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Puerperal Sepsis and its Associated Factors: Review of Cases in a Tertiary Hospital in Jigawa, North-West Nigeria

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Background: Puerperal sepsis is the 3rd leading cause of direct maternal death in developing countries. The case fatality rate of puerperal sepsis was reported to be as high as 8%, and it complicates 1-8% of all deliveries. It is an infection of the genital tract occurring anytime between the rupture of membranes and 42nd day postpartum.
Objective: The aim of the study was to determine the prevalence of puerperal sepsis and associated factors.
Materials and Methods: This was a retrospective cross-sectional study carried out in the Department of Obstetrics and Gynecology of Rasheed Shekoni Federal University Teaching Hospital. The study participants were all the patients managed for puerperal sepsis during the

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period under review. The patients" data were collected using a structured proforma from their case files. Data obtained was analyzed with IBM SPSS version 21.0. Measured variables were expressed in descriptive statistics; mean ± SD for normally distributed quantitative variables, median and interquartile range for skewed quantitative variables. Qualitative variables were expressed in percentage and proportions.

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

Conclusion: The prevalence 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: Anaemia; home delivery; jigawa; puerperal sepsis.

1. INTRODUCTION

Puerperal sepsis is one of the leading causes of maternal mortality accounting for approximately 11% of maternal death globally [1]. Puerperal sepsis is defined as infection of the genital tract occurring at any time between the onset of rupture of membranes or labour and 42nd 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) [2,3]. 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 [4].

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

Regarding causative agents, puerperal sepsis is usually poly-microbial comprising of aerobic and anaerobic organisms [8]. The commonly isolated organisms in Nigeria are Escherichia coli, Staphylococcus aureus and Klebsiella sp; which are often indigenous to the lower genital tract [2,7]. However exogenous organisms, including Nieisseria gonorrhoea and Chlamydia trachomatis are also isolated [2].

Puerperal sepsis if untreated could result in several complications that include progression of the infection to pelvic abscess, septicaemia, septic shock, renal failure and multiple organ failure leading to death [9]. Long term complications include chronic pelvic pain, chronic Pelvic Inflammatory Disease {PID}, ectopic pregnancy, secondary amenorrhoea and infertility [9]. Puerperal sepsis is one of the disorders that can be avoided. Knowledge of population and area specific risk factors, causes and clinical presentation is important in the prevention of the occurrence of puerperal sepsis and its complication.

Hence, the aim of this study was to determine the prevalence of puerperal sepsis and associated complications at Rasheed Shekoni Federal University Teaching Hospital, (RSFUTH) Dutse, Jigawa state, Nigeria.

2. MATERIALS AND METHODS

2.1 Study Area

The study was carried out in the department of Obstetrics and Gynaecology of Rasheed Shekoni Federal University Teaching Hospital, Dutse Jigawa State between 1st June 2021 and 31st May 2023. Rasheed Shekoni Federal University Teaching Hospital is one of the tertiary health facilities (HFs) in the state. This Hospital serves

as a referral center for patients within Jigawa and neighboring states.

2.2 Study Design

This is a retrospective cross-sectional study.

2.3 Study Population

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. Files with gross missing data were excluded.

2.4 Data Collection

Patients' data were obtained using a structured proforma from their case files. 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.

2.5 Data Processing and Statistical Analysis

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 descriptive statistics; mean ± SD for normally distributed quantitative variables, median and interquartile range for skewed quantitative variables. Qualitative variables were expressed in percentage and proportions. Test for association was done using Chi-square non-parametric test setting P- value at < 0.05 at 95% level of confidence.

3. RESULTS

There were 816 obstetric admissions during the period under review and out of these 10.7% (n=88) patients were managed for puerperal sepsis. However, only 75(85.2%) case files were retrieved for analysis. The mean age of the patients was 25.85 $\pm$ 7.5. Most 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.

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 of the women were un-booked for ANC (74.71%), had home delivery (69.3%) and birth was supervised by unskilled attendants (60%). Most (84.0%) of the women had vaginal delivery.

Table 1. Socio-demographic characteristics of the participants

Variables	Frequency (n)	Percentage (%)
Age		
Mean age= 25.8 $\pm$ 7.5		
<20	22	29.3
20-25	22	29.3
26-30	10	13.3
31-35	18	24.0
>35	3	4.0
Education level		
No formal education	51	68.0
Primary	8	10.6
Secondary	14	18.7
Tertiary	2	2.7
Employment status		
Unemployed	66	88.0
Student	2	2.7
Civil servant	5	6.6
Business	2	2.7
Residence		
Rural	58	77.3
Urban	17	22.7

