FACTORS & SEQUELAE OF PUERPERAL SEPSIS AMONG WOMEN DELIVERED AT FORT PORTAL REGIONAL REFERRAL HOSPITAL

BY

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ABSTRACT

Puerperal sepsis, defined as infection of the genital tract occurring at any time between the rupture of membranes or the onset of labour, and the 42nd day postpartum is still a major contributor to maternal morbidity and mortality. Despite diagnosis, medical management and antimicrobial therapy for sepsis having significantly advanced, puerperal sepsis remains an important cause of maternal mortality accounting for 10.7% of all maternal deaths annually worldwide.

In developing countries, most of the risk factors for development of puerperal sepsis exist and cases of puerperal sepsis have been reported. Adverse outcomes ranging from prolonged length of hospital stay to death do occur. Information about this matter is scarce in Fort-portal and thus this study was about the prevalence, associated factors and outcomes of puerperal sepsis in women delivered at FPRRH. A prospective study design was employed that was based chiefly on record review and case follow-up and that involved 284 women in puerperium at FPRRH. The prevalence of puerperal sepsis was 2.47% with Caesarean Section, PROM, primiparity and comorbid conditions such as HIV/AIDS, DM and anaemia being significant contributors whereas obesity was not significant. Full recovery, PID and mastitis with prolongation of duration of hospital stay were the significant outcomes.

DECLARATION

I do hereby declare that this research dissertation is the product of my own efforts and to the best of my knowledge and conviction, has never been presented to any institution for any award or qualification whatsoever. Wherever the works of other people have been included, due acknowledgement to this has been made in accordance with the appropriate referencing and citations. The findings and the analysis that resulted from this research project are my original information.

Researcher: **MANYEKI JOHANESI, BMS/0068/132/DU**

Signature ……...

Date ……...….

APPROVAL

This is to certify that this research dissertation has been prepared under my supervision and has never been presented anywhere for any other purpose and is now ready for submission to the Faculty of Clinical Medicine and Dentistry of Kampala International University for further consideration.

Supervisor: **MR. MUJUNI DAVID (DMR (MuK)), BPH, MPH**

Signed…….

Date……..……

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I would like to, first and foremost, acknowledge The Almighty God, The Giver of life and Who without Him all is in futility. I would also like to thank my lovely parents, siblings, mentors, teachers and colleagues for moulding me into what I am today and what am bound to become in the future. Special thanks go to my supervisor, **Mr. Mujuni David** whose guidance have been instrumental in every step of this piece of work.

LIST OF ABBREVIATIONS AND ACRONYMS

ANC	**:**	Antenatal Care
BMI	**:**	Body Mass Index
CDC	**:**	Centers for Disease Control and Prevention
CI	**:**	Confidence Interval
CS	**:**	Caesarean Section
DIC	**:**	Disseminated Intra-Vascular Coagulation
DM	**:**	Diabetes Mellitus
FPRRH	**:**	Fort Portal Regional Referral Hospital
GAS	**:**	Group A Streptococcus
GBOD	**:**	Global Burden of Disease
HIV	**:**	Human Immunodeficiency Virus
MRRH	**:**	Mbarara Regional Referral Hospital
MDGs	**:**	Millennium Development Goals
MMR	**:**	Maternal Mortality Ratio / Rate
MOH	**:**	Ministry of Health
PID	**:**	Pelvic Inflammatory Disease
PP	**:**	Postpartum
PROM	**:**	Premature Rupture of Membranes
SDGs	**:**	Sustainable Development Goals
SVD	**:**	Spontaneous Vertex Delivery
VEs	**:**	Vaginal Examinations
WHO	**:**	World Health Organization

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OPERATIONAL DEFINITIONS

Sepsis: Life –threatening organ dysfunction caused by a dysregulated host response to an infection (Third International Consensus, 2016).

Puerperium: the period between childbirth and the return of the uterus to its normal size. Can take up to 42 days (6 weeks)

Caesarean section: Use of surgery to deliver a baby or babies (Merriam Webster, 2017).

CHAPTER ONE: INTRODUCTION

1.0. BACKGROUND

Puerperal sepsis is defined as infection of the genital tract occurring at any time between the rupture of membranes or the onset of labor, and the 42nd day postpartum, in which a fever (oral temperature 38.5°C or higher on any occasion) and 1 or more of the following signs and symptoms are present: Pelvic pain, Abnormal vaginal discharge, e.g. presence of pus, abnormal smell/foul odour of discharge, Sub-involution, i.e. delay in the rate of reduction of the size of the uterus (<2cm/day during the first 8 days) (The Global Health Network, 2014).

Diagnosis, medical management and antimicrobial therapy for sepsis have significantly advanced. Despite this, puerperal sepsis remains an important cause of maternal mortality accounting for 10.7% of all maternal deaths annually worldwide(Say et al., 2014).

In 2010, puerperal sepsis alone caused at least 75,000 maternal deaths, mostly in low-income countries. Studies from high-income countries report incidence of maternal morbidity due to sepsis of 0.1-0.6 per 1000 deliveries. The causative microorganisms are generally polymicrobial with beta-haemolytic streptococci group A (GAS) often being the cause of severe cases of puerperal fever. The single most important risk factor for postpartum infection seems to be caesarean section, and prophylactic antibiotics during the procedure substantially reduce the infection risk. Improvements in service provision as promoted through the Surviving Sepsis Campaign can reduce the overall risk of mortality and morbidity from maternal sepsis in high-income as well as in low-income countries (van Dillen, Zwart, Schutte, & van Roosmalen, 2010)(Aboyeji, Ijaiya et al., 2012).

In developing countries, most of the risk factors for development of puerperal sepsis exist and cases of puerperal sepsis have been reported. For example, In a hospital in Johannesburg, South Africa, out of 272 women who delivered via Caesarean section, 4 (1.5%) were readmitted with puerperal sepsis, and 30 (11.0%) with possible mild wound infection(Johnson, 2012), while in a rural hospital in Sudan in 2012, the incidence of puerperal sepsis was found to be very high. Out of 170 samples, 124 (72.9%) were pathogen-positive (Ahmed, Alsammani, & Ali, 2013). Here, in our own Uganda, a study conducted in Mbarara Regional Referral Hospital in 2016, showed that maternal sepsis contributed the largest proportion of maternal mortality. Direct causes of mortality accounted for 77.7 % while indirect causes contributed 22.3 %. The most frequent cause of maternal mortality was puerperal sepsis (30.9 %) (Ngonzi et al., 2016).

