

## Original Research Article

# **Puerperal sepsis and its associated factors: Review of cases in a Tertiary Hospital in Jigawa, North-west Nigeria.**

### **ABSTRACT**

**Background:** Puerperal sepsis is an infection of the genital tract occurring anytime between the rupture of membranes and 42<sup>nd</sup> day postpartum. It is one of the leading causes of maternal mortality accounting for 11% maternal death.

**Objective:** The aim of the study was to determine the incidence of puerperal sepsis and associated complications.

**Material and method:** It was a retrospective study carried out in the department of Obstetrics and Gynecology of Rasheed Shekoni Federal University Teaching Hospital. Data obtained was analyzed with IBM SPSS version 21.0. Measured variables were expressed in percentage. Test for association was done using chi-square non-parametric test, setting P-value at <0.05.

**Results:** The incidence of puerperal sepsis was 10.7%. The mean age of the patients was  $25.85 \pm 7.5$ . The mean parity was  $3.89 \pm 4.5$ . Majority (74.71%) of the women were unbooked and had home delivery (69.3%). Fever (90.7%) was the most frequent presenting complaint. The commonest (75.0%) organism cultured was staphylococcus aureus. Anemia was the commonest (63.6%) complication.

**Conclusion:** The incidence of Puerperal sepsis in this study is high. Low literacy level, unemployment, un-booked status and home delivery were found to be predisposing factors.

**Keywords:** Puerperal sepsis, anemia, home delivery, Jigawa.

## INTRODUCTION

Puerperal sepsis is one of the leading causes of maternal mortality accounting for approximately 11% of maternal death.<sup>(1)</sup> Puerperal sepsis is defined as infection of the genital tract occurring at any time between the onset of rupture of membranes or labour and 42<sup>nd</sup> day postpartum in which fever and one or more of the following are present: pelvic pain, abnormal vaginal discharge, abnormal smell/foul odour of discharge, delay in the rate of reduction of size of uterus (< 2cm/day during first 8 days).<sup>(2,3)</sup> According to international statistical classification of disease and related problems (ICD-10), puerperal sepsis refers to complication related to the puerperium. It includes not only puerperal endometritis but also encompasses other puerperal infections such as: infection of obstetric surgical wounds, infection of other genital tract including cervicitis and vaginitis, urinary tract infection following delivery, pyrexia of unknown origin following delivery and extra-genitourinary complications related to the puerperium.<sup>(4)</sup>

Puerperal sepsis is the 3<sup>rd</sup> leading cause of direct maternal death in the developing countries.<sup>(1)</sup> The case fatality rate of puerperal sepsis was reported to be as high as 8%,<sup>(5)</sup> and it complicates 1-8% of all deliveries.<sup>(6)</sup> Furthermore, the risk factors for puerperal sepsis include: low socioeconomic status, low literacy level, un-booked status, prolonged rupture of membranes, prolonged labor, obstructed labour, repeated vaginal examination during labour, anemia in pregnancy, caesarean section, home delivery and poor hygiene.<sup>(1,7,8)</sup>

Regarding causative agents, puerperal sepsis is usually poly-microbial comprising of aerobic and anaerobic organisms.<sup>(6)</sup> The commonly isolated organisms in Nigeria are Escherichia coli, staphylococcus aureus and Klebsiella species; which are often indigenous to the lower genital tract.<sup>(2, 8)</sup> However exogenous organisms, including Niesseriagonorrhoea and chlamydia trachomatis are also isolated.<sup>(2)</sup>

Similarly, puerperal sepsis if untreated may result in several complications. The early complications include progression of the infection resulting in pelvic abscess, septicaemia, septic shock, renal failure and multiple organ failure leading to death.<sup>(9)</sup> Long term complications include chronic pelvic pain, chronic PID, ectopic pregnancy, secondary amenorrhoea and infertility.<sup>(9)</sup> Therefore, the aim of this study was to determine the incidence of puerperal sepsis and associated complications at Rasheed Shekoni Teaching Hospital, (RSTH), Dutse.

