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Prevalence of and Factors Associated with Puerperal Sepsis Among Postpartum Women at A Regional Referral in Uganda

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ABSTRACT

Background:
Puerperal sepsis remains a significant contributor to maternal mortality and morbidity in Uganda despite government efforts to improve prevention and management through the provision of supplies, equipment, and training for healthcare workers.

Aim:
This study aimed to assess the prevalence of puerperal sepsis and identify associated factors among postpartum women in LRRH, Lira City

Method:
An institutional-based cross-sectional study design was employed to systematically recruit 230 study participants from March 2023 to May 2023. The study included all postpartum mothers in the postnatal ward who were willing to participate, excluding those who were critically ill and could not communicate. Any mother who presented with three or more signs and symptoms was considered to be infected. Data was entered into SPSS version 26 for AND analyzed using descriptive and inferential statistics with a p-value of <0.05 and a CI of 95%.

Results:
The prevalence of puerperal sepsis was high (9.1%). Of this, almost all (90.5%) were delivered from the hospital, and the majority (66.7%) were delivered by caesarean section.

Conclusion and recommendation:
Puerperal sepsis is high in the study area. Place of delivery, antibiotic prophylaxis, mode of delivery, and antenatal care attendance were significant factors. Proper spacing of postnatal beds, administration of antibiotic prophylaxis before invasive procedures, managing risk factors that lead to caesarean section, and promoting antenatal care attendance will help reduce the prevalence of puerperal sepsis.

Key words: prevalence, puerperal sepsis, antibiotic prophylaxis, caesarian section, aseptic technique
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Introduction

Globally, an estimated 211 to 243 deaths occur per 100,000 live births. Africa carries the highest MMR, 542 deaths per 100,000 live births, according to the World Health Organization. (World Health Organization, 2022). In East Africa, MMR decreased from 853 to 443 per 100000 live births from 2000 to 2017(Onambele et al., 2022). In Uganda, MMR is estimated at 336 deaths per 100000 live births by the Uganda Demographic Health Survey. (Udhs, 2011). In Lira Regional Hospital (LRRH), an estimated 20 mothers died as a result of pregnancy and all its related complications during the financial year 2021-2022, according to the records office. Puerperal sepsis accounts for 10.7% global deaths.s(Atlaw et al., 2019), with 10% of these deaths attributed to Sub-Saharan Africa(Ngonzi et al., 2018). In Uganda, the incidence of death due to sepsis in a national referral

hospital is 12.7%, and in a regional referral hospital is 30.9% (Ngonzi et al., 2018).

Puerperal sepsis is associated with complications such as abscesses, pulmonary embolism, pelvic inflammatory diseases (PID), and infertility.(Mohammed Hassan et al., 2021). Puerperal sepsis, in this case, is any infection that arises between the time a baby is born and 42 days postpartum, regardless of the mode of delivery.(Atlaw et al., 2019). On the other hand, approximately 2- 3/10-15 women report to the gynecological ward with either an infection at the incision site or foul vaginal smell, and several others with foul virginal discharges. (Luwaga et al., 2022). Signs and Symptoms may include fever > 38 °C and < 36 °C, offensive lochia, headache, and delay in uterine involution. (Luwaga et al., 2022).

The government of Uganda, through the Ministry of Health (MoH), has been supplying the hospital with personal protective equipment and antibiotics and has trained midwives and nurses on the prevention and management of puerperal sepsis. Furthermore, the MoH Uganda, through the Uganda Clinical Guidelines, recommends the administration of antibiotics 30-60 minutes before any invasive surgical procedure(Geraldine). Health education for antenatal and postnatal mothers has been put in place, with the majority of postnatal health education focusing on newborn care. Despite the above strategies, puerperal sepsis continues to be among the three leading causes of direct maternal mortality and morbidity in Ugandan Regional and National Referral hospitals (Alobo et al., 2022; Ngonzi et al., 2018). Little effort has been made in finding the prevalence and factors associated with puerperal sepsis in the hospitals, and the information on the actual ground is scanty. Therefore, the purpose of this study is to find out the prevalence of puerperal sepsis and associated factors in Uganda's regional referral hospitals.

Methods

Design

This was a descriptive cross-sectional study that employed quantitative methods of data collection. The design was a cross-sectional study because it was the most appropriate for data collection at a single point in time. It was descriptive because it was giving the differences in factors associated with puerperal sepsis.