Important data on incidence, risk factors and outcomes of puerperal sepsis among mothers delivering in this country is minimal and so the study aimed at assessing the incidence, risk factors and outcomes of puerperal sepsis among women delivered at Fort Portal Regional Referral Hospital between January and June 2018.

1.1.PROBLEM STATEMENT

Puerperal sepsis is still a major cause of preventable maternal mortality worldwide, more so in developing countries of sub-Saharan Africa. It is the most common cause of maternal mortality world-wide (Say et al., 2014). The Millennium Development Goal 5 (MDG_5) and Sustainable Development Goal 3(SDG_3) target improving maternal health and ensuring good health and well-being respectively (The United Nations, 2015) which some developed countries have made strides towards achieving these targets. Countries in developing regions especially in sub-Saharan Africa still have a problem as far as reduction of maternal mortality (Sustainable Development Solutions Network, 2014). Uganda's current maternal mortality ratio (MMR) is very high with puerperal sepsis being the leading cause of maternal deaths in Uganda (Ngonzi et al., 2016). Similar statistics could be extended to the Western region, Kabarole District and Fort-Portal though information on the actual values on the ground is scanty, if not completely non-existent. No studies have been conducted on the prevalence and factors associated with puerperal sepsis in Fort Portal Regional Referral Hospital (FPRRH) and thus the study aimed to attempt and bridge this information gap.

1.2.STUDY OBJECTIVES

1.2.1. BROAD OBJECTIVE

To assess the prevalence, risk factors and sequelae of puerperal sepsis among women delivered at Fort Portal Regional Referral Hospital.

1.2.2. SPECIFIC OBJECTIVES

1. To determine the prevalence of puerperal sepsis among women delivered at Fort Portal Regional Referral Hospital.
2. To identify the risk factors of puerperal sepsis among women delivered at Fort Portal Regional Referral Hospital.
3. To identify the outcomes of puerperal sepsis among women delivered at Fort Portal Regional Referral Hospital from.

1.3. RESEARCH QUESTIONS

1. What is the prevalence of puerperal sepsis among women delivered at Fort Portal Regional Referral Hospital?
2. What are the possible risk factors of puerperal sepsis among women delivered at Fort Portal Regional Referral Hospital?
3. What the different outcomes of puerperal sepsis among women delivered at Fort Portal Regional Referral Hospital?

1.4.SIGNIFICANCE OF THE STUDY

This study aimed to provide statistics on puerperal sepsis among delivering mothers. Puerperal sepsis is the most common cause of maternal mortality world-wide. Decision-makers and policy makers will definitely find this information invaluable. Its usefulness will affect different decision-making levels vis-à-vis FPRRH, The Ministry of Health (MOH), and world health bodies such as World Health Organization and Centers for Disease Control and prevention (CDC). First and foremost, to FPRRH, the information will be useful in as far as highlighting incidence of puerperal sepsis is concerned, predisposing factors and overall prognosis so as to inform planning and intervention.

When interventions are made, less mothers will have to incur the burden of puerperal sepsis in terms of morbidity and mortality. The length of hospital stay after delivery will reduce and the costs that accompany it. The mothers will be able to quickly return to their activities of daily living and resume their pre-pregnancy productivity.

To the government policymakers and ministry of health, this information will add to their much-needed statistics for surveillance and monitoring and thus facilitate planning. Equitable fund allocation as per priority needs in maternal health will be possible and the overall quality of the country's health sector will improve.

To other stakeholders and relevant bodies globally, the research will contribute to the information pool from which decisions and policies can be based on plus other researchers can be able to draw from while conducting similar or related studies either within or without the same study population.

1.5.STUDY SCOPE

1.5.1. GEOGRAPHICAL SCOPE

The study was conducted at Fort Portal Regional Referral Hospital (FPRRH) departments of obstetrics and gynecology, maternity wards. Fort Portal Regional Referral Hospital, commonly known as Fort Portal Hospital, sometimes referred to as Buhinga Hospital, is a hospital in the town of Fort Portal, in Kabarole District, Western Uganda. It is the referral hospital for the districts of Bundibugyo, Kabarole, Kamwenge, Kasese, Ntoroko and Kyenjojo. It is a public hospital, funded by the Uganda Ministry of Health and general care in the hospital is free. It is one of the 13 "Regional Referral Hospitals" in Uganda. The hospital is designated as one of the 15 "Internship Hospitals" where graduates of Ugandan medical schools can serve one year of internship under the supervision of qualified specialists and consultants. The bed capacity of Fort Portal Hospital is quoted as 333.

1.5.2. CONTENT SCOPE

The study was on puerperal sepsis prevalence and different presentations, associated factors and sequelae or outcomes of patients of puerperal sepsis.