## MATERIAL AND METHOD

This is a retrospective study carried out in the department of Obstetrics and Gynaecology of Rasheed Shekoni Teaching hospital, Dutse Jigawa State between 1<sup>st</sup> June 2021 and 31<sup>st</sup> May 2023. Rasheed Shekoni Teaching hospital is one of the tertiary health facilities in the state. It serves as a referral center for patients within Jigawa and neighbouring states.

The study participants were all the patients admitted into the postnatal ward and managed for puerperal sepsis during the period under review. The case files of the participants were retrieved from the record department. Relevant information obtained from the files included socio-demographic data, parity, booking status, mode of delivery, place of delivery, presenting complaints, complications and microbiology result.

The data obtained was checked for completeness and accuracy. Data analysis was carried out using IBM statistical package for social sciences (SPSS) version 21.0. Measured variables were expressed in percentage. Test for association was done using chi-square non-parametric test, setting P-value at <0.05.

The study was carried out after obtaining approval from the Health Research and Ethics committee of Rasheed Shekoni Teaching Hospital Jigawa, Nigeria (Approval number- RSSH/GEN/226/V.I)

## RESULTS

There were 816 obstetric admissions during the period under review, of which 88 patients were managed for puerperal sepsis. This gave an incidence of 10.7%. However, only 75(85.2%) case files were retrieved for analysis. The mean age of the patients was  $25.85 \pm 7.5$ , with a range of 17 – 40 years. Majority of the patients were not educated (68%), not employed (88%) and resided in the rural areas (77.3%). The socio-demographic characteristics are presented in Table1.

**Table 1: Socio-demographic characteristics of the participants**

Variables	Frequency (n)	Percentage (%)
I-Age		

<b>Mean age= 25.8 ± 7.5</b>		
<20	22	29.3
20-25	22	29.3
26-30	10	13.3
31-35	18	24.0
>35	3	4.0
<b>II-Education level</b>		
No formal	51	68.0
Primary	8	10.6
Secondary	14	18.7
Tertiary	2	2.7
<b>III-Occupation</b>		
Unemployed	66	88.0
Student	2	2.7
Civil servant	5	6.6
Business	2	2.7
<b>IV-Residence</b>		
Rural	58	77.3
Urban	17	22.7

The Obstetric characteristics of the participants are shown in Table 2. The mean parity was  $3.89 \pm 4.5$  with a parity range of 1 – 10. The occurrence of puerperal sepsis was almost equally distributed among the parity groups. Majority (74.71%) of the women were un-booked and had home delivery (69.3%), supervised by unskilled attendants (60%). Most (84.0%) of the women had vaginal delivery.

**Table 2: Obstetrics characteristics of the study participants**

Variables	Frequency (n)	Percentage (%)
<b>I-Parity</b>		
<b>Mean parity= 3.89 ± 4.5</b>		
<b>Primiparous</b>	23	30.7
<b>Multiparous</b>	24	32.0
<b>Grand-multiparous</b>	28	37.3

<b>II-Booking status</b>		
<b>Un-booked</b>	56	74.7
<b>Booked:</b>	19	25.3
<b>a-booked at study hospital</b>	2	10.5
<b>b-booked at referring hospital</b>	5	26.3
<b>c-booked elsewhere</b>	12	63.2
<b>III- Place of delivery</b>		
<b>Home</b>	52	69.3
<b>Hospital:</b>	23	30.7
<b>a-study hospital</b>	2	8.7
<b>b-other hospitals</b>	21	91.3
<b>IV-Duration of labour</b>		
<b>&lt;24 hours</b>	16	21.3
<b>&gt;24 hours</b>	27	36.0
<b>Not known</b>	32	42.7
<b>V-Mode of delivery</b>		
<b>Vaginal</b>	63	84.0
<b>Caesarean section</b>	12	16.0
<b>V-Accoucheur</b>		
<b>Unskilled birth attendant</b>	45	60.0
<b>Midwife/Nurse/Chew</b>	18	24.0
<b>Doctor</b>	12	16.0

