

## CERVICAL INSUFFICIENCY AND PERINATAL OUTCOME IN A TERTIARY HOSPITAL IN YENAGOA, SOUTH-SOUTH, NIGERIA

### ABSTRACT

**Background:** Cervical insufficiency has been defined by the American College of Obstetricians and Gynaecologists (ACOG) as inability of the cervix to retain a pregnancy in the second trimester, in the absence of uterine contractions. It is an important contributor to the incidence of preterm delivery, perinatal morbidity and mortality in our sub-region.

**Objective:** To determine the prevalence of cervical insufficiency and the perinatal outcome at the Federal Medical Centre, Yenagoa, Bayelsa State, Nigeria over a 5-year period.

**Materials and Methods:** This retrospective study was carried out between 1st January, 2016 and 31st December, 2020. Data were retrieved, entered into a pre-designed proforma, and analysed using IBM SPSS version 25.0. Results were presented in frequencies and percentages.

**Results:** There were a total of 4,571 deliveries, and 59 of the pregnancies were complicated by cervical insufficiency giving prevalence of 1.29% or 12.9 per 1,000 pregnancies. Most of the cerclage were history indicated (74.6%). About 7 in 10 women (71.2%) who had cervical insufficiency had vaginal delivery. Majority of the cerclage (77.2%) were removed at term and median age at removal of cerclage was 37 weeks. The mean cerclage removal to delivery interval was 8.1 days.

**Conclusion:** Cervical insufficiency is a distressing condition both for the obstetrician and the couple due to the psychological effect of recurrent pregnancy loss. Avoiding acquired predisposing factors, early booking for antenatal care, prompt insertion of cervical cerclage for women with cervical insufficiency are key in preventing associated perinatal morbidity and mortality.

**Keywords:** Cervical insufficiency, Cerclage, Morbidity, Mortality, ACOG.

### INTRODUCTION

Cervical insufficiency is a distressing condition both for the obstetrician and the couple due to the psychological effect of recurrent pregnancy loss. Cervical insufficiency has been defined by the American College of Obstetricians and Gynaecologists (ACOG) as inability of the cervix to retain a pregnancy in the second trimester, in the absence of uterine contractions [1]. It describes the failure of the cervix to retain an intrauterine pregnancy to term due to a structural or functional weakness. An incidence of 0.69% was reported in Port-Harcourt, South-South, Nigeria [2]. It is an important contributor to the incidence of preterm delivery, perinatal morbidity and mortality in our sub-region.

Acquired causes of cervical insufficiency include cervical lacerations during labour and delivery, mechanical dilation of the cervix during gynaecological procedures (like in termination of pregnancy),

cervical biopsy, laser ablation, loop electrosurgical excision procedures (LEEP), or cold knife conization [3,4].

Congenital causes can result in functional defect in the cervix. These include anatomic abnormality (such as congenital Müllerian anomalies), in utero diethylstilbestrol (DES) exposure, or collagen disorders (e.g., Ehlers-Danlos syndrome) [3,4]. Other congenital causes could be from uterine anomalies, (bicornuate uterus, uterus didelphys and septate uterus) [4].

Risk factors include, previous second trimester painless miscarriage, previous precipitous delivery, preterm deliveries, previous insertion of cervical cerclage and prolonged second stage of labour [4,5].

The American College of Obstetricians and Gynaecologists (ACOG) recommends that a history indicated cervical cerclage be placed at 12 – 14 weeks of gestation where there have been one or more miscarriages in a woman, and those miscarriages fit the pattern associated with cervical insufficiency [1]. The Society of Obstetricians and Gynaecologists of Canada recommends the placement of a history indicated cerclage at 12 – 14 weeks of gestation after three or more mid trimester miscarriages that are suggestive of cervical insufficiency [3]. The National Institute for Health and Care Excellence (NICE) recommends a choice of either prophylactic vaginal progesterone or prophylactic cervical cerclage to women with a history of spontaneous preterm birth or mid-trimester loss that was between 16 and 34 weeks of pregnancy; and a patient in whom a transvaginal ultrasound scan has been carried out between 16 and 24 weeks of pregnancy that reveals a cervical length of less than 25 mm [6].