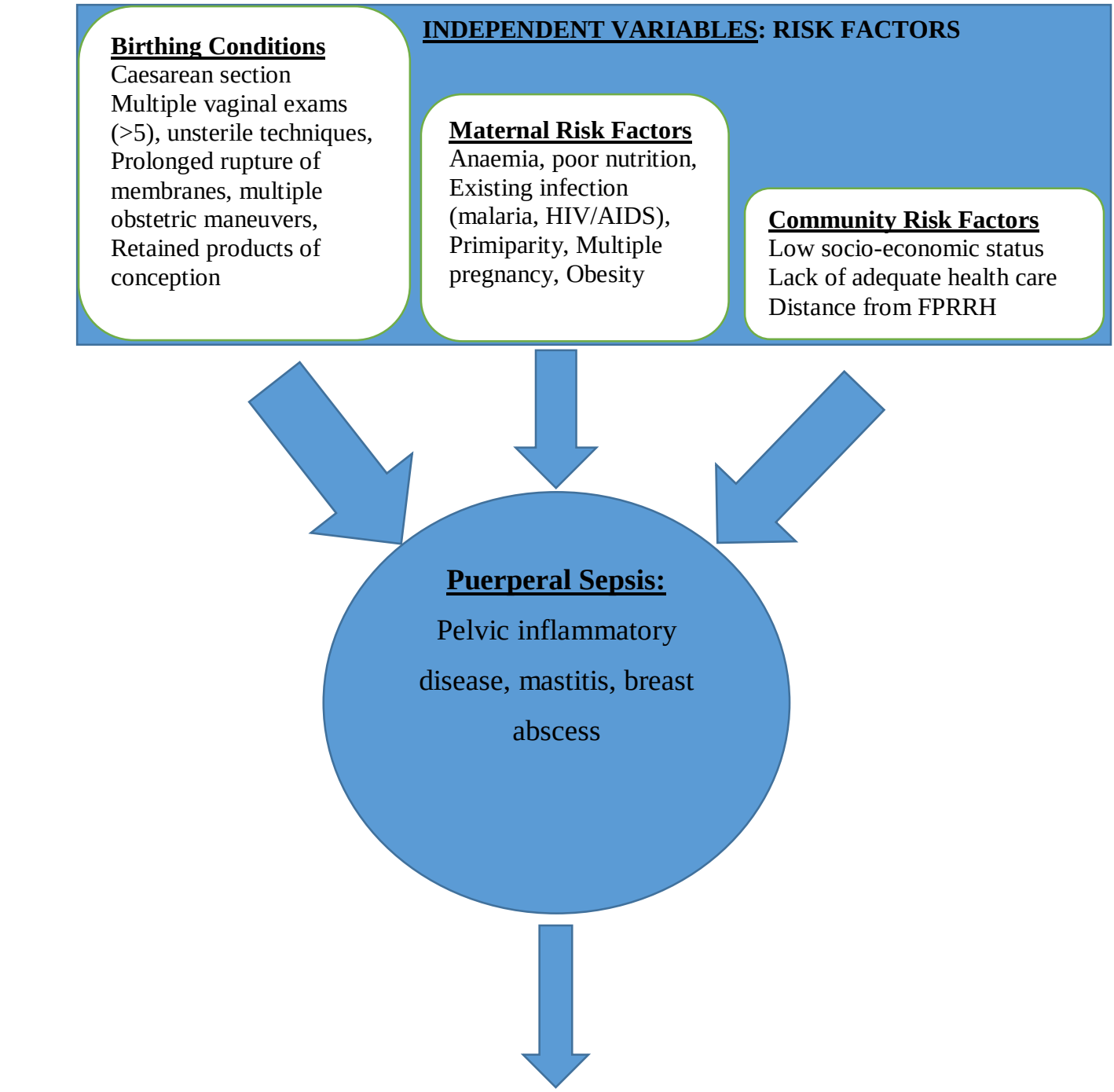
1.5.3. TIME SCOPE

The study ran from the month of January through June, in the year 2018.

1.6.CONCEPTUAL FRAMEWORK

The different risk factors (our independent or modifiable variables) are divided into maternal factors, socio-economic factors and birthing conditions whereas our dependent variable will be the prevalence of puerperal sepsis in its different presentations such as pelvic inflammatory disease (PID), mastitis, breast abscess. The outcomes will include complete recovery and recovery with complications (sterility, multi-organ damage, disseminated intravascular coagulation, thrombo-embolism, abscesses, peritonitis, pelvic thrombophlebitis, pulmonary embolism, sepsis or septic shock, prolonged length of hospital stay, and even death).

Figure 1: Conceptual Framework on risk factors for Puerperal Sepsis Among Parturient mothers; Researcher's View



CHAPTER TWO: LITERATURE REVIEW

2.0. INTRODUCTION

This chapter deals with the literature reviewed on the prevalence, risk factors and sequelae of puerperal sepsis among women who have just delivered.

2.1. PREVALENCE OF PUERPERAL SEPSIS

The prevalence of postpartum sepsis varies worldwide, with reports between 2–10 % and varies by risk factors. The World Health Organization (WHO) used an estimate of 5 % incidence for the Global Burden of Diseases (GBOD) work (Bartlett et al., 2016).

According to WHO estimates, maternal sepsis among live births has a prevalence of 4.4% globally, representing more than 5·7 million cases per year (Bonet, Oladapo, Khan, Mathai, & Gülmezoglu, 2015). Important variations exist between regions, with higher incidence in low-income and middle-income countries (up to 7%) compared with high-income countries (1–2%).

In 2013, over 30,000 maternal deaths (11 %) were attributed to postpartum sepsis, the third most frequent cause of the approximately 290,000 maternal deaths worldwide. Almost all these deaths occurred in low resource settings and the region with the greatest proportion of maternal deaths due to sepsis was South Asia (14 %).

Despite the relative low prevalence and the availability of interventions for its prevention and treatment, maternal sepsis remains a life-threatening condition and one of the leading direct causes of maternal mortality worldwide, accounting for up to 10% of maternal deaths (Bonet et al., 2015). Over 5 million/ year of maternal sepsis occur globally with an estimated 75,000 maternal deaths(Sayinzoga et al., 2016).

The risk of maternal mortality in high income countries is 2.1% of all maternal deaths, while in low income countries it is 11.6% e.g. 2 – 2.7-fold higher in Africa, Asia, Latin America and the Caribbean than in developed countries(Sayinzoga et al., 2016)

Low resource countries account for 99 % (286,000) of the global maternal mortalities with sub-Saharan Africa responsible for the bulk of the maternal deaths and accounting for 62 % followed by southern Asia at 24 %. The biggest contributor to these deaths is puerperal sepsis (Ngonzi et al., 2016). In Uganda, there has been a slow decline in maternal mortality ratio (MMR) between 1990 and 2010 (from 550 in 1990 to 438 in 2012) (Ngonzi et al., 2016).

An observational prospective Cohort study was conducted from January 2011 to December 2011 at the Obstetrics and Gynaecology Department Liaquat University of Medical & Health Sciences

Jamshoro/Hyderabad, Sindh Pakistan. During the study period there were 3316 obstetrical admissions and out of these 129(3.89%) women had puerperal sepsis (Khaskheli, Baloch, & Sheeba, 2013).

In Chris Hana Baragwanath Academic Hospital in Johannesburg, South Africa, study among 272 parturients showed that 4 (1.5%) were readmitted with puerperal sepsis, while another 11% had possible wound infection (Johnson & Buchmann, 2012).

