneity of outcomes highlights the need to individualize treatment protocols based on patient history and specific risk factors.

Our study is not without limitations. First, this was a single-center study, and therefore the generalizability of our findings to larger populations may be potentially limited. Second, the relatively modest sample size also restricts the statistical power to detect subtle outcome differences between demographic groups. Third, the observational nature of this study prevents us from conclusively determining causality, and larger multicenter studies are necessary to validate our findings.

CONCLUSION

Research findings demonstrate cervical cerclage serves as an effective medical procedure to enhance pregnancy results for women with cervical incompetence. These results highlight the value of personalized patient monitoring for better outcomes because cervical cerclage proves essential to avoid preterm delivery and spontaneous abortion together with its vital role in individual care. Additional findings from this study will strengthen the existing evidence base for cervical cerclage being used as a standardized management strategy for high-risk pregnancies.

Acknowledgments

We express our sincere gratitude to the medical team in the department for their diligent efforts in maintaining precise records and effectively managing patient information. Their commitment is truly valued.

Author Contributions

The authors have played significant roles in the preparation of this manuscript, outlined as follows:
Dr. Huma Mahsud was responsible for the initial study design, drafting the manuscript, and gathering hospital data.
Dr. Naheed Akhter was involved in refining the article, contributing to the study design, and analyzing and interpreting the data.

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