Cervical cerclage is considered for women that transvaginal ultrasound scan done between 16 and 24 weeks of gestation reveals a cervical length of less than 25 mm and who have either had preterm pre-labour rupture of membranes in a previous pregnancy or a history of cervical trauma [6].

If a dilated cervical os with bulging foetal membranes are found incidentally between 16 and 27 weeks and 6 days of pregnancy, 'rescue' cervical cerclage is considered [6]. Contraindications to this cerclage include signs of infection, active vaginal bleeding or uterine contractions [6]. The benefits and risks of the procedure are explained to the women. The benefits include to delay delivery and increase the likelihood of neonatal survival and reduction of serious neonatal morbidity [6]. The risks include anaesthetic complications, trauma to the cervix, rupture of foetal membranes and preterm delivery.

Tests including ease of passage of size 8 Hegar's dilator through the internal cervical os, Foley catheter traction test and hysterosalpingography have been used in non-pregnant state to make a diagnosis of cervical insufficiency. However, none of these tests have been validated in scientific studies, and therefore no longer recommended for the diagnosis of cervical insufficiency [1].

The McDonald technique is presently most predominantly used for cervical cerclage. This technique does not require reflection of the bladder mucosa during placement of the cerclage and has the advantage of not requiring anaesthesia during removal unlike the Shirodkar technique [7]. It is also associated with low complication rates hence its popularity among gynaecologists [2]. The position of the knot does not influence the outcome. The mainly used positions are the 6 o' clock and 12 o'clock. There have been several modifications.

Open trans-abdominal and laparoscopic cervical cerclage have also been documented for cases where it is technically impossible to perform transvaginal placement due to extreme shortening, scarring or laceration of the cervix and where two or more previous transvaginal cerclages had failed [8]. This is usually done prior to conception or in early pregnancy [9].

Cervical cerclage may be complicated by miscarriage, bleeding, bladder injury, premature rupture of membranes, preterm contractions, vulvovaginitis, chorioamnionitis and preterm delivery. The cerclage stitch is usually removed at 37 weeks' gestational age (term). Removal of McDonald stitch does not require anaesthesia. Other indications for removal of cervical cerclage before term include foetal demise, significant vaginal bleeding, drainage of liquor, labour and evidence of chorioamnionitis. The mean cerclage removal to delivery interval has been reported as 9.3 days [10].

Cervical cerclage has brought about a high foetal salvage rate for patients with cervical insufficiency. Early presentation to a health facility, prompt diagnosis and treatment are important in successful management of this condition. The objective of this study was to determine the prevalence of cervical insufficiency and the perinatal outcome at the Federal Medical Centre, Yenagoa, Bayelsa State, Nigeria over a 5-year period.

## **MATERIALS AND METHODS**

A **retrospective survey** was carried out of all women with cervical insufficiency who presented to the Department of Obstetrics and Gynaecology, Federal Medical Centre, Yenagoa, Bayelsa State, Southern Nigeria between 1st January, 2016 and 31st December, 2020. All parturients without a diagnosis of cervical insufficiency were excluded from the survey.

Data were retrieved from the labour ward records, delivery register, theatre records, and patients' folders during the period under review. These records were entered into a pre-designed proforma. These records included age, marital status, level of education, state of residence, occupation, parity, booking status, clinical presentation, indication and type of cerclage, gestational age at insertion of cerclage and delivery of the baby, mode of delivery, perinatal outcome and total number of deliveries during the period under review. **All the patients had McDonald's procedure.**

Data were analysed using IBM SPSS version 25.0. Results were presented in frequencies and percentages for categorical variables and mean and standard deviation for continuous variables.