In a retrospective survey conducted in Rwanda in 2016, 44.9% of maternal deaths occurred in the post-partum period. Seventy per cent were due to direct causes, with postpartum haemorrhage as the leading cause (22.7%), followed by obstructed labour (12.3%). Indirect causes accounted for 25.7% of maternal deaths, with post-partum sepsis as the leading cause (7.5%) (Sayinzoga et al., 2016).

In a rural hospital in Sudan, a study was conducted running from January 2011 through January 2012 and it found that, out of the 170 samples of blood taken from mothers post-partum, 124 (72.9%) were pathogen-positive (Ahmed et al., 2013).

Yarine et al conducted a study in Mulago between January 2011 and November 2014 in which they found that the direct causes of maternal mortality accounted for 77.7 % while indirect causes contributed 22.3 %. The most frequent cause of maternal mortality was puerperal sepsis (30.9 %), followed by obstetric hemorrhage (21.6 %), hypertensive disorders in pregnancy (14.4 %), abortion complications (10.8 %). Malaria was the commonest indirect cause of mortality accounting for 8.92 % (Ngonzi et al., 2016).

At Mbarara Regional Referral Hospital, the incidence of puerperal sepsis was found to be 2% (Ngonzi et al., 2018).

2.2. FACTORS ASSOCIATED WITH PUERPERAL SEPSIS

The single most important risk factor for postpartum infection seems to be caesarean section while the use of prophylactic antibiotics during the procedure substantially reducing the infection risk (Bonet et al., 2015).

This fact has been replicated in several other studies such as that in Hani Baragwanath Academic Hospital in Johannesburg where Caesarean Section (CS) was identified as the most important risk factor for postpartum sepsis and the most common complication associated with CS was sepsis (The Global Health Network, 2014).

Results from a study in a tertiary health care centre in Pakistan found out that the most common risk factors for puerperal sepsis were anaemia; suboptimal personal hygiene as well as improper sterilization practices(Khaskheli et al., 2013). Other common risk factors found were absent membranes in 108 (83.72%) of the women, delivered or undelivered and mismanaged, referred cases 95(73.64%), are being delivered in this hospital 34 (26.35%) (Aboyeji, Ijaiya et al., 2012).

In Bangladesh and Pakistan, concurrent studies were conducted where location of delivery (facility vs. home), low socioeconomic status, poor nutrition, anemia, prolonged labor, premature rupture of membranes, multiple pregnancies, primiparity, being overweight and the type of delivery (caesarean versus vaginal), more than 5 vaginal examinations during labor, other obstetrical maneuvers, no use of antibiotic prophylaxis were cited as risk factors towards development of puerperal sepsis (Bartlett et al., 2016).

A retrospective cohort study conducted in Rwanda between 2009 and 2013 into the risk factors for development of puerperal sepsis and subsequent death from the same showed that, health system failures were identified as the main responsible factor for the majority of cases (61.0%); in 30.3% of the cases, the main factor was patient or community related (Sayinzoga et al., 2016).

Studies in Mulago showed that primary or no education (OR 1.9; 95 % CI, 1.0–3.3); HIV positive sero-status (OR, 3.6; 95 % CI,1.9–7.0); no antenatal care attendance (OR 3.6; 95 % CI, 1.8–7.0); rural dwellers (OR, 4.5; 95 % CI, 2.5–8.3); having been referred from another health facility (OR 5.0; 95 % CI, 2.9–10.0); delay to seek health care (delay-1) (OR 36.9; 95 % CI, 16.2–84.4) were risk factors towards development of puerperal sepsis and dying from it (Ngonzi et al., 2016).

2.3. SEQUELAE OF PUERPERAL SEPSIS

The sequalae or outcomes of puerperal sepsis range from total recovery, Pelvic Inflammatory diseases (PID), tubal adhesions, infertility, mastitis, breast abscess, thrombo-embolism, endometritis, endo-myometritis, and endo-parametritis, Multi-Organ Damage (MOD) to death (Cunningham, 2014).

In Liquat University in Pakistan, septicemia in 35 (27.13%) cases, disseminated intravascular coagulation (DIC) in 23(17.82%) cases were the common sequelae of postpartum sepsis. 11 (8.52%) of the women died in the same study(Khaskheli et al., 2013).

CHAPTER THREE: METHODOLOGY

3.0.INTRODUCTION

This chapter presents the information on the study area focusing on population structure and many other aspects including study design, sample size determination, sampling method, selection criteria, data collection, data analysis, data presentation, data quality control, study limitation and Ethical consideration.

3.1. STUDY DESIGN

A prospective study design was employed that was based chiefly on record review and case follow-up.

3.2. STUDY POPULATION

All women delivered at FPRRH during the time scope of the study.

3.2.1. INCLUSION CRITERIA

All delivered mothers at FPRRH in Puerperium who consented to take part in the study.

3.2.2. EXCLUSION CRITERIA

Those that refused to consent and outside the puerperium period.

3.3. SAMPLE SIZE DETERMINATION

The sample size was determined using Fishers et al., 2006 formula. The formula was used to estimate the smallest possible categorical sample size. i.e. $N=Z^2PQ/D^2$:

Where N is the desired sample size

Z is the standard normal deviation taken as 1.96 at a confidence interval of 95%.

P is the proportion of the mothers delivered that develop puerperal sepsis = 30.9%% (estimated from Mulago study by Ngozi et al, 2016)

D is the degree of accuracy= 0.05.

Q= (1-P) which is the population of mothers that did not develop puerperal sepsis.

Therefore, $N= 1.96^2 \text{ X } 0.309 (1-0.309) / (0.05)^2 = 329$.

3.4. SAMPLING TECHNIQUE

Consecutive sampling technique was applied where all the consenting mothers meeting the inclusion criteria were recruited till the sample size required was achieved.

3.5. DATA COLLECTION METHOD

The researcher utilized chiefly patients' records and case sheets to obtain most of the data. The study was more of a prospective follow-up study that was based mainly on record review and case

follow-up. Additional information like height and weight of patients was measured by the researcher to enable calculation of body mass index (BMI)

3.6. DATA COLLECTION TOOLS AND PROCEDURE

Patient's details were obtained from the patient's file. Weighing scales and heightometers were used so as to facilitate BMI calculation.

3.7. QUALITY CONTROL

Patient demographic data and bio data was counterchecked by asking the patient where possible. Researcher performed the actual weighing and height measurement to ensure accuracy. Two research assistants were recruited and trained for the study.