Study setting

The study was conducted in Lira Regional Referral Hospital, Lira City, Northern Uganda. The majority of participants were subsistence farmers who spoke and understood the Lango language. It is bordered by Pader District to the North, Otuke District to the Northeast, Alebtong District to the East, Dokolo District to the Southeast, Apac District to the South, and Kole District to the West. Lira city has an estimated population projection of about 119,323. Lira Regional Referral Hospital is located 340 kilometers North of Kampala (Obua & Okori, 2022)

Participant recruitment.

A consecutive sampling technique was used, where all women who met the inclusion criteria and were conveniently available were part of the sample. Research was conducted one after another until the sample size limit of 230 was reached. Consecutive sampling was used because participants were selected based on their availability and willingness.

Inclusion and exclusion criteria

The study included all postpartum women who were present and willing to participate in the study, both in the post-natal and gynecological wards. Women who were critically ill and unable to communicate were excluded.

Sample size

The sample size was determined using Fisher's 1990 formulae for calculating the population of more than 10,000 people.

That is to say (i.e.)

N=(World Health Organization)2PQ/(World Health Organization)2

Where;

N=Sample size of the infinite population

Z = Standard deviation is usually set at 1.96, which corresponds to 95% Confidence Interval.

P = Estimated prevalence (proportions of the targeted population estimated to have a particular problem and characteristic).

D= Acceptable error, = 0.05

Q=1-P=1-0.177=0.823

Estimated prevalence= 17.7% is equivalent to 0.177, based on a prior study

= (1.96)2 *(0.177) *(0.823) (0.05)2

Sample size= 223.843

Therefore, the calculated sample size was 223

A non-response rate of 10% was added to have a final sample size of 245.

Measures

The data collection tool was an interviewer-administered semi-structured questionnaire. The questions were developed with references to other previous literature on prevalence and factors associated with puerperal sepsis (Kambugu, 2018; Ssenyonga, 2017) the questionnaire comprised three sections; section a);socio-demographics(age, education level, occupation marital status), section b); individual factors (ever heard of sepsis, underlying medical condition, parity, place of delivery), section c); Prevalence which was determined through proportion of the women who presented with at least three of the signs and symptoms of puerperal sepsis.

Reliability and validity of the data collection instrument.

The questionnaire was checked by experts in postnatal care, including my supervisor, who assessed external and content validity. A pilot study was carried out using convenience sampling on a total of five participants, from which responses were obtained for one day using the developed questionnaire to enable modification of the tool to make it valid and reliable. Before data collection, the questionnaire was pretested among five postnatal mothers to check for adequacy of questions in terms of wording, clarity, and ambiguity before use in the actual study. Pre-coding and categorization of data were done to ensure quality data was collected.

Data collection

Data was collected using a pre-tested, structured, researcher-administered questionnaire. The purpose of the research was explained to participants before signing the consent form. Those who consented took 5-10 minutes responding to the questionnaire. Their identity were kept confidential. The survey was in English and Lango, depending on the participant's preference.

Data analysis

Data was analyzed using the Statistical Package for the Social Sciences (SPSS) version 23 at three levels, that is, at univariate, bivariate, and multivariate. Descriptive variables were analyzed and presented as frequencies, percentages in suitable tables, and proportions in a pie chart. Logistic regression was used to determine the association between the independent and dependent variables at 95% confidence interval level. Multivariate analysis was used to determine the association of significant factors.

Ethical consideration

The developed proposal was submitted to the Department of Midwifery, Lira University, and permission to conduct research was granted by the Head of the Department. In LRRH, permission was obtained from the hospital director. Informed consent was obtained from eligible study participants in terms of initials, signatures, and thumbprints after a thorough explanation of the research objectives, risks, and benefits of participating in the study. Privacy and confidentiality were observed throughout the data collection process. Identifiers such as names or phone numbers were not included in the questionnaires. All matters about individual rights on personal and medical information concealment were adhered to and only used for research purposes. The data collected for analysis was password-protected and kept in an enclosed place, only accessible by the researcher, to ensure confidentiality.

Results

This study assessed the prevalence of puerperal sepsis and associated factors among postpartum mothers in Uganda's Regional Referral Hospitals. The response rate was high at 96%.

