



## **Revisiting Puerperal Sepsis in Obsteric Referral Centres in Port Harcourt, Southern Nigeria**

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### **Authors' contributions**

*This work was carried out in collaboration among all authors. Author OEO conceived and designed the study, managed the analysis and wrote the first draft of the manuscript. Author OAO collected the data and performed the statistical analysis. Author INEE did the literature search and proof read the study. All authors read and approved the final manuscript.*

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### **ABSTRACT**

**Background:** As the frontier of knowledge expands, surgical skills improve; and with the advent of increasingly potent antibiotics, it is expected that puerperal sepsis and its complications as captured in the literature of studies will be on the down turn. With this in mind, we decided to find out what is current as par risk factors and complications of puerperal sepsis in these obstetric referral centres in Port Harcourt.

**Objective:** To determine the risk factors and complications of puerperal sepsis at the University of Port Harcourt Teaching Hospital(UPTH), Port Harcourt and the River State University Teaching Hospital (RSUTH), Port Harcourt, Nigeria.

**Methods:** The case notes of these patients were retrieved from the medical records departments and relevant data extracted using a well-structured proforma. Data collected included the demographic characteristics, booking status, background immune suppression (HIV/AIDS or DM),

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labour characteristics, place and mode of delivery, fetal outcome, length of hospital stay. Morbidities like septicaemia, pelvic abscess, disseminated intravascular coagulopathy among others; and the presence of mortality was also noted. The data was analyzed using SPSS version 23.0. Statistical analysis of data was done by Chi-square test. A p-value less than 0.05 was considered significant. The result is presented in tables of frequencies and percentages.

**Results:** The prevalence of puerperal sepsis was 1.7%. Risk factors were low parity, unbooked status (84.35%) and wound infection (29.9%), among other intrauterine foetal death (22.8%), obstructed labour (14.2%) and perineal tear (11.0%). The main complications of puerperal sepsis noticed were prolonged hospital stay (58.3%) and septicaemia (13.4%); pelvic abscess (10.2%) and intestinal obstruction (4.7%) while (1)3.1% ended in mortality.

**Conclusion:** Complications of puerperal sepsis were still high in these centres. Worryingly, a huge number of these patients were unbooked.

*Keywords: Puerperal sepsis; complications; unbooked status; Port Harcourt.*

## 1. INTRODUCTION

Puerperal sepsis is one of the major causes of maternal morbidity and mortality especially in developing countries [1,2,3,4]. The WHO reported 358,000 maternal mortality yearly and 15% of this is associated with puerperal sepsis [1]. A study in Nigeria reported that it is the third leading cause of maternal mortality after preeclampsia/eclampsia and haemorrhage, accounting for 12% of maternal deaths [3]. The incidence of puerperal sepsis has relatively declined worldwide due to better obstetric care, improved personal health and hygiene and availability of potent antibiotics [3].

Puerperal sepsis is defined as infection of the genital tract occurring at any time between the onset of rupture of membranes or labour and the 42nd day following delivery or abortion in which two or more of the following signs or symptoms are present: fever of  $>38^{\circ}\text{C}$ , foul-smelling vaginal discharge, lower abdominal pain and tender subinvolved uterus [5]. The predisposing factors for puerperal sepsis include low socioeconomic status, anaemia, obesity, malnutrition, lack of antenatal care, prolonged labour, frequent vaginal examinations in labour and premature rupture of membrane for a prolonged period [6, 7,8,9,10,11]. Others include impaired immunity, operative vaginal delivery, caesarean delivery and retained products of conception [10].

The disease is usually polymicrobial and the causative organisms can be aerobic, anaerobic or a mixture of the two. These pathogens include *Escherichia coli*, *Streptococcus pyogenes*, *Klebsiella* species, *Staphylococcus aureus*, *Proteus* species, *Bacteroides* species, *Clostridium perfringens*, among others. The severity of infection depends on the virulence of the invading organism, number of bacteria and

host resistance [10,12]. The modes of infection can be exogenous or endogenous; [8] endogenous is when the infection occurs due to organisms present in the vagina and cervix in the presence of devitalized tissues while exogenous is when it is introduced from outside (from attendants, relatives, or unsterile instruments) [8]. The primary site of infection is the uterus (endomyometrium) after which it can spread via the parametrium to the fallopian tubes and ovaries, and then it can enter the bloodstream (septicaemia) [10].

The onset of puerperal sepsis is usually two to three days after delivery. Common clinical features (aside from aforementioned fever, lower abdominal pain, foul-smelling vaginal discharge and subinvolved uterus) are malaise, headache, nausea, vomiting. It is important to examine episiotomy or caesarean section wound to rule out infection. Clinical features suggestive of formation of a pelvic abscess include high-grade fever, tenderness and or rigidity in the lower abdomen, boggy or tender fluctuant mass in the pouch of Douglas [5,10,13]. The following investigations should be done; full blood count, peripheral smear to rule out malaria, urine microscopy, culture and sensitivity, high vaginal or endo-cervical swab, ultrasound scan to rule out retained products. Other investigations that can be done depending on the clinical scenario include blood culture and x-ray of the abdomen/pelvis [5,10].