3.8. DATA ANALYSIS

BMI computation was performed from standard BMI charts using the weight (Kg) and height (m^2) of the patient. Data was exported to SPSS version 17. Using double entry, the data was cross checked for consistency and accuracy. Values were tallied, and means calculated where necessary.

3.9. ETHICAL CONSIDERATIONS

Clearance was obtained from Kampala International University-Western Campus faculty of clinical medicine & dentistry through IREC. Informed consent from the respondents was sought both verbally and in writing. Participants were assured of confidentiality and use of the information obtained only for the purpose of the research. Participation was fully out of the respondents' choice with the right to pull out at any time, whenever they no longer felt comfortable to continue. Their participation, or its lack thereof, did not in any way influence any condition-related services they were already getting or were bound to get at any time from the Hospital or staff involved.

CHAPTER FOUR: STUDY FINDINGS

4.0.INTRODUCTION

This chapter deals with the results obtained from the study and presents the demographic characteristics of the study population, prevalence of puerperal sepsis, factors associated with puerperal sepsis and the different outcomes observed. A total of 284 women took part in the study. This made about 86.32% of the calculated sample size of 329 but is still a valid representative number.

4.1. DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENTS

4.1.1. Age of Respondents (N=284)

AGE (YRS.)	FREQUENCY (N)	PECENTAGE (%)
15 – 19	22	7.74
20 – 24	47	16.55
25 – 29	94	33.10
30 – 34	69	24.30
35 – 39	36	12.68
40 – 44	14	4.93
45 – 49	2	0.70
TOTALS	**284**	**100**

Table 1: Ages of mothers delivered at FPRRH

A seen from table 1 above, the women were aged between 15 and 49 years with a mean age of 28.76 years. A majority (86.63%) of them were aged between 20 years and 39 years of age. Only 16 (5.63%) were aged 40 years and above while 22 (7.74%) were aged below 20 years.

4.1.2. Marital Status of Respondents (N=284)

MARITAL STATUS	**FREQUENCY (N)**	**PERCENTAGE (%)**
NOT MARRIED	79	27.82
MARRIED	143	50.35
SEPARATED / DIVORCED	62	21.83
TOTALS	**284**	**100**

Table 2: Marital status of the women delivered at FPRRH

From table 2 above, we see that 143 (50.35%) of the women delivered at FPRRH were married, followed by the unmarried (single) at 27.82% and lastly, 62 (21.83%) separated or divorced.

4.2.3. Religion of Respondents (N=284)

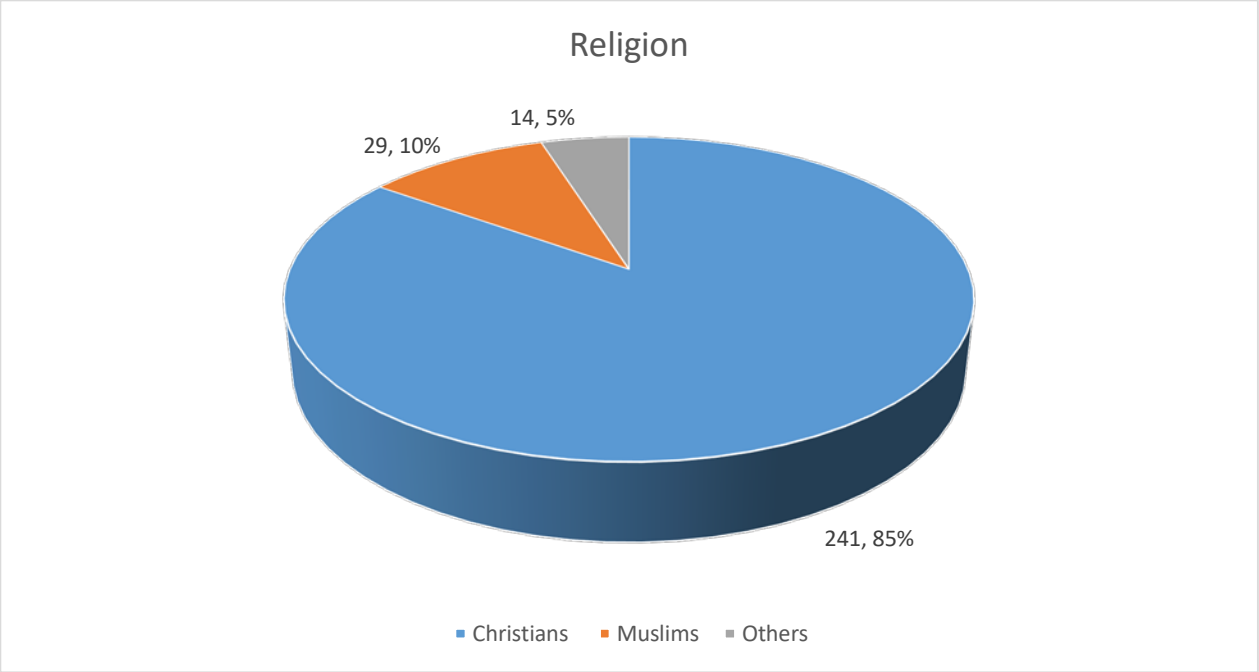


Figure 2: Religious affiliations of women delivered at FPRRH

Most women delivered at FPRRH were Christians – 241 (85%) of them to be precise. Muslims followed closely with 10% while those that belonged to other religions such as traditionalists were 14 (5%). This is shown in figure 2 above.

4.2. PREVALENCE OF PUERPERAL SEPSIS

A total of 284 women took part in the study whereby 12 (4.23%) were categorized as overweight to obese, 38 (13.38%) were HIV-positive, 108 (38.03%) were primigravida and 144 (50.70%) were delivered via caesarean section (CS). Of the 284 women 7 (2.47%) had features qualifying a diagnosis of puerperal sepsis. These 7 were then closely followed up and the various risk factors under study such as CS delivery, underlying comorbidity, obesity, PROM, parity, social economic status and pregnancy outcome were deeply explored. Most of the variables were univariately analyzed for individual significance as a factor affecting puerperal sepsis.