Socio-demographic characteristics of study participants

Overall, 230 postpartum women participated in this study, of which the majority, 140/230(60.9%), were aged between 26 and 35 years, and more than half, 130/230(56.8%), reported having attained primary education. Most of the participants, 152/230 (66.1%), were housewives. More than three-quarters (95.5%) were married women (Table 1)

Hospital factors associated with puerperal sepsis

From the study, hospital factors included mode of delivery, duration of labor, and problems encountered during labor. Findings reveal that more than three-quarters of the women, 195/230(84.8%), had spontaneous vaginal delivery. Almost all (94.3%) of the women spent 6-12hours in labor. A few women (13.5%) reported having faced some problems in labor, with the commonest problem being a tear (7.0%) (Table 2)

Proportion of mothers infected with puerperal sepsis

The study involved 230 participants, of which (9.1%) were infected with puerperal sepsis, with more than half (60%) having cesarean section as a mode of delivery. (Chart 1)

Factors associated with puerperal sepsis

A chi-square test was conducted on a Bivariate analysis to determine the association between infection with sepsis and each of the associated factors at a P value <0.05. Place of delivery, mode of delivery, underlying medical conditions, and antibiotic prophylaxis were significant (<0.0001). Antenatal care attendance was significant (p=0.017). Having ever heard about sepsis was significant (p=0.004). Meanwhile, Sociodemographic characteristics did not show any significant association. As well, hours spent in labor and the number of vaginal examinations did not show any significant association at p <0.05.

Multivariate association with puerperal sepsis infection

A multivariate binary logistic regression was run, and no specific significant association of the factors was seen, as shown in Table 4.

Discussion

This study was conducted to assess the prevalence of puerperal sepsis and associated factors among postpartum mothers in Uganda's Regional Referral hospitals.

The prevalence of puerperal sepsis was high (9.1%). However, the prevalence in this study is lower compared to other studies in some parts of Uganda, 17.7% (Alobo et al., 2022)and 30.9% (Ngonzi et al., 2018), Tanzania, 16.7%(Kajeguka, 2020 #17). The differences in this study may be attributed to the difference in study designs and the small sample size used in this study compared to the rest of the studies. There is a need to employ other methods of data collection, such as a retrospective study design with a bigger sample size.

The mode of delivery was associated with puerperal sepsis. More than half of the mothers who delivered by cesarean were infected with sepsis. This could be attributed to the quality of the delivery kit and the quality of care practiced by the mothers and their attendants. (Abd El-Maqsoud et al., 2023) and(Sultana et al., 2018). This study is comparable to the Ugandan study. (Ngonzi et al., 2018)where mothers who underwent cesarean section were two times more likely to develop puerperal sepsis compared to their counterparts who had a spontaneous vaginal delivery. However (Musaba et al., 2019; Ngonzi et al., 2018) In their different studies in high-resource countries, they contrasted these findings, stating that all mothers were equally at risk. The differences in these findings may be a result of geographical location and differences in hospital settings, as compared to those in low-income countries. This result could aim at creating awareness about better strategies for early diagnosis and treatment of puerperal sepsis.

More than ¾ of the mothers who did not receive antibiotic prophylaxis were infected with puerperal sepsis. Administration of antibiotics was seen as protective against the prevention of puerperal sepsis in high-risk mothers (Harris et al., 2023; Hedjal, 2023). This finding is similar to other studies in Australia and New Zealand (Giouleka et al., 2023). However, in Indonesia, Liabsuetrakul et al. (2020) contrasted this study, stating that antibiotic prophylaxis was only protective against known causative bacterial agents. The differences in the study findings could be attributed to methods of data collection, as the one in question above was extensively investigated further, including laboratory investigations to find specific associations. Therefore, there is a need to carry out laboratory confirmatory tests to avoid the use of broad-spectrum antibiotics and resistance.

Place of delivery was a risk factor associated with puerperal sepsis. The study revealed that more than ¾ of women who delivered in the hospital were infected. Reduced bed numbers and bed space have shown a positive effect on the transmission of infection. (Mohammed et al., 2023). This study is similar to one in Western Uganda, where hospital delivery was highly associated with puerperal sepsis. (Ngonzi et al., 2018). However, these findings were inconsistent with other studies in Western Uganda and Ethiopia. (Felix, 2023; Mohammed et al., 2023)respectively, where home delivery was highly associated with puerperal sepsis. The differences in the above findings could be a result of the study site setting. There is a need for proper spacing in hospital settings in order to minimize nosocomial infection.

The results showed that antenatal care attendance was not protective against puerperal sepsis. Regarding this, whether a mother attended or did not attend antenatal care did not matter. Mothers who made four contacts or fewer were equally infected with sepsis. A study in Tanzania had similar findings. (Kajeguka et al., 2020), where antenatal care was not protective against puerperal sepsis. This study was inconsistent with other study findings in Ethiopia. (Demisse et al., 2019; Mohammed et al., 2023)where mothers who made less than two antenatal visits were likely to develop sepsis. Midwives and nurses should educate mothers on the prevention of puerperal sepsis during antenatal visits.