The key to management of puerperal sepsis is early recognition, aggressive resuscitation, antibiotic administration and source control [14,15]. The mainstay of treatments for these patients is the use of antibiotics with good coverage for implicated organisms. Patients with moderate to severe infection should be treated with parenteral antibiotics while those with mild

infection can be given oral medications [5]. Other specific treatments might involve laparotomy and drainage of a pelvic abscess in massive pelvic collection [5,15].

The complications of puerperal sepsis include anaemia, pelvic abscess, septicaemia, septic pelvic thrombophlebitis, disseminated intravascular coagulopathy. Late complications of puerperal sepsis like infertility, ectopic pregnancy and intestinal obstruction might arise [5,9,16]. Anaemia found in sepsis could result from haemolysis of red blood cells by the multiplying offending organisms. Puerperal sepsis accounted for 19% of maternal mortality in northern Nigeria [17].

Infection control protocols and evidence-based procedures including prophylactic antibiotics for caesarean section or preterm rupture of membranes and updated antibiotic regimens can help prevent puerperal sepsis and its attendant complications [18,1].

The aim of this study therefore is to review the risk factors and complications of puerperal sepsis in the two obstetric referral centres in Port Harcourt, Nigeria. Hence, the findings from the review will guide our obstetric practice to preventing and managing cases of puerperal sepsis for a better outcome.

## 2. MATERIALS AND METHODS

This is a hospital-based retrospective study of all cases of puerperal sepsis managed at the UPTH, Port Harcourt and the River state university teaching hospital, Nigeria over a 5-year period; from June 1,2012 to May 31, 2017. The cases were identified through records from the labour ward and obstetric wards. The case notes were retrieved from the medical records departments and relevant data for the study was extracted using a pretested-structured proforma. Data collected included the demographic characteristics, booking status, background immune-suppression (HIV/AIDS or DM), labour characteristics, place and mode of delivery, fetal outcome and length of hospital stay. Morbidities like septicaemia, pelvic abscess, disseminated intravascular coagulopathy among others; and mortalities were noted.

The data was analyzed using SPSS version 23.0. Statistical analysis of data was done by Chi-square test. A p-value less than 0.05 was considered as significant. The result is presented in tables of frequencies and percentage.

## 3. RESULTS

There were 8,943 deliveries during the period under study. Of this total, 149 women had puerperal sepsis, thus its incidence was 1.7%. A total of 127 case folders were retrieved and analyzed giving a retrieval rate of 85.2%.

The age of the patients ranged between 18-42 with a mean age of  $29.14 \pm 5.02$  (S.D) years. The mean parity was  $2.30 \pm 1.40$  (S.D) with a range of 1-6. Table 1 shows the socioeconomic characteristics of the study group. Majority of patients with puerperal sepsis belong to the age group 25-29 (37.8%); para 1 (37.0%) and were unbooked (84.3%). Many of the patients and their husbands had secondary education (57.5% and 60.6% respectively).

Table 2 shows the risk factors in patients with puerperal sepsis during the study period. The commonest risk factor is maternal anaemia (68.5%). Others include wound infection (29.9%), intrauterine fetal death (22.8%), obstructed labour (14.2%), postpartum hemorrhage (7.1%), perineal tear (11.0%).

The complications of puerperal sepsis noticed in the study include prolonged hospital stay of more than 7 days (58.3%) with mean 11.7days, septicaemia (13.4%), pelvic abscess (10.2%) and intestinal obstruction (4.7%). There were four maternal deaths with a case fatality rate of 3.1%. (Table 3).

Further analysis (Table 4) showed that statistically significant risk factors for developing multiple complications of puerperal sepsis are Caesarean delivery ( $p=0.009$ ) and un booked status ( $p=0.045$ ).

## 4. DISCUSSION

The prevalence of puerperal sepsis in this study is 1.7% as against 9.3% found in a cross sectional study by Ononuju et al. in UPTH. However, this is in keeping with the study done by Dare et al. in Ile-Ife [11], higher than 0.78% reported by Bako et al in Maiduguri [8] and lower than 3.89% and 6.28% obtained in studies done by Khaskheli et al. and Pradhan et al. in Pakistan and Nepal respectively [6,9], The disparity in incidence may be due to the location of the hospitals where the studies were carried out (Urban versus Rural). The higher level of education of our patients is of value in preventing puerperal sepsis. The findings on age distribution and parity among the patients studied agree with previous reports where the

majority of their patients were in their third decades and of low parity [7,8,11,19]. This age group is the reproductive peak. The increased incidence noted among primiparous women may be unrelated to their lack of experience as first-timers, and that they usually have difficult or prolonged labour [12,16,20,19].

In addition, women of low socioeconomic status are more likely to present late during labour and delivery, and also deliver in an unsafe environment. A combination of these factors may likely be responsible for increased risk of

puerperal sepsis in them. Most of the patients have a good level of education which possibly explains the low incidence generally. It is not surprising that 84.3% of the patients were unbooked, as their poor health-seeking behaviour is even manifested in labour and delivery.

