

## Assessments of Puerperal Sepsis in Women at Kampala International University Teaching Hospital Western Campus, Uganda.

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### ABSTRACT

These are infections after birth usually in the first 42 days following postpartum period. It is the major cause of maternal morbidity. Puerperal sepsis is second leading causes of maternal death in Africa and in sub Saharan Africa is estimated to be 19.5 %. Thus in Uganda prevalence of puerperal sepsis is about 7.2% and considered as the greatest burden experienced in low income countries. Puerperal sepsis (PS) is estimated to cause complications like obstetric shock resulting into maternal mortality. One's susceptibility to infections is related to factors such as caesarean section, prolonged labor, obesity, anemia and poor nutrition. The aim of this study was to determine the prevalence and factors associated with puerperal sepsis. This study employed a cross section descriptive study with a sample size of 36 patients of the age ranging from 19 to 45 in Kampala International University Teaching Hospital (KIU-TH) through examining the strategies that were put into place to control these infections. Data was collected by administering questionnaires to all patients who met the inclusion criteria. The data that was collected was analyzed using Microsoft excel and then presented in form of percentages frequencies through tables, graphs and charts. From the demographic obtained it showed that women aged between 36 to 45 years were mainly affected while the least affected age was less than 36 years. According to level of education 44.4% who attained primary level were the most affected group and the least affected were 5.6% who attended tertiary and university levels. Most affected mothers were the married by 88.9% and unmarried least affected by 11.1%. Most of the affected mothers were of high parity 50% (multi gravid), 72.2% had delivered by caesarian section and 50% had multiple vaginal examinations. Proper nutrition showed greatest impact since some women with good nutrition could experience short durations of labor (27.8%). Chronic debilitating conditions such as HIV (44.4%) also play part in PS by immune suppression. Results showed that there is inadequate knowledge about the etiology of puerperal sepsis of which 88.9% were aware about PS existence and 11.1% did not have knowledge about it. Therefore, adequate prerequisites are required to perform PS awareness both in the hospital and the community at large. The above factors tend to underscore the need for MOH to provide funds to aid in the facilitation of campaigns to create awareness. Hygienic education in the communities and policy makers should consider integrating hygienic education and PS awareness into antenatal care (ANC) services as a strategy to prevent and control infections.

**Keywords:** Puerperal sepsis, Infections, Labor, Nutrition, Mothers.

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### INTRODUCTION

Puerperal sepsis has been described for many past years and one of the symptoms being puerperal fever affecting women shortly or during child birth, miscarriage or abortion resulting into septicemia and death. Puerperal sepsis together with eclampsia, preeclampsia and obstetrical hemorrhage has caused maternal death for many years. It is the leading cause of

preventable maternal morbidity and mortality not only in developing countries but also in developed countries [1-3]. From the 1600s to 1800s, the many cases of childbed fevers were caused by the doctors themselves. Doctors did not believe hand washing was needed since there was inadequate knowledge of germs. In the 1800s, investigations done showed

that women giving birth at home had a much lower incidence of childbed fever than those giving birth in the doctor's maternity ward through investigations which were done. These investigations showed that hand washing with an antiseptic solution before delivery reduced child bed fever fatalities by 90% [4, 5]. In United Kingdom, a study conducted revealed that 5.5% of SVD and 7.4% of cesarean section resulted into puerperal sepsis and the total were 6.0% for endometriosis counting half of the infections in mothers following cesarean section. Mastitis and Urinary Tract Infections (UTIs) accounted for 5% [6-8]. The most common causes of maternal mortality in sub-Saharan Africa include puerperal sepsis 30.9%, hemorrhage 21.6%, hypertension 44%, HIV/AIDs 6%, malaria being the most indirect cause ranked 8.92% and abortions 10.8% [8, 9, 10, 11]. A study was done in Maiduguri University Teaching Hospital in Nigeria and found that the major leading cause to puerperal sepsis includes perinea trauma, tears and episiotomy. *Escherichia coli* and *staphylococcus aureus* were mainly isolated for culture purposes. In Nigeria Abbottabad Hospital maternal deaths of 19.2% were by postpartum infections. It is considered as the third leading cause of maternal death [3]. Puerperal sepsis is reported as the single most common cause of maternal death in developing, low income and middle income [12-14]. Another study done in Tanzania with a sample size of 3,262 women who were selected and only 27% (877) claimed that the birth attendant inserted his /her hands in the vagina, and 25% (830) reported that the birth attendant first did hand washing before delivering her. Of those (830) women, 98% reported that the attendant used soap and water before inserting hands, while 1.5% were attended to by birth assistants who washed hands but developed puerperal sepsis compared to two (8.0%) of the 25 women who reported that the birth attendant did not wash their hands before inserting them into the vagina [15]. Puerperal sepsis is one of the major causes of maternal death in Uganda. Millennium Development Goal Five (MDG