Table 2. Obstetrics characteristics of the study participants

Variables	Frequency (n)	Percentage (%)
Parity		
Mean parity= 3.89 + 4.5		
Primiparous	23	30.7
Multiparous	24	32.0
Grand-multiparous	28	37.3
Booking status		
Un-booked	56	74.7
Booked:	19	25.3
a-booked at study hospital	2	10.5
b-booked at referring hospital	5	26.3
c-booked elsewhere	12	63.2
Place of delivery		
Home	52	69.3
Hospital:	23	30.7
a-study hospital	2	8.7
b-other hospitals	21	91.3
Duration of labour		
<24 hours	16	21.3
>24 hours	27	36.0
Not known	32	42.7
Mode of delivery		
Vaginal	63	84.0
Caesarean section	12	16.0
Accoucheur		
Unskilled birth attendant	45	60.0
Midwife/Nurse/Chew	18	24.0
Doctor	12	16.0

CHEW= Community Health Extension Worker

Fever (90.7%) was the most frequent presenting complaints. Again, 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.

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

4. DISCUSSION

There were 816 obstetric admissions during the period under review and out of these 88 patients were managed for puerperal sepsis. The prevalence of puerperal sepsis is 10.7% in this study. This is similar to 9.34% observed in Port Harcourt, south-south Nigeria [10]. However, the prevalence 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 [11]. This variation in incidence may reflect health seeking behaviour 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 [12]. Puerperal sepsis was highest among the age groups of <20 and 20 – 25. A significant proportion (68%) of the patient had no formal education and this is similar to the finding of Sulaiman et al and Maritim et al. [11,13]. However, this is in contrast with the findings of Oriji et al where majority (60.6%) had secondary education [14]. More so, most of the patients (88%) were unemployed as also reported by Sulaiman et al and Maritim et al.

[11,13]. Low literacy level and low socio-economic status are significant risk factors for puerperal sepsis [1] and have been shown to have effect on health seeking behavior. [15] Likewise, most (77.3%) of the patients came from rural setting and this the finding tally with those reported by Signh et al and Demisse et al. [16,17] though differ from a study in Bangladesh [18]. 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 antenatal care. This is similar to the findings of Onunuju et al and Bako et al. [10,19] Pregnant

Table 3. Presenting complaints and microbial culture

Presenting complaint	Frequency (n)	Percentage (%)
Fever	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
Duration of symptoms at time of presentation		
1-7 days	31	41.3
>7 days	44	58.7
Culture and sensitivity		
Not done	67	89.3
Done	8	10.7
Culture result	n=8	
Staphylococcus	6	75.0
Klebsiella spp	4	50.0
Streptococcus spp	4	50.0
Escherichia coli	2	25.0
No growth	2	25.0
Sensitivity pattern	**n=6**	
Levofloxacin	5	83.3
Ofloxacin	4	66.7
Ciprofloxacin	3	50.0
Cefuxime	3	50.0
Erythromycin	2	33.3
Azithromycin	1	16.6

Table 4. Outcome of puerperal sepsis among participants

Variables	Frequency (n)	Percentage (%)
Outcome	n=75	
Complications	44	58.7
No complication	31	41.3
Complications	**n=44**	
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
Discharge summary		
Discharged	58	77.3
DAMA	12	16.0
Death	5	6.7

DAMA= Discharged Against Medical Advice

women during antenatal care are educated on danger signs of pregnancy and need to present to hospital when problem arise. Parity of patients in this study was almost evenly distributed. Contrary findings were reported by Sulaiman et al, Singh et al and Ngozi et al. [11,16,20] The current study found that 69.3% of the patients had home delivery, supervised by unskilled attendants. This is consistent with the findings of Sulaiman et al, Oriji et al, Singh et al and Demisse et al. [11,14,16,17]. Home deliveries from unskilled attendant increase the risk of puerperal sepsis due to lack of knowledge and skills to maintain IPC and use of harmful traditional practices. In the study sub-region, cultural values and husband's choice is also a determinant of place of delivery [21]. 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 primary and secondary HFs. 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 [11,20]. A major proportion (84%) of the patients had vaginal delivery and this is similar to the reports of some studies [11,16] 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 [17,22].

Fever (90.7%) was the most frequent presenting complaints. Regarding laboratory investigation, 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. [19,23] However this is in contrast to the findings of some studies in which Klebsiella was the most isolated organism. [10,16,23] More so, the isolated organisms were most sensitive to Levofloxacin (83.3%) which was in contrast to the findings in Sokoto (Ceftraixone), [11] Yenagoa (Amoxicillin – Clavulanic acid) [14] and India (Gentamycin) [16].

Similarly more than half (58.7%) of the patient managed developed or presented with complications; with anaemia being the commonest (63.6%). Again this study reported 5(6.7%) maternal death. Oriji et al in their study did not record any mortality [14]. However, Sulaiman et al had a higher (15.1%) mortality [11]. 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, 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.

5. 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.

6. 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.

CONSENT

It is not applicable.

ETHICAL Approval

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

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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