## RESULTS

### Sociodemographic characteristics of women with cervical cerclage

In the review period, there were 4,571 deliveries, and 59 of the pregnancies were complicated by cervical insufficiency, giving a case incidence rate of 12.9 per 1,000 pregnancies. Majority (62.7%) of the women were in their fourth decade of life, and the mean age of women with cervical insufficiency was 33.4 years with a standard deviation of 5.5 years (Table 1).

**Table 1: Sociodemographic characteristics of women with cervical cerclage**

Characteristics	Frequency (N = 59)	Percentage (%)
<b>Age group</b>		
< 30 years	15	25.4
30 – 40 years	37	62.7
> 40 years	7	11.9
<b>Mean Age (SD) in years</b>	<b>33.4 ± 5.5</b>	
<b>Marital Status</b>		
Single	1	1.7
Married	58	98.3
<b>Religion</b>		
Christianity	58	98.3
Others	1	1.7
<b>Educational level</b>		
Secondary	31	52.5
Tertiary	28	47.5
<b>Occupation</b>		
Civil Servant	22	37.3
Trader/Farmer	25	42.3
Professional	6	10.2
Unemployed	6	10.2

### Obstetric features of women with cervical insufficiency.

Table 2 shows that the parity of women who had cervical insufficiency ranged from 0 to 2 and majority (57.6%) of them were primiparous. Most (91.5%) of the women were booked with singleton gestation (91.5%).

**Table 2: Obstetric features of women with cervical insufficiency**

Characteristics	Frequency (N = 59)	Percentage (%)
<b>Parity</b>		
0	18	30.5
1	34	57.6
2	7	11.9

<b>Median parity (Range)</b>	1 (0 – 2)	
<b>Booking Status</b>		
Booked	54	91.5
Unbooked	5	8.5
<b>Number of foetuses</b>		
Singleton	54	91.5
Twins	3	5.1
Triplets	2	3.4

### Clinical presentation of cervical insufficiency and features of cerclage insertion.

Forty-two (71.2%) of the 59 women who had cervical insufficiency in the period under review presented with history of recurrent miscarriages, about half (52.5%) of them had a previous cervical cerclage (Table 3). Most (74.6%) of the cerclage were history indicated and inserted by an elective procedure. The median gestational age at insertion was 14 weeks with a range between 12 and 24 weeks (Table 3).

**Table 3: Clinical presentation of cervical insufficiency and features of cerclage insertion**

Characteristics	Frequency (N = 59)	Percentage (%)
<b>Clinical presentation of Cervical insufficiency</b>		
Recurrent miscarriages	42	71.2
Previous insertion of cervical cerclage	31	52.5
Short cervical length	7	11.9
Bulging foetal membrane	9	15.3
<b>Indication for cervical cerclage</b>		
History indicated	44	74.6
Ultrasound indicated	6	10.2
Rescue indicated	11	18.6
<b>Type of Cerclage</b>		
Elective	44	74.6
Emergency	15	25.4
<b>Gestational Age at insertion of cerclage</b>		
12 – 14 weeks	42	71.2
>14 weeks	17	28.8
<b>Median GA (range) in weeks</b>	14 (12 – 24)	
<b>Mean duration ± SD of cerclage insertion in minutes</b>	15.4 ± 5.3	
<b>Anaesthesia at insertion of cerclage</b>		
Sub-arachnoid block	51	86.4
Total intravenous anaesthesia	8	13.6

### Delivery features among women with cervical insufficiency

About 7 in 10 (71.2%) women who had cervical insufficiency were delivered by spontaneous vaginal delivery while 18.6% of them had emergency Caesarean section (Table 4). Majority (77.2%) of the

cerclage were removed at term and median age at removal of cerclage was 37 weeks with a range from 20 to 38 weeks (Table 4). Labour commenced at term for most (77.2%) of these women after the cerclage was removed, and the mean cerclage removal to delivery interval was 8.1 days. Most (73.3%) of the women who had Caesarean section were delivered prematurely. Median duration of hospital stay after delivery was 2 days, ranging from 1 to 6 days.