5) in Uganda targets by  $\frac{3}{4}$  the total number of women who die in due to birth related problems thus improving maternal health. Between 1990 to 2015 MDG 5 aimed at reducing maternal mortality by 75% [16]. World Health Organization (WHO) recommends that pregnant women should have a written plan for births and for dealing with unexpected adverse events such as complications or emergencies that may occur during pregnancy, child birth or the immediate postnatal period, and should discuss and review this plan with a skilled attendant at each antenatal assessment and at least one month prior to the estimated date of delivery [16].

#### **Statement of Problem**

Over 70% of maternal deaths in developing countries are caused by puerperal sepsis among other causes including hemorrhage, hypertension unsafe abortion and obstructed labor [17, 18]. The government of Uganda enforced ANC services. It has also collaborated with NGOs and partnerships with private hospitals to offer service to all pregnant women as well as abolishing TBAs so as to control infections and other complications after delivery but many mothers report back to health settings with puerperal sepsis. Locally, in Uganda and KIU-TH inclusive, mothers tend to return to Health facility a few days after delivery with complaints concerning different infections without proper origin which can however, lead to morbidity and mortality [16]. There are no clear reasons that explain prevalence and factors associated with puerperal sepsis in KIU-TH. Therefore, this study is meant to find out prevalence and factors associated with puerperal sepsis in KIU-TH and knowing them will help reducing the complications and the incidence of puerperal sepsis in KIU-TH.

#### **Aim of the Study**

To assess the prevalence and factors associated with puerperal sepsis among women delivering at Kampala International University Teaching Hospital.

#### **Specific Objectives of the Study**

- To determine the prevalence of puerperal sepsis among women delivering at Kampala International University Teaching Hospital.

- To assess the patient factors associated with puerperal sepsis among women delivering at Kampala International University Teaching Hospital.
- To assess hospital factors associated with puerperal sepsis among women delivering at Kampala International University Teaching Hospital.

#### **Research Questions**

- What is the prevalence of women that present with puerperal sepsis among women delivering at Kampala International University Teaching Hospital?
- What are the patient factors that are associated with puerperal sepsis among women delivering at Kampala International University Teaching Hospital?
- What are the hospital factors that are associated with puerperal sepsis among women delivering at Kampala International University Teaching Hospital?

#### **Justification of the Study**

Uganda being a developing country, information obtained from this research will help health personnel particularly in KIU-TH to sensitize women on the dangers and causes of puerperal sepsis. The findings will act as an important tool by availing knowledge of risk factors to inform public interventions for puerperal sepsis control and to the clinicians, identifying risk factors in Antenatal Care (ANC) and intra partum periods may provide an opportunity for timely interventions to prevent puerperal sepsis. From this study, stake holders and other concerned shall use the knowledge of the objectives to improve on the safe motherhood and pregnancy status there by meeting one of the pillar of Millennium Development Goal. Knowing the patient

#### **Study Design**

The study applied a cross sectional descriptive study design.

#### **Area of Study**

Kampala International University Teaching Hospital [KIU-TH] is situated on about 70