4.3. FACTORS ASSOCIATED WITH PUEPERAL SEPSIS

4.3.1. Mode of Delivery and Puerperal Sepsis (N=7)

The mode of delivery for the seven that had the diagnosis of puerperal sepsis were checked for any observable correlation with puerperal sepsis. The findings were as shown in the figure 3 below.

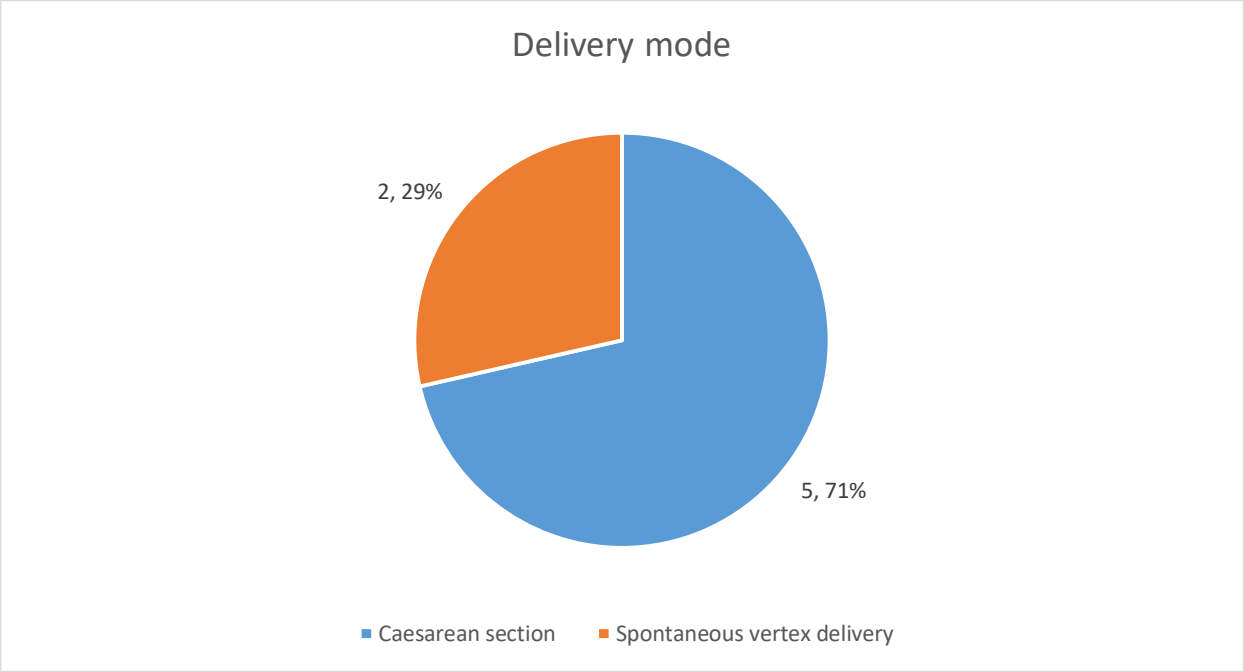


Figure 3: Mode of delivery among those diagnosed with puerperal sepsis

5 (71%) of those with the diagnosis of puerperal sepsis had undergone caesarean section as compared to only 2 (29%) who had delivered SVD. By univariate comparison alone, CS has a higher incidence of puerperal sepsis compared to SVD. The pregnancies were singleton with no multiple gestations reported. 2 (28.57%%) of them had reported PROM.

4.3.2. Underlying Comorbid Conditions and Puerperal Sepsis

5 (71.43%) of those with puerperal sepsis were also HIV-positive, 4 (57.14%) were anemic, and 2 (28.57%) were diabetic. None of them was found to be overweight or obese, they were all within the normal range as per their BMI scores. No history of hypertensive disorders, malaria or cancers were reported either among this cohort.

4.3.3. Parity/Gravidity and Puerperal Sepsis

There were 108 (38.03%) primigravidae in total while the multiparous women were 176 (61.97%) of the women under study. Of the 7 with puerperal sepsis, 3 were primigravid while 4 were multiparous. This is presented in the 2 by 2 table below for proper analysis and interpretation.

	Nulliparous	**Multiparous**	**TOTALS**
Developed Sepsis	3	4	7
Did not Develop Sepsis	105	172	277
TOTALS	108	176	284

Table 3: Odds of developing puerperal sepsis in nulliparous v/s multiparous women

From table 3 above, the odds of developing puerperal sepsis among nulliparous women was found to be slightly higher than in multiparous women (OR=1.23).