Underlying medical conditions, such as diabetes, were associated with puerperal sepsis. Uncontrolled sugar levels predispose an individual to infection. (Isanga et al., 2020). The result is similar to a study in the UK and the Netherlands.(Acosta et al., 2013). There is a need to put more emphasis on diabetic mothers to help them modify their diet and lifestyles during their antenatal clinics.

In the current study, age, education, marital status, and occupation were not associated with puerperal sepsis. This could be attributed to a small sample size, which could have resulted in decreased statistical power. However, other studies have found that these factors were associated with puerperal sepsis. (Atlaw et al., 2019; Bakhtawar et al., 2020)

Study strengths and limitations

The study excluded mothers who were critically ill, yet some of them were ill due to puerperal sepsis. The study was hospital-based, leaving out mothers who delivered from home and never came to the hospital, and those who were not admitted to the postnatal and gynecological ward after delivery. Upcoming studies should be designed to include mothers who do not deliver from the hospital, as well as those who leave immediately after delivery, for example, be extended to the young child clinic.

Recommendation

To the Ministry of Health, there is a need to allocate more funds for the health sector, as there are always stockouts of most of the essential drugs, like antibiotics. To the health facility, there is a need to create more room for expansion, most especially for postpartum mothers, to reduce the risk of nosocomial infections. Additional research is required to fully understand community-

based system approach interventions in postpartum sepsis prevention, as this study did not fully examine some of the elements, such as cultural aspects.

Conclusion

The prevalence of puerperal sepsis was high, 9.1%. Mode of delivery, antibiotic prophylaxis, and antenatal care attendance were associated with puerperal sepsis.

References.

1. Abd El-Maqsoud, E. M., Gaheen, M. A., Belal, G. A. E.-S. R., & Hashem, S. M. (2023). Effect of educational program on nurses' knowledge and practices regarding prevention of puerperal sepsis. Journal of Pharmaceutical Negative Results, 851-865.
2. Acosta, C. D., Knight, M., Lee, H. C., Kurinczuk, J. J., Gould, J. B., & Lyndon, A. (2013). The continuum of maternal sepsis severity: incidence and risk factors in a population-based cohort study. PloS one, 8(7), e67175. https://doi.org/10.1371/journal.pone.0067175
3. Alobo, G., Reverzani, C., Sarno, L., Giordani, B., & Greco, L. (2022). Estimating the risk of maternal death at admission: a predictive model from a 5-year case reference study in northern Uganda. Obstetrics and Gynecology International, 2022. https://doi.org/10.1155/2022/4419722
4. Atlaw, D., Seyoum, K., Woldeyohannes, D., & Berta, M. (2019). Puerperal sepsis and its associated factors among mothers in University of Gondar referral hospital, Ethiopia, 2017. International Journal of Pregnancy & Childbirth, 5(5), 190-195. https://doi.org/10.15406/ipcb.2019.05.00175
5. Bakhtawar, S., Sheikh, S., Qureshi, R., Hoodbhoy, Z., Payne, B., Azam, I., Von Dadelszen, P., & Magee, L. (2020). Risk factors for postpartum sepsis: a nested case-control study. BMC pregnancy and childbirth, 20, 1-7. https://doi.org/10.1186/s12884-020-02991-z
6. Demisse, G. A., Sifer, S. D., Kedir, B., Fekene, D. B., & Bulto, G. A. (2019). Determinants of puerperal sepsis among postpartum women at public hospitals in West SHOA zone, Oromia regional STATE, Ethiopia (institution-based case control study). BMC pregnancy and childbirth, 19, 1-6. https://doi.org/10.1186/s12884-019-2230-x
7. Felix, A. (2023). Assessment of factors associated with burden of Puerperal Sepsis in maternity women at Ishaka Adventist Hospital, Bushenyi District. INOSR Experimental Sciences, 11(2), 32-41.
8. Geraldine, E. Prevalence and Factors Associated with Puerperal Sepsis among Women Attending the Postnatal Ward at Fort Portal Regional Referral Hospital.
9. Giouleka, S., Boureka, E., Tsakiridis, I., Lallas, K., Papazisis, G., Mamopoulos, A., Kalogiannidis, I., Athanasiadis, A., & Dagklis, T. (2023). Sepsis in pregnancy and the puerperium: a comparative review of major guidelines. Obstetrical & Gynecological Survey, 78(4), 237-248. https://doi.org/10.1097/OGX.0000000000001108
10. Harris, K., Proctor, L. K., Shinar, S., Philippopoulos, E., Yudin, M. H., & Murphy, K. E. (2023). Outcomes and management of pregnancy and puerperal group A streptococcal infections: A systematic review. Acta obstetricia et gynecologica Scandinavica, 102(2), 138-157. https://doi.org/10.1111/aogs.14500
11. Hedjal, J. (2023). The Epidemiology of Sepsis. In The Sepsis Codex (pp. 11-15). Elsevier. https://doi.org/10.1016/B978-0-323-88271-2.00027-4
12. Isanga, J., Emmanuel, B., Musa, K., Julius, M., Tibaijuka, L., Ronald, M., & Ngonzi, J. (2020). The prevalence, risk factors, and bacterial profile of cesarean surgical site infections at a University Teaching Hospital in South Western Uganda. International Journal of Women's Health Care, 5(1), 5-10. https://doi.org/10.33140/IJWHC.05.01.02
13. Kajeguka, D. C., Mrema, N. R., Mawazo, A., Malya, R., & Mgabo, M. R. (2020). Factors and causes of Puerperal Sepsis in Kilimanjaro, Tanzania: A descriptive study among postnatal women who attended Kilimanjaro Christian Medical Centre. The East African Health Research Journal, 4(2), 158. https://doi.org/10.24248/eahrj.v4i2.639
14. Liabsuetrakul, T., Choobun, T., Peeyananjarassri, K., & Islam, Q. M. (2020). Antibiotic prophylaxis for operative vaginal delivery. Cochrane Database of Systematic Reviews(3). https://doi.org/10.1002/14651858.CD004455.pub5
15. Luwaga, R., Beebwa, E., Ngonzi, J., Nduhukire, T., & Brennaman, L. (2022). Providing education and tools increases nurses' and midwives' assessment for puerperal sepsis in a regional referral hospital in South Western Uganda. International Journal of Africa Nursing Sciences, 17, 100487. https://doi.org/10.1016/j.ijans.2022.100487
16. Mohammed, A., Belay, Y., Sintayehu, Y., Nuri, A., & Abera, L. (2023). Determinants of Puerperal Sepsis among Postpartum Women Admitted to Public and Private Hospitals in Dire Dawa City Administration, Eastern Ethiopia: Unmatched