The commonest risk factor noted in the study was anaemia (68.5%). Several studies concluded that the various major risk factors for developing puerperal sepsis were primiparity, perineal tear, obstructed labour, unbooked status, caesarean

**Table 1. Sociodemographic characteristics**

Variables	Frequency (n = 127)	Percentage
<b>Age</b>		
≤19	5	3.9
20-24	18	14.2
25-29	48	37.8
30-34	34	26.8
35-39	20	15.7
≥40	2	1.6
Total	127	100
<b>Parity</b>		
1	49	38.6
2	38	29.9
3	14	11.0
4	12	9.5
≥5	14	11.0
<b>Level of education</b>	127	100
No formal	0	0
Primary	12	9.4
Secondary	73	57.5
Tertiary	42	33.1
<b>Booking status</b>	127	100
Booked	20	15.7
Unbooked	107	84.3
	127	100

**Table 2. Risk factors associated with puerperal sepsis (this is multi-factorial)**

	Frequency	Percentage (%)
Anaemia	87	68.5
Wound Infection	38	29.9
Postpartum haemorrhage	37	29.1
Emergency caesarean section	27	24.3
Intrauterine fetal death	29	22.8
Obstructed labour	18	14.2
Retained product of conception	18	14.2
Perineal tear	14	11.0
Retained placenta	9	7.1
HIV	9	7.1

**Table 3. Morbidities & mortalities (complications)**

	Frequency (n=114)	Percentage (%)
Prolonged hospital stay (>7days)	74	64.9
Septicaemia	17	24.9
Pelvic abscess	13	11.4
Intestinal Obstruction	6	5.3
Death	4	3.5

**Table 4. Risk factors for multiple complications**

Variables	Multiple complications	Single complication	P value
<b>Parity</b>			
Primiparous	13	35	0.066
Multiparous	11	68	
<b>Booking status</b>			
Booked	1	19	0.045*
Unbooked	27	80	
<b>Mode of delivery</b>			
Vaginal delivery	10	72	0.009*
Caesarean section	14	31	
<b>Fetal outcome</b>			
Live birth	12	68	0.2351
Stillbirth	11	36	

\*Statistically significant

delivery which is in keeping with our study [8,9,15]. The risk is also increased in individuals who laboured or delivered in their homes, churches, maternity homes or homes of traditional birth attendants [9,21,22]. This is due to non-adherence to aseptic techniques during labour and delivery in these places. In addition, we found that intrauterine fetal demise, postpartum haemorrhage, wound infection and retained product of conception also carried a significant risk for puerperal sepsis. Intervention by emergency caesarean section (for prolonged labour, obstructed labour, foetal distress etc) was found in 24.3% of cases, same as reported by Khaskheli et al and Shamshad et al. [9,16].

The most frequent morbidity noted in this study is prolonged hospital stay (58.3%). Puerperal sepsis was complicated with a pelvic abscess in 10.2% of the women same as reported in Pakistan by Shamshad et al. (10.8%) [16]. Septicaemia complicated 13.4% of cases, higher than that reported by Shamshad et al (4.3%) however lower than the 27.2% reported by Khaskheli et al. and 4.7% of the patients had intestinal obstruction. The case mortality rate for puerperal sepsis in this study was 3.1%. This is close to that reported in Ile-Ife by Dare et al. (4.1%) but far lower than that reported by Shamshad et al. (14.2%) and Khaskheli et al.

(8.52%). The huge percentage of unbooked status (84.3%) of the patients who eventually had puerperal sepsis underscores the importance of registering pregnancy and undergoing antenatal care in improving delivery outcome. This also explains the many risk factors for puerperal sepsis noted in these unbooked patients; hence making unbooked status a significant risk factor for puerperal sepsis (p-value of 0.045). However, the most significant risk factor for puerperal sepsis was caesarean section (p-value 0.009).

Many of the predisposing factors of this condition are preventable. Thus, antenatally; prevention of anaemia, treatment of any septic focus to prevent autogenous infection is important. Intrapartum measures include; supervised hospital delivery, fewer per vaginal examinations, strict aseptic precautions during deliveries while postnatal measures include maintenance of good personal hygiene, ensure the use of sterile pads. A prophylactic antibiotic for caesarean section or preterm rupture of membranes is key. An updated antibiotic regimens will also help prevent puerperal sepsis and its attendant complications [18,19].

## 5. CONCLUSIONS

Complications of puerperal sepsis are still high in obstetric referral centers in Port Harcourt,

Nigeria. Unbooked status, caesarean section and anaemia top the list of identified risk factors for puerperal sepsis in this study.

## 6. RECOMMENDATION

We must work towards entrenching routine antenatal care and supervised hospital deliveries for all pregnant women. Periodic reviews of this nature will help track the trend in puerperal sepsis and hence guide our management towards international best practices; resulting in a better outcome.

## 7. LIMITATIONS

The study was a retrospective study and poor record keeping limited retrieval of all the case folders for analysis. Poor or non-documentation of patient's history prevented analysis of some factors such as duration of rupture of membrane and duration of labour.

## CONSENT

It is not applicable.

## ETHICAL APPROVAL

It is not applicable.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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