factors that predispose mothers to puerperal sepsis will create an alarm to health person to carryout community outreach and health education talks via mass media. This study has also come up with hospital factors that predispose mothers to puerperal sepsis so as to upgrade and improve on the working environmental and evaluating their skills. This information will be disseminated to the local authorities; District Health Officer DHOs, Health Inspectors, LCs, NGOs and In-charges of Health Centers around the town with a hope that they will take up their role towards implementation of the recommendations herein. The purpose of this study was therefore aimed at providing detailed information on puerperal sepsis in KIU-TH, determine the prevalence and factors associated with puerperal sepsis, establish the knowledge on puerperal sepsis and determine the preventive measures in order to form the basis for decision making, policy formulation and planning towards the management of morbidities resulting from puerperal sepsis in KIU-TH. Kampala International University Teaching Hospital, the fact that it's one big facility in Ishaka region catering for a larger population, there is need to minimize on the prevalence of puerperal sepsis. The information obtained from this research will help the health personnel to conduct seminars to sensitize the whole population (particularly women) on the dangers of puerperal sepsis. The findings herein will be an important tool in achieving Millennium Development Goal 5 by providing baseline data for further researches. This report will be disseminated to the local authorities; District Health Officer, Health Inspectors, LCs, NGOs and In-charges of Health Centers and KIU-TH in particular with a hope that they will take up information elicited within this research.

#### **METHODOLOGY**

acres of land at Ishaka town in Bushenyi District, along Mbarara -Kasese Road in Western Uganda. The presence of the university has strongly led to the development of various businesses in Ishaka town, with the students and staff of

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the university comprising of the major clientele of these businesses. Businesses range from boutiques, restaurants, supermarkets, bars, and night clubs. Bushenyi District lies between 0 0 N and 0 0 46' S of the equator and 29 0 41' East and 30 0 30' East of Greenwich. Bushenyi District headquarters is located 340 Kilometers (KMs) from Kampala in the South Western part of Uganda. Bushenyi District is neighboring with the districts of Rubirizi in the North, Buhweju and Sheema in the North East, Sheema in the East, Mitooma in the South West and Sheema in the South. The district has a land area of 3'949 square kilometers and lying between 910 - 2,500 meters above sea level. The main physical features within the district include natural tropical forests of Karinzu and Imaramagambo covering an area of 784 km. Arable land covers 2,215 square KMs, open water bodies cover 372 square KMs and wetlands covering 183 square KMs. Bushenyi District has a population of 241,500 people and 124,000 women according to the projected population estimates of 2014 of whom KIU-TH maternity receives about 40 pregnant mothers in a month. The hospital receives about ten mothers with complaints concerning puerperal sepsis every week where most of them are above 30 years of aged peasant farmers. These mothers most of them have multiple pregnancies with parity greater than one and have undergone caesarian section. The economy of the district depends mainly on agriculture. Agriculture is a source of food for the population, subsistence income for most families, and provides direct employment to 86.7% of the district population, as well as supplying raw materials for industries (www.Bushenyi.Org.com).

#### **Variables**

The prevalence and factors associated with Puerperal sepsis was the dependent variable of the study while the independent variables were: Socio-demographic factors such as: age, occupation, education, knowledge on puerperal sepsis, marital status and parity status, Obstetric factors including: mode of delivery, prolonged labor, place of

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delivery, vaginal examinations. Patient's characteristics including; facility factors including availability of adequate equipment, finance, distance and hygiene.

#### **Study Population**

The study focused on the mothers of child bearing age who presented to KIU-TH with population size of 43,210. According to the In-charge maternity ward who was also included in the study, the hospital gets about 10 mothers with puerperal sepsis in a week, which gave a reflection of PS.

#### **Sample Size Determination**

The sample size was determined using Krejcie and Morgan [19] from the specified population and was limited to mothers diagnosed with puerperal sepsis at KIU-TH. The target population was 40 mothers who visit KIU-TH. By using the Morgan table sample size was 36.

Therefore:  $n = 36$ .

#### **Sampling Methods**

To determine the prevalence of puerperal sepsis, a systemic sampling method using in-patient numbers was used. To determine the patient and the hospital factors a questionnaire was administered among the patients.

#### **Inclusion Criteria**

Any mother diagnosed with Puerperal sepsis found in maternity ward at time of the interview was included provided she was willing to take part in the study and the procedure was explained accordingly.

#### **Exclusion Criteria**

Mothers who were mentally ill and critically ill were excluded; this is because they could give irrelevant information for the study subject. Also those who were not willing to take part in the study for one reason or the other were excluded.

#### **Data Collection Methods**

The data was collected using a questionnaire, which was a mixture of structured questions. The data was collected by the researcher himself ensuring that the person who filled the questionnaire met the inclusion criteria. A record review tool was used to collect relevant information about hospital factors to determine the prevalence. Data was collected for two months since the hospital works every day.