Case-Control Study. https://doi.org/10.21203/rs.3.rs-2452884/v1
17. Mohammed Hassan, R. H., Mohamed, H. A. E. A., & Solimen, H. A. E. (2021). Knowledge and practices of postnatal mothers regarding prevention of puerperal sepsis. Minia Scientific Nursing Journal, 9(1), 33-39. https://doi.org/10.21608/msnj.2021.188066
18. Musaba, M. W., Barageine, J. K., Ndeezi, G., Wandabwa, J. N., & Weeks, A. (2019). Effect of preoperative bicarbonate infusion on maternal and perinatal outcomes of obstructed labour in Mbale Regional Referral Hospital: a study protocol for a randomised controlled trial. BMJ open, 9(4), e026675. https://doi.org/10.1136/bmjopen-2018-026675
19. Ngonzi, J., Bebell, L. M., Fajardo, Y., Boatin, A. A., Siedner, M. J., Bassett, I. V., Jacquemyn, Y., Van Geertruyden, J.-P., Kabakyenga, J., & Wylie, B. J. (2018). Incidence of postpartum infection, outcomes, and associated risk factors at Mbarara regional referral hospital in Uganda. BMC pregnancy and childbirth, 18, 1-11. https://doi.org/10.1186/s12884-018-1891-1
20. Onambele, L., Ortega-Leon, W., Guillen-Aguinaga, S., Forjaz, M. J., Yoseph, A., Guillen-Aguinaga, L., Alas-Brun, R., Arnedo-Pena, A., Aguinaga-Ontoso, I., & Guillen-Grima, F. (2022). Maternal Mortality in Africa: Regional Trends (2000-2017). International journal of environmental research and public health, 19(20), 13146. https://doi.org/10.3390/ijerph192013146
21. Sultana, S., Methe, F. Z., Muhammad, F., & Chowdhury, A. (2018). Knowledge and practice regarding prevention of puerperal sepsis among postpartum women attending a private hospital in Bangladesh. Int J Res Med Sci, 6(10), 3264. https://doi.org/10.18203/2320-6012.ijrms20184029
22. Udhs, I. (2011). Uganda demographic and health survey. Uganda Bureau of Statistics, Kampala, Uganda.
23. World Health Organization. (2022). Maternal mortality measurement: guidance to improve national reporting. World Health Organization