4.4. OUTCOMES / SEQUALAE OF PUERPERAL SEPSIS AMONG RESPONDENTS (N=7)

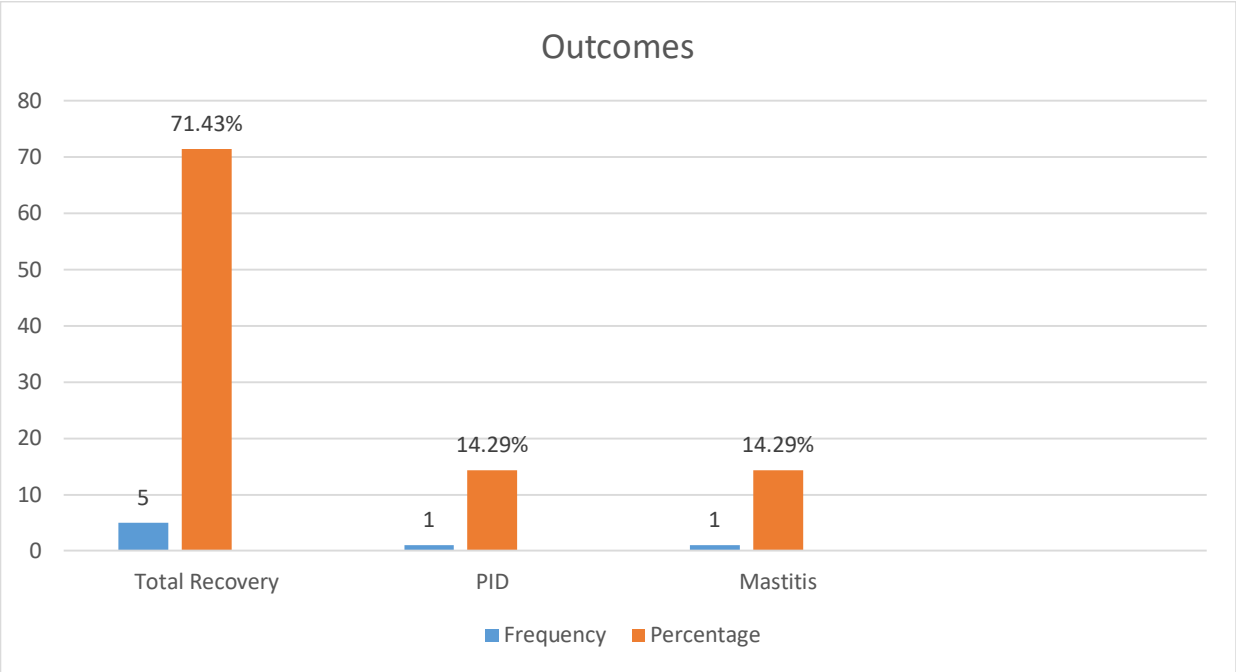


Figure 4: Different outcomes in those who developed puerperal sepsis

All of the seven that developed puerperal sepsis had their hospital stay prolonged so that to allow for management. 5 (71.43%) of them recovered fully and were discharged, albeit later than they would have been, 1 (14.29%) developed mastitis, while the other 1 (14.29%) developed PID. Both were appropriately managed and later discharged. None of the other complications were reported or observed and none died.

CHAPTER FIVE: DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.0.INTRODUCTION

This chapter deals with the discussion of the study findings, conclusions derived from the results and the recommendations made to the various parties concerned.

5.1. DISCUSSION OF STUDY FINDINGS

5.1.1. PREVALENCE OF PUERPERAL SEPSIS

The prevalence of puerperal sepsis was found to be 2.47% which fell within the range reported by (Bartlett et al., 2016). Though lower, these findings mirror closely those by (Bonet et al., 2015) with the slight difference being attributable to variations in region, population dynamics, study designs and study periods. The other difference that was evident from the (Bonet et al., 2015) study was the report that puerperal sepsis contributes up to 10% in maternal mortality. The case mortality in our study was zero! This too could be attributed to differences in study populations, sample sizes and duration of study. Studies with findings similar to ours included (Low et al., 2013) and (Ngonzi et al., 2018) in MRRH but South Africa had a slightly lower value (1.5%) than this (Johnson & Buchmann, 2012). All this variation falls within the WHO-reported range.

5.1.2. FACTORS ASSOCIATED WITH PUERPERAL SEPSIS

On the factors found to have a significant association with puerperal sepsis, mode of delivery, history of premature rupture of membranes, comorbid conditions and parity showed clear relation. Just like in (Bonet et al., 2015) and (Chun-Hai Fung, Cheung, Fu, Ip, & Tsz Ho Tse, 2016), caesarean section stood out as the single most important risk factor for puerperal sepsis. Comorbid conditions such as anaemia was also a factor just as in (Khaskheli et al., 2013) study in Pakistan though personal hygiene and sterilization practices were not within the scope of our study. HIV-seropositivity also emerged as a risk factor for puerperal sepsis just like in (Ngonzi et al., 2016) Mulago study though it did not contribute to deaths as reported in that study.

PROM was also a significant contributor, just as reported in (Aboyeji, Ijaiya et al., 2012), and together with anemia and primiparity (Bartlett et al., 2016) increased risk of development of postpartum infection.

5.1.3. OUTCOMES OF PUERPERAL SEPSIS

For outcome/sequel, full recovery, PID and, mastitis with prolongation of hospital stay were reported in our study. No other complications, including death, were reported though and by this aspect only, our findings differ from those by (Khaskheli et al., 2013) in their study conducted in

Liquat University in Pakistan where they reported that DIC is a common sequalae and cause of death in puerperal sepsis patients.

5.2. CONCLUSION

Prevalence of puerperal sepsis in FPRRH, though on the lower end of the WHO-reported range 0f 2 -10%, still needs to drop further, to even zero if possible and caesarean section stood out as the strongest predictor of puerperal sepsis. Other predictors were history of PROM, presence of HIV, anemia and DM as comorbidities and parity. Obesity was not found to be of statistical significance in as far as risk for puerperal sepsis was concerned.

5.3. RECOMMENDATIONS

5.3.1. To the pregnant mothers

To ensure ANC attendance as early and as regularly as possible when pregnant since all the factors found significant such as anemia, HIV, and DM can be screened and controlled, if not completely managed, at the antenatal clinic and thus reduce their contribution to postpartum infection later.

5.3.2. To health staff at FPRRH

Though the incidence values for puerperal sepsis appear acceptably low, still much can be done to reduce it further almost neat to or equal to zero. Timely screening, diagnosis and treatment of comorbid conditions together with strict adherence to aseptic techniques and infection control measures could lower it even further. Revitalize efforts towards the war against HIV/AIDS since the prevalence of 13.38% among the pregnant women is still too high.

5.3.3. To fellow Researchers

So many questions that need answering have been come up with this study. Some aspects were outside the scope of this study and thus they can pick up from where this study left or did not tackle. For example, healthcare-associated factors affecting puerperal sepsis were not studied here plus ways in reducing puerperal sepsis to almost zero could also be studied. Similar studies could be conducted in other health facilities within the region and the country.

REFERENCES

Aboyeji, Ijaiya, F., Sinha, P., Mrcpi, F., Diped, D., Mrcogb, M. O., Khaskheli, M. N., … Bleker, O. P. (2012). Risk factors and complications of puerperal sepsis at a tertiary healthcare centre. *Matrenal And Infant Death-SG*, *29*(4), 2–17. https://doi.org/10.1017/CBO9781107784758.011

Ahmed, M. I., Alsammani, M. A., & Ali, R. (2013). Puerperal Sepsis in a Rural Hospital in Sudan. *Mat Soc Med.*, *25*(1), 19–22. https://doi.org/10.5455/msm.2013.25.19-22

Bartlett, L. A., LeFevre, A. E., Mir, F., Soofi, S., Arif, S., Mitra, D. K., … Ahmed, S. A. (2016). The development and evaluation of a community-based clinical diagnosis tool and treatment regimen for postpartum sepsis in Bangladesh and Pakistan. *Reproductive Health*, *13*(1), 16. https://doi.org/10.1186/s12978-016-0124-1

Bonet, M., Oladapo, O. T., Khan, D. N., Mathai, M., & Gülmezoglu, A. M. (2015). New WHO guidance on prevention and treatment of maternal peripartum infections. *The Lancet Global Health*, *3*(11), e667–e668. https://doi.org/10.1016/S2214-109X(15)00213-2

Chun-Hai Fung, I., Cheung, C.-N., Fu, K.-W., Ip, P., & Tsz Ho Tse, Z. (2016). Incidence and risk factors for surgical site infections in N'Gaoundéré Regional Hospital, Cameroon. *AJIC: American Journal of Infection Control*, *44*(10), 1195–1196. https://doi.org/10.1016/j.ajic.2016.04.248

Cunningham, G. (2014). *Williams Obstetrics*. (B. C. Steven Bloom, Catherine Spong, Ed.) (24th ed.). New York: McGraw Hill Medical.