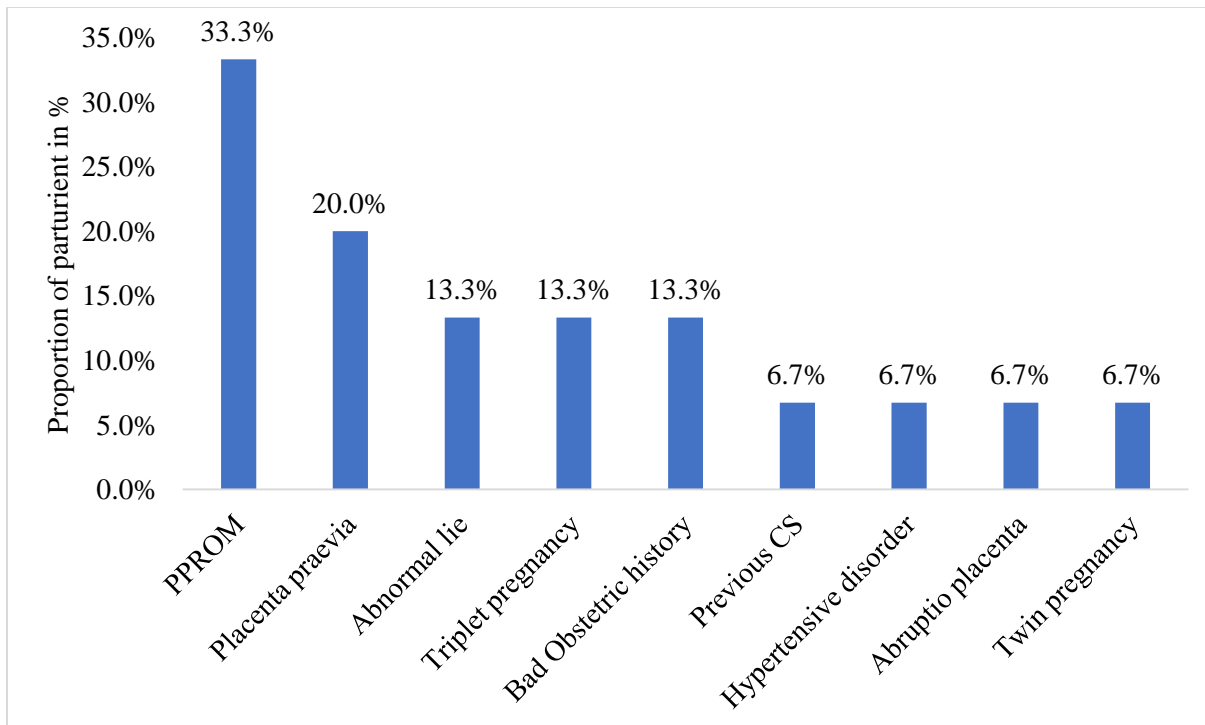
While two (3.4%) of the women had miscarriages at 20 and 25 weeks respectively, another 2 (3.4%) were lost to follow-up after the insertion of the cerclage (Table 4).

**Table 4: Mode of and gestational age at delivery after removal of cerclage**

<b>Characteristics</b>	<b>Frequency</b>	<b>Percentage (%)</b>
<b>Mode of Delivery</b>	<b>N = 59</b>	
Vaginal delivery	42	71.2
Elective Caesarean section	4	6.8
Emergency Caesarean section	11	18.6
Lost to follow-up	2	3.4
<b>Gestational age at removal of cerclage</b>	<b>N = 57</b>	
Preterm (20 – 36 weeks)	13	22.8
Term (37 – 38 weeks)	44	77.2
Median GA (Range) in weeks	37 (20 – 38)	
<b>Gestational age at onset of labour</b>	<b>N = 45</b>	
Preterm (29 – 36 weeks)	5	11.1
Term (37 – 40 weeks)	40	88.9
Median GA (Range) in weeks	38 (29 – 40)	
<b>Mean cerclage removal to delivery interval</b>	<b>8.1 days</b>	
<b>Gestational age at caesarean section</b>	<b>N = 15</b>	
Preterm (25 – 36 weeks)	11	73.3
Term (37 – 38 weeks)	4	26.7
<b>Gestational age at miscarriages</b>	<b>N = 2</b>	
20 weeks	1	50.0
25 weeks	1	50.0
<b>Median duration (range) of hospital stay post-delivery (in days)</b>		2 (1 – 6)