Chew= Community health extension worker

Fever (90.7%) was the most frequent presenting complaints. Also, delay in health seeking is observed with more than half (58.7%) of the patients presenting to the facility more than a week following the onset of symptoms. Majority (89.3%) of the patient did not have vaginal or wound swab microscopy, culture and sensitivity. Among the eight (10.7%) patients who had swabs taken for culture, 2 (25.0%) yielded no growth. The most common (75.0%) organism cultured was staphylococcus aureus. The isolated organisms were most sensitive to (83.3%) to levofloxacin. The findings are detailed in Table 3.

**Table 3: Presenting complaints and microbial culture**

I-Presenting complaint	Frequency (n)	Percentage (%)
<b>Fever</b>	68	90.7

Abdominal pain	41	54.7
Abnormal vaginal discharge	22	29.3
Abdominal distension	17	22.7
Vaginal bleeding	7	9.3
Uterine sub-involution	4	6.7
<b>II-Duration of symptoms at time of presentation</b>		
1-7 days	31	41.3
>7 days	44	58.7
<b>III-Culture and sensitivity</b>		
Not done	67	89.3
Done	8	10.7
<b>IV-Culture result n=8</b>		
Staphylococcus	6	75.0
Klebsiella spp	4	50.0
Streptococcus spp	4	50.0
Escherichia coli	2	25.0
No growth	2	25.0
<b>V-Sensitivity pattern n=6</b>		
Levofloxacin	5	83.3
Ofloxacin	4	66.7
Ciprofloxacin	3	50.0
Cefuxime	3	50.0
Erythromycin	2	33.3
Azithromycin	1	16.6

As shown in Table 4; more than half (58.7%) of the women had complications; of which anaemia was the commonest (63.6%). In the same vein 5 (6.7%) maternal death was recorded.

**Table 4: Outcome of puerperal sepsis among participants**

Variables	Frequency (n)	Percentage (%)
<b>I-Outcome: n=75</b>		
Complications	44	58.7
No complication	31	41.3

<b>II-Complications:</b>	<b>n=44</b>	
Anaemia	28	63.6
Abdomino-pelvic abscess	10	22.7
Surgical site infection	8	18.2
Acute kidney injury	5	11.4
Septicaemia	2	4.5
Septic shock	1	2.3
Psychosis	1	2.3
<b>III-Discharge summary</b>		
Discharged	58	77.3
DAMA	12	16.0
Death	5	6.7

DAMA= Discharged against medical advice

## DISCUSSION

The incidence of puerperal sepsis is 10.7% in this study. This is similar to 9.34% observed in Port Harcourt, south-south Nigeria.<sup>(10)</sup> However, the incidence observed in this study is higher than the 0.9% reported in Sokoto, north-west Nigeria. On the contrary, the incidence is lower than the 16.7% in Jos, north-central Nigeria.<sup>(12)</sup> This variation in incidence may reflect health seeking behavior and access to health facilities in these areas.

The mean age of the patient in this study was 25.8%  $\pm$  7.5. This is similar to the mean age recorded in Sokoto.<sup>(11)</sup> Puerperal sepsis was highest among the age groups of <20 and 20 – 25. A significant proportion (68%) of the patient had no formal education. This is similar to the finding of some studies.<sup>(11, 13)</sup> However, this is in contrast with the findings of Orijii et al where majority (60.6%) had secondary education.<sup>(14)</sup> More so, most of the patients (88%) were unemployed as also reported in some studies.<sup>(11, 13)</sup> Low literacy level and low socio-economic status are significant risk factors for puerperal sepsis<sup>(1)</sup> and have been shown to have effect on health seeking behavior.<sup>(15)</sup> Likewise, most (77.3%) of the patients reside in the rural areas. This is in line with the findings by Singh et al and Demisse et al.<sup>(16, 17)</sup> This is in contrast to a study from Bangladesh.<sup>(18)</sup> High incidence of puerperal sepsis among rural dwellers may be

as a result of unclean home delivery, low literacy level and poor awareness of the need for antenatal care.