### Methods of Data Analysis

The data was then analyzed using Microsoft excel manually and interpreted into average and percentages and presented on tables, graphs and pie charts.

### Data Quality Control

The questionnaire was pretested in a similar population of KIU-TH Bushenyi District Western Uganda to ensure clarity of questions. The wrongly stated question was corrected. At the end of the interview I checked for completeness of the questionnaire and participants were selected randomly to eliminate bias.

### Data Presentation

#### Respondents Demographic Data.

Data collected in this study indicates that the most affected age group is from 36 to 45, 16 (44.4%), most of them being married 32(88.9%), majority were from Catholics religious affiliation 15(41.7%), by tribe the

The data collected was presented in form of charts, graphs, tables and figures.

### Ethical Consideration

I sought approval from KIU authorities and the research committee of KIU western Campus, who in turn upon approval, granted me permission to conduct the study with an introductory letter. The letter was addressed to the medical Director KIU-TH who introduced me to the in charge of the maternity. Verbal consent was sought from mothers of PS to interview them and also confidentiality was strictly observed at all stages of research.

## RESULTS

highest number of participants were Banyankole 22(61.1%). Furthermore, most participants had attained primary level 16(44.4%) which rendered majority of them peasants 18(50%) by occupation.

### A Summary of the Socio Demographic Information

**Table 1:** The socio demographic characteristics of the study of mothers diagnosed of puerperal sepsis in KIU-TH (n=36)

Variable	Frequency	Percentage (%)
<b>Age range (years)</b>		
19-25	10	27.8
26-35	10	27.8
36-45	16	44.4
<b>Marital status</b>		
Married	32	88.9
Un married	4	11.1
<b>Religion</b>		
Catholics	15	41.7
Protestants	12	33.3
SDA	5	13.9
Muslims	4	11.1
<b>Tribes</b>		
Banyankore	22	61.1
Bakiga	8	22.2
Baganda	4	11.1
Others	2	5.6
<b>Occupation</b>		
Peasants	18	50
Teachers	12	33.3
Unemployed	2	5.6
Traders	4	11.1
<b>Educational level</b>		
Nil	10	27.8
Primary	16	44.4
Secondary	6	16.7
University	2	5.6
Tertiary	2	5.6

### Obstetrical Data

#### Prevalence of Puerperal Sepsis among Mothers Delivering at Kampala International University Teaching Hospital

##### Prevalence of Puerperal Sepsis

Majority of the mothers 32(88.9%) were positive about Puerperal Sepsis and had sought treatment while 4(11.1%) were negative about Puerperal sepsis. Health workers made the highest source of

information to mothers 20(55.6%), followed by friends 5(13.9%), 5(13.9%) was through television and 6(16.7%) by radio. It's from attendance of ANC that health workers provided information to these mothers about Puerperal sepsis.

**Table 2:** Prevalence of puerperal sepsis

Variable	frequency	Percentage
<b>Source of information</b>		
Health worker	20	55.6
Friend	5	13.9
Television	5	13.9
Radio	6	16.7
<b>Mother's awareness of prevalence</b>		
Yes	32	88.9
No	4	11.1

#### The Hospital Factors Associated with Puerperal Sepsis among Mothers Delivering in Kampala International University Teaching Hospital.

##### Hospital Factors

Most of the respondents 30 (83.3%) of the mothers had their deliveries in health centers, 4(11.1%) delivered at home and 2(5.6%) in other places like with TBAs. Majority of the mother who had developed PS had delivered through caesarian section 26(72.2%) and rest of the mothers 10(27.8%) had delivered spontaneously by vaginal delivery. From the table below, 16(44.4%) of the mothers were assisted by

doctors, 15(41.7%) by mid wives and 05(13.9%) by TBAs. Most of the mothers interviewed 22(61.1%) claimed health worker used new gloves, 12(33.3%) claimed the assistant washed hands with soap and rest 2(5.6%) didn't know. Majority had had many examinations 18(50%), 12(33.3%) had had two examinations, those who didn't know were 4(11.1%) and 2(5.6%) had no examination done onto them before delivery.