**Indication for Caesarean section among women after removal of cerclage**

Figure 1 shows that PPROM was the leading indication for Caesarean section among women with cervical insufficiency in our Centre (33.3%). Other indications include placenta praevia (20.0%), abnormal lie (13.3%), triplet pregnancies (13.3%) and bad obstetric history (13.3%).



PPROM – Preterm premature rupture of foetal membranes; CS – Caesarean section.

**Figure 1: Indication for Caesarean section among women after removal of cerclage (N = 15).**

### Maternal and Foetal outcomes following the management of cervical insufficiency

All women with cervical insufficiency in the review period delivered without associated mortality and morbidity. There were 64 babies from the 57 women who were delivered in our Centre. There were 52 babies from singleton gestations, 6 from 3 twin pregnancies and another 6 babies from 2 triplet pregnancies. Table 5 revealed that fifty-one (79.7%) babies were alive and well at birth, 1 perinatal death was recorded, and 12 (18.8%) babies needed management in the special care baby unit. All babies admitted into the special care baby unit were preterm babies, and a third (33.3%) of them were also asphyxiated (Table 5).

**Table 5: Foetal outcome following cervical cerclage**

Characteristics	Frequency (N = 64)	Percentage (%)
<b>Foetal outcome</b>		
Alive and well	51	79.7
Alive but admitted to SCBU	12	18.8
Perinatal mortality	1	1.5
<b>Indication for SCBU Admission*</b>		
<b>N = 12</b>		
Prematurity	12	100.0
Asphyxia	4	33.3

SCBU – Special care baby unit

## DISCUSSION

This review revealed that the prevalence of cervical insufficiency was 1.29% or 12.9 per 1,000 pregnancies and thus means that there was 1 cervical cerclage procedure in every 77 deliveries that occurred in the facility. The prevalence we report is comparable to the 1 in 69 deliveries found in Jos, Plateau State in North central, Nigeria but higher than the 8.4 per 1,000 [11]. reported in Ilorin, Western Nigeria and the 0.69% – 0.78% reported by authors from Southern Nigeria [2,12,13]. However, our finding was within the 0.5% – 8 % global estimate [14]. Variations in reported prevalence are likely due to differences in diagnostic methods employed in these studies.

Since cervical cerclage insertion is a well-known practice that has been shown to significantly improve foetomaternal outcomes, clarity of the need to perform the procedure must be sought. According to the American College of Obstetricians and Gynaecology guidelines [1], a suggestive history or findings on ultrasound, as well as rescue cerclage are recommended reasons for cervical cerclage insertion. In this study, five-sevenths of the women who had cervical cerclage were history-indicated. Our findings were consistent with what has been similarly reported in the literature where a history of cervical insufficiency evidenced by recurrent miscarriages and previous cervical cerclage have been the predominant indication [15,16]. Yet, for parturients presenting early in pregnancy in this review, ultrasonography aided the confirmation of the diagnosis of cervical incompetence in about a tenth of them.

In this study it was observed that a majority of the women were of low parity and were in the fourth decade of their lives which was comparable to findings by in a study in Port Harcourt with a mean age of 31.5 years [17]. We agree with the view that increasing incidents of traumatic insults to the cervix resulting from previous abortions with advancing age as suggested by other authors [17,18] is a plausible explanation for the occurrence of this obstetric condition among predominantly primiparous and nulliparous women.