Majority (74.7%) of the patients did not book for ANC. This is similar to the findings of some studies.<sup>(10, 19)</sup> Pregnant women during ANC are educated on danger signs of pregnancy and need to present to hospital when problem arise. The parity of these patients with puerperal sepsis in this study was almost evenly distributed. This is in contrast to the findings of some studies<sup>(11, 16, 20)</sup> The current study found that 69.3% of the patients had home delivery, supervised by unskilled attendants. This is consistent with the findings of other studies.<sup>(11, 14, 16, 17)</sup> Home deliveries increase the risk of puerperal sepsis due to ignored asepsis, contact with contaminated materials and some harmful traditional practices. In the study sub-region, cultural values and husband's or his family's choice is also a determinant of place of delivery,<sup>(21)</sup> which together with low literacy level and poverty contribute to high incidence of home delivery. In the current study only 23(30.7%) patients managed for puerperal sepsis had deliveries in the hospital; and among them only 2(8.7%) delivered in the study hospital. Others (91.3%) had their deliveries at other primary and secondary health facilities. Referred cases are more likely to develop puerperal sepsis when compared to those from the study hospital. This was similarly observed in Uganda and Pakistan.<sup>(11, 20)</sup> A major proportion (84%) of the patients had vaginal delivery and this is similar to the reports of some studies.<sup>(11, 16)</sup> More so, the patients who were in labour for more than 24hours (36%) had higher prevalence of the disease and this also share similarity with some studies in Ethiopia and Nepal<sup>(17, 22)</sup>

Fever (90.7%) was the most frequent presenting complaints. Regarding laboratory confirmation of the diagnosis, most (89.3%) of the patients did not have swab taken for microscopy, culture and sensitivity (MCS). For those that had the swab MCS, the most common (75.0%) organism cultured was staphylococcus aureus. This is similar to findings in Maiduguri and Sudan.<sup>(19, 25)</sup> However this is in contrast to the findings of some studies in which Klebsiella was the most isolated organism.<sup>(10, 16, 23)</sup> More so, the isolated organisms were most sensitive to Levofloxacin (83.3%) which was in contrast to the findings in Sokoto (Ceftraixone),<sup>(11)</sup> Yenagoa (Amoxicillin – Clavulanic acid)<sup>(14)</sup> and India (Gentamycin).<sup>(</sup>

Similarly more than half (58.7%) of the patient managed developed or presented with complications; with anaemia being the commonest (63.6%). Also this study reported 5(6.7%) maternal death. Orijji et al in their study did not record any mortality. <sup>(14)</sup> However, Sulaiman et al had a higher (15.1%) mortality. <sup>(11)</sup> The patients' status on referral was contributory to the mortality: Majority (97.3%) of these patients were referred from other health facilities. Additionally, more than half (58.7%) of these patients presented more than a week following the onset of symptoms with already developed complications. Additionally some (16%) of the patients requested and were discharged against medical advice (DAMA). This was because of the medical bills in the study (tertiary) hospital and unusual feeding expenses for the accompanying relatives. These families had enjoyed free maternal health care services (including caesarean section) in all the government owned primary and secondary health care facilities in the sub-region.

Nevertheless, majority (77.3%) of these patients were discharged from the hospital after full recovery.

## **LIMITATION**

This is a hospital based study as such does not reflect what is obtainable in other government owned and private hospitals where the socio-economic status and place of residence may differ.

## **CONCLUSION**

The incidence of Puerperal sepsis in this study is high. Low literacy level, unemployment, unbooked status and home delivery were found to be predisposing factors. Making health care affordable through poverty alleviation support, in addition to increase awareness on need for ANC where pregnant women will be given effective health education on safe delivery and postpartum care could help in reducing the incidence of puerperal sepsis in the study community.

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