**Table 3: Showing hospital factors**

Variable	Frequency	Percentage (%)
<b>Place of delivery</b>		
Health center	30	83.3
Home	4	11.1
others	2	5.6
<b>Mode of delivery</b>		
SVD	10	27.8
C/S	26	72.2
<b>Assistant in delivery</b>		
Doctor	16	44.4
Midwife	15	41.7
TBA	5	13.9
<b>Hygienic practice</b>		
Using new gloves on every examination	22	61.1
Washing hands with soap	12	33.3
Don't know	2	5.6
<b>Number of vaginal examinations</b>		
Two examinations	12	33.3
Many examinations	18	50
Don't know	4	11.1
None	2	5.6

### **The Patient Factors Associated with Puerperal Sepsis among Mothers Delivering at Kampala International University Teaching Hospital.**

#### **Patient Factors**

Majority of the mothers had had one delivery 18(50%), 10(27.8%) had four deliveries or greater, 4(11.1%) had had three deliveries and the remaining 4(11.1%) had had two deliveries. The respondents 20(55.6%) were malnourished

as assessed at ANC while 16(44.4%) were well-nourished. Most mothers 16(44.4%) were HIV positive; as compared to 15(41.7%) who were HIV negative and the remaining 5(13.9%) don't know. Majority of the mothers' duration of labour was prolonged (extended) for 26(72.2%) and least was short duration 10(27.8%).

**TABLE 4: Showing patient factors.**

Variable	Frequency	Percentage (%)
<b>Duration of labour</b>		
Short	10	27.8
Extended	26	72.2
<b>HIV status</b>		
Positive	16	44.4
Negative	15	41.7
Don't know	5	13.9
<b>Nutritional status</b>		
Well nourished	16	44.4
Malnourished	20	55.6
<b>Number of deliveries</b>		
1	18	50
2	4	11.1
3	4	11.1
>=4	10	27.8

## DISCUSSION

A total number of 36 mothers were interviewed at KIU-TH from 21<sup>ST</sup>/APRIL/2017 to 4<sup>TH</sup>/JUNE/2017.

### Prevalence Factors

Most mothers 32(88.9%) were positive about Puerperal Sepsis. Minority were negative about Puerperal Sepsis were 4(11.1%) [20].

### Hospital Factors

Those 30(83.3%) had delivered from health centers, 4(11.1%) had delivered from home and 2(5.6%) in other places like with hospitals and clinics, thus this could be due to accessibility, affordability and attendance of ANC services which differs from the previously investigated research, where 73.8% had delivered from home [20]. About vaginal examinations done, 18(50%) had many vaginal examinations followed by mother who had two vaginal examinations 12(33.3%). Those who did not know were 4(11.1%) and none 2(5.6%). The prolonged labor attracts many vaginal examinations by the assistant, hence with ruptured membranes and an open cervix

that directly introduces microorganisms by ascending from the lower vaginal canal to upper parts of the reproductive organ [10, 21]. Majority of deliveries were done in the night and others were emergencies from which the chain of sterility could have been broken in the due course to save the mother, caesarian section accounted for 26(72.2%) done by the doctor 16(44.4%), other deliveries were by spontaneous vaginal delivery 10(27.8%) of which 15(41.7%) were assisted by mid wives and 5(13.9%) by TBAs.



### Patient Factors

Patient factors play roles in infection upcoming such as deliveries by unskilled attendants, unhygienic practices, and late referrals to hospitals, poor social economic status of most mothers, prolonged labor, induced abortions and other underlying chronic infections like HIV that weaken the immune system. This is similar to previous reports [8, 12, 22, 23]. In most developed countries caesarian section is the most contributing factor to puerperal sepsis [8, 24, 25]. Most people have inadequate skills at cleaning caesarian site.

### Strength and Weaknesses

My study was being facilitated and helped by nurses in charge of maternity to archive my goal. However, the sample size was insufficient and this may affect the generalization of the findings to other settings where the patient numbers are large. However, the clear outcome variables were captured from hospital records

### CONCLUSION

The prevalence of puerperal sepsis was 88.9% among women delivering at KIU-TH. Hospital factors, most mothers who presented with puerperal sepsis had delivered by Caesarian section 26(72.2%) and others 10(27.8%), Doctors assisted most in deliveries 44.4% and at health center 83.3%. They reported frequent vaginal examinations 50% and claimed that each time the assistant could put on new gloves (61.1%). Patient factors: mostly affected mothers had prolonged labor (72.2%), majority being HIV Positive (44.4%), Malnourished (55.6%) and having a low parity (50%).