The McDonald technique was the preferred procedure in this facility because it was rather simple to insert, remove, is less traumatic and did not require anaesthesia. This was similarly observed to be the choice for other authors [17–21], but contrast reports from a study in Aba [15], South-East Nigeria where Shirodkar technique was the common procedure and was attributed to their preference and training. The gestational age at insertion in five-sevenths (71%) of women in our series ranged between 12 and 24 weeks with a median of 14 weeks. This slightly differed from the 12 weeks [16] reported by Ndubuisi and colleagues in Enugu, South Eastern Nigeria and the 15 weeks reported by Bukar and colleagues [10], in a study among women from Gombe and Adamawa states, North eastern Nigeria and by Adeniran and colleagues [11] in a study among women in Ilorin, Kwara State, North Central Nigeria. The underpinning rationale hinges on the premise that first trimester miscarriages from other underlying aetiologies should have occurred. Overall, most authors in Nigeria reported a range between 14 – 16 weeks [13,21–23]. Also, for about a quarter of our patients, emergency insertion of cerclage was done at later gestations above 14 weeks extending up to 24 weeks. Our finding was similar to a study in Saudi Arabia where the

mean gestational age for emergency cerclage insertion was 23.05 weeks and ranged between 18 and 26 weeks.

In this study, the most common modality of delivery was spontaneous vaginal which is consistent with reports from other studies in Nigeria. Albeit, among the one-fifth of women who eventually had emergency Caesarean sections, the top indications were preterm premature rupture of foetal membranes (PPROM) and placenta previa which varied from the findings of pre-eclampsia, foetal distress, prematurity and failed induction reported by other authors in Nigeria [13,15,22,23]. However, placenta praevia was also noted to be the most common indication for Caesarean section in a study in Ile Ife [20].

We also report a term pregnancy rate of 77.2% following the cerclage insertion and was similar to rates ranging from 65.3% to 76.8% reported in other studies in Nigeria [11,17,21]. While it is normally expected that spontaneous labour follows soon after removal of cerclage to validate actual presence of an incompetent cervix [20], the mean cerclage removal to delivery interval in this study was 8.1 days. Our finding is similar to 9.3 days noted by Bukar and colleagues [10], yet, slightly shorter than the 12 days reported in a study by Onwudiegwu [20], in Ile-Ife. Hence, gives credence to the fact that other factors besides merely mechanical factors like a shortened cervix may be responsible for initiating onset of labour. About five-sevenths of the women in our series who had Caesarean section delivered prematurely. The median duration of hospital stay after delivery was 2 days, ranging from 1 to 6 days and is comparable with the 4 days reported by Feyi-Waboso and Umezurike [15] in Aba, South Eastern Nigeria, suggesting that following removal of cerclage and delivery, length of hospital stay may not be unnecessarily prolonged.

The overall foetal salvage noted in this study was 98.5% and compared favourably to the reports from other authors in Nigeria which ranged from 76% to 92.2% [10,13,15,19,21,22]. We report a low perinatal mortality of 1.5% with no maternal mortality which is similar to 2.1% observed in Jos [19]. While most of the babies were term and alive, it is worth noting that about one-fifth of the babies delivered post-cerclage removal were premature, necessitating admission into the neonatal intensive care unit and were comparable to findings reported by other studies in Nigeria [19,21]. Our finding though unsurprising, corroborates existing literature that suggests cervical cerclage reduces the risk of preterm births and improves perinatal outcome [24].

#### **LIMITATION**

This study is limited by the fact that it was a hospital-based study and findings may not be entirely generalizable to the entire country. Multi-centered prospective studies are therefore suggested.

## CONCLUSION

Cervical insufficiency is associated with significant perinatal morbidity and mortality. Our study revealed a case incidence rate of 12.9 per 1,000 pregnancies. It is a distressing condition both for the obstetrician and the couple due to the psychological effect of recurrent pregnancy loss. Avoiding acquired predisposing factors, early booking and regular antenatal care, prompt insertion of cervical cerclage for women with cervical insufficiency are key in preventing associated perinatal morbidity and mortality.

## ETHICAL APPROVAL

The research work was examined and approved by the hospital research and ethics committee.

## COMPETING INTERESTS DISCLAIMER:

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

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