Johnson, A. N. (2012). Puerperal infection after caesarean section at Chris Hani Baragwanath Academic Hospital , Johannesburg. *South African Journal of Obstetrics and Gynaecology*, *18*(3), 9–12. https://doi.org/10.7196/SAJOG.559

Johnson, A. N., & Buchmann, E. J. (2012). Puerperal infection after caesarean section at Chris Hani Baragwanath Academic Hospital, Johannesburg. *South African Journal of Obstetrics and Gynaecology*. https://doi.org/10.7196/sajog.559

Khaskheli, M. N., Baloch, S., & Sheeba, A. (2013). Risk factors and complications of puerperal sepsis at a tertiary healthcare centre. *Pakistan Journal of Medical Sciences*, *29*(4).

Low, S., Cddep, Khaskheli, M. N., Baloch, S., Sheeba, A., Shagufta, Q., … Ali, R. (2013). Puerperal sepsis--still a major threat for parturient. *Journal of Liaquat University of Medical & Health Sciences*, *22*(4), 1–8. https://doi.org/10.4997/JRCPE.2011.411

Ngonzi, J., Bebell, L. M., Fajardo, Y., Boatin, A. A., Siedner, M. J., Bassett, I. V., … Riley, L. E. (2018). Incidence of postpartum infection, outcomes and associated risk factors at Mbarara regional referral hospital in Uganda. *BMC Pregnancy and Childbirth*, *18*(1), 1–11. https://doi.org/10.1186/s12884-018-1891-1

Ngonzi, J., Tornes, Y. F., Mukasa, P. K., Salongo, W., Kabakyenga, J., Sezalio, M., … Van Geertruyden, J.-P. (2016). Puerperal sepsis, the leading cause of maternal deaths at a Tertiary University Teaching Hospital in Uganda. *BMC Pregnancy and Childbirth*, *16*(1), 207. https://doi.org/10.1186/s12884-016-0986-9

Say, L., Chou, D., Gemmill, A., Moller, A. B., Daniels, J., G??lmezoglu, A. M., … Alkema, L. (2014). Global causes of maternal death: A WHO systematic analysis. *The Lancet Global Health*, *2*(6), 323–333. https://doi.org/10.1016/S2214-109X(14)70227-X

Sayinzoga, F., Bijlmakers, L., van Dillen, J., Mivumbi, V., Ngabo, F., & van der Velden, K. (2016). Maternal death audit in Rwanda 2009–2013: a nationwide facility-based retrospective cohort study. *BMJ Open*, *6*(1), e009734. https://doi.org/10.1136/bmjopen-2015-009734

Sustainable Development Solutions Network. (2014). *Indicators for Sustainable Development Goals*. *United Nations*. https://doi.org/10.3390/su5072840

The Global Health Network. (2014). Maternal Sepsis. *The Geneva Foundation for Medical Education and Research*.

The United Nations. (2015). *Sustainable Develpment Goals*.

van Dillen, J., Zwart, J., Schutte, J., & van Roosmalen, J. (2010). Maternal sepsis: epidemiology, etiology and outcome. *Current Opinion in Infectious Diseases*, *23*(3), 249–254. https://doi.org/10.1097/QCO.0b013e328339257c

APPENDICES

APPENDIX ONE: CONSENT FORM

CONSENT FORM

STUDY TITLE: FACTORS & SEQUELAE OF PUERPERAL SEPSIS AMONG WOMEN DELIVERED AT FORT PORTAL REGIONAL REFERRAL HOSPITAL.

I have read and understood the research topic above on the planned study and the explanations given to me. I understand what I have been requested to do in respect to this study. I have asked questions and gotten clarifications about the study and I am satisfied. I have, after due consideration, willingly consented to take part in this study as explained.

Participant's signature …… Date ……...

Investigators name …… Signature ……

Date ……

APPENDIX TWO: DATA COLLECTION INSTRUMENT

A. PATIENT'S DETAILS

SERIAL NO: ……

1. AGE: ……...
2. MARITAL STATUS …….
3. RELIGION: ……

B. RISK FACTORS FOR PUERPERAL SEPSIS

1. PROLONGED RUPTURE OF MEMBRANES (PROM)

YES ☐ NO ☐

2. TYPE OF PREGNANCY SINGLETON ☐ TWIN ☐
3. MODE OF DELIVERY: CS ☐ SVD ☐
4. PARITY: ……
5. UNDERLYING COMORBID CONDITION

YES ☐ NO ☐

WHICH COMORBID CONDITION?

HIV/AIDS ☐

DIABETES ☐

HYPERTENSION ☐

EPILEPSY ☐

CANCER ☐

MALARIA ☐

ANEMIA ☐

OTHERS (SPECIFY) ……...

6. EDUCATION LEVEL: ……...
7. OCCUPATION: …….
8. RESIDENCE RURAL ☐ URBAN ☐
9. NATURE OF RESIDENCE REFUGEE CAMP ☐ CIVILLIAN ☐
10. DISTANCE FROM FPRRH

Less than 1 Km ☐

1 – 2 Km ☐

3 – 5 Km ☐

More than 5 Km ☐

11. TRANSPORT COST TO FPRRH

    1000 UGX ☐

    2000 UGX ☐

    3000 UGX ☐

    5000 UGX ☐

    More than 5000 UGX ☐

12. WEIGHT CLASSIFICATION

    UNDERWEIGHT ☐

    NORMAL WEIGHT ☐

    OVERWEIGHT ☐