#### Recommendations

From the findings of this study, the following recommendations can be drawn;

#### Prevalence Recommendations

The need to avail knowledge on Antenatal attendance for screening and use of skilled birth attendants who observe the aseptic techniques during delivery.

There is more need to educate the community on hygienic practices especially for the post-partum mothers so

as to control infections through more community outreaches by community health workers.

#### Hospital Factors

Government through the Ministry of Health should partner with hospitals creating affordable costs to mothers whenever serious conditions arise.

Also the provision of both surgical and disposable gloves to health facilities should be considered highly as this will promote on hygiene.

Increase on recruitment and salary payment to health workers in time to motivate their work.

#### Patient Factors

Improving on diet through a balanced diet to meet the body demands especially during pregnancy and after delivery.

Mothers' should be advised to always go for HIV screening tests during their ANC visits.

Family planning methods should be emphasized as it gives time to cater for mothers' life and the child.

### REFERENCES

1. Byonanuwe, S., Nzabandora, E., Nyongozi, B., Pius, T., Fajardo, Y., & Ssebuufu, R. (2020). Bacterial pathogens and their susceptibility to antibiotics among mothers with premature rupture of membranes at a teaching hospital in western Uganda. *Journal of Medical Care Research and Review*, 3(7), 386-394.
2. Turyasiima, M., Nduwimana, M., Andres, S. M., Kiconco, G., & Egesa, W. I., Maren, B. M., & Ssebuufu, R. (2020). Neonatal umbilical cord infections: incidence, associated factors and cord care practices by nursing mothers at a tertiary Hospital in Western Uganda. *Open Journal of Pediatrics*, 10(02), 288-301.

3. Shamshad, S. S., & Rauf, B. (2010). Puerperal sepsis--still a major threat for parturient. *J Ayub Med Coll Abbottabad*.22 (3):18-21. PMID: 22338409.
4. Turyasiima, M., Nduwimana, M., Kiconco, G., Egesa, W. I., Manuel, S. A., Kalubi, P., & Ortiz, Y. E. A. (2020). Bacteriology and antibiotic susceptibility patterns among neonates diagnosed of omphalitis at a tertiary special care baby unit in western uganda. *International Journal of Pediatrics*, pp 1-6. Article ID 4131098. Doi.org/10.1155/2020/4131098
5. Bamfo, J. E. (2013). Managing the risks of sepsis in pregnancy. *Best Pract Res Clin Obstet Gynaecol.*, 27(4):583-95. doi: 10.1016/j.bpobgyn.2013.04.003. Epub 2013 Apr 29. PMID: 23639681.
6. Ziraba, A. K, Madise, N, Mills, S., Kyobutungi, C., & Ezeh, A. (2009). Maternal mortality in the informal settlements of Nairobi city: what do we know? *Reprod Health*. 6:6. doi: 10.1186/1742-4755-6-6. PMID: 19386134; PMCID: PMC2675520.
7. Pius, T. (2020). Assessment of Factors Associated with Caesarean Section among Women Attending Kampala Inter-national University Teaching Hospital: A Retrospective Study. *Int J Clinical & Case*, 4(2): 8-12.
8. Ambrose, B. M., Mauti, G. O., Nansunga, M., Mauti, E. M., Mabeya, B. M., & Neel, G. R. (2016). To determine the serostatus and frequency of HIV exposed infants in Ishaka Adventist Hospital. *Journal of Pharmacy and Nutrition Sciences*, Volume 6, Issue 2, Pages 72-77.
9. Ahmed, M. I, Alsammani, M. A., & Babiker, R. A. (2013). Puerperal sepsis in a rural hospital in Sudan. *Mater Sociomed*. 25(1):19-22. doi: 10.5455/msm.2013.25.19-22. PMID: 23678336; PMCID: PMC3633386.
10. Muhongya, J. K., Vivalya, B. M., Saasita, P. K., & Edward, S. (2020). Determinants of delivery site's preferences among women in East Africa: case study in Ishaka municipality, Western Uganda. *PAMJ-One Health*, 3(12).
11. Byonanuwe, S., Nzabandora, E., Nyongozzi, B., Pius, T., Ayebare, D. S., Atuheire, C., & Ssebuufu, R. (2020b). Predictors of premature rupture of membranes among pregnant women in rural Uganda: a cross-sectional study at a tertiary teaching hospital. *International journal of reproductive medicine*, International Journal of Reproductive Medicine, Article ID 1862786. doi.org/10.1155/2020/1862786
12. Mbina, S. A., Magaji, G., Fanuel, A., Pius, T., Gorret, A., Mavine, A. N., & Stellamaris, K. (2021). Breastfeeding Practices among Infants and Young Children in Bushenyi, Uganda: Influence of Maternal Knowledge and Occupation. *Journal of Family Medicine and Health Care*, 7(4), 90-97.
13. Uganda, I. (2015). Knowledge, attitudes, and practices about regular, voluntary non-remunerated blood donation in Peri-urban and rural communities in Mbarara District, South Western Uganda, and its Impact on Maternal Health. *J Obstet Gynaecol Can*, 37(10), 903-904.
14. Herman, M. O. (2014). Political-economic transitions and the changing context of maternal health access in Tanzania: Evidence from DHS data. *African Population Studies*, 1072-1087.
15. Winani, S., Wood, S., Coffey, P., Chirwa, T., Mosha, F., & Changalucha, J. (2007). Use of a clean delivery kit and factors associated with cord infection and puerperal sepsis in Mwanza, Tanzania. *J Midwifery Womens Health*. 52(1):37-43. doi: 10.1016/j.jmwh.2006.09.004. PMID: 17207749.
16. WHO. (2008). Managing puerperal

- sepsis. Managing material for teachers of midwifery. *Midwifery Education Module, (2nd Edition)*.
17. van Dillen, J., Zwart, J., Schutte, J., & van Roosmalen, J. (2010). Maternal sepsis: epidemiology, etiology and outcome. *Curr Opin Infect Dis.* 23(3):249-54. doi: 10.1097/QCO.0b013e328339257c. PMID: 20375891.
  18. Uzoma, O. G., & Ifeanyi, O. E. (2019). Practices of Emergency Obstetrics Care among Midwives in Maternity Unit of Two Government Hospitals in Enugu North Local Government Area. *EC Gynaecology*, 8.
  19. Krejcie, R. V., & Morgan, D. W. (1970). Determining Sample Size for Research Activities. *Educational and Psychological Measurement*, 30(3), 607-610. <https://doi.org/10.1177/001316447003000308>
  20. Khaskheli, M. N., Baloch, S., & Sheeba, A. (2013). Risk factors and complications of puerperal sepsis at a tertiary healthcare centre. *Pak J Med Sci.* 29 (4):972-6. doi: 10.12669/pjms.294.3389. PMID: 24353670; PMCID: PMC3817780.
  21. Seale, A. C., Mwaniki, M., Newton, C. R., & Berkley, J. A. (2009). Maternal and early onset neonatal bacterial sepsis: burden and strategies for prevention in sub-Saharan Africa. *Lancet Infect Dis.* 9 (7):428-38. doi: 10.1016/S1473-3099(09)70172-0. PMID: 19555902; PMCID: PMC2856817.
  22. Asomugha, I. C., Uwaegbute, A. C., & Obeagu, E. I. (2017). Food insecurity and nutritional status of mothers in Abia and Imo states, Nigeria. *Int. J. Adv. Res. Biol. Sci*, 4(10), 62-77.
  23. Obeagu, E. I., & Obeagu, G. U. (2017). Occult Hepatitis B infection and immunity. *Int. J. Curr. Res. Med. Sci*, 3(8), 89-100.
  24. MacVicar, S., Berrang-Ford, L., Harper, S., Huang, Y., Namanya Bambaiba, D., & Yang, S. (2017). Whether weather matters: Evidence of association between in utero meteorological exposures and foetal growth among Indigenous and non-Indigenous mothers in rural Uganda. *PloS one*, 12(6), e0179010.
  25. Chandra, M. D., Khurishid, F., & Sirichand, P. (2011). Maternal morbidity and mortality. Association with Puerperal sepsis. *Liquat University Hospital. JLUMHS*, 10 (3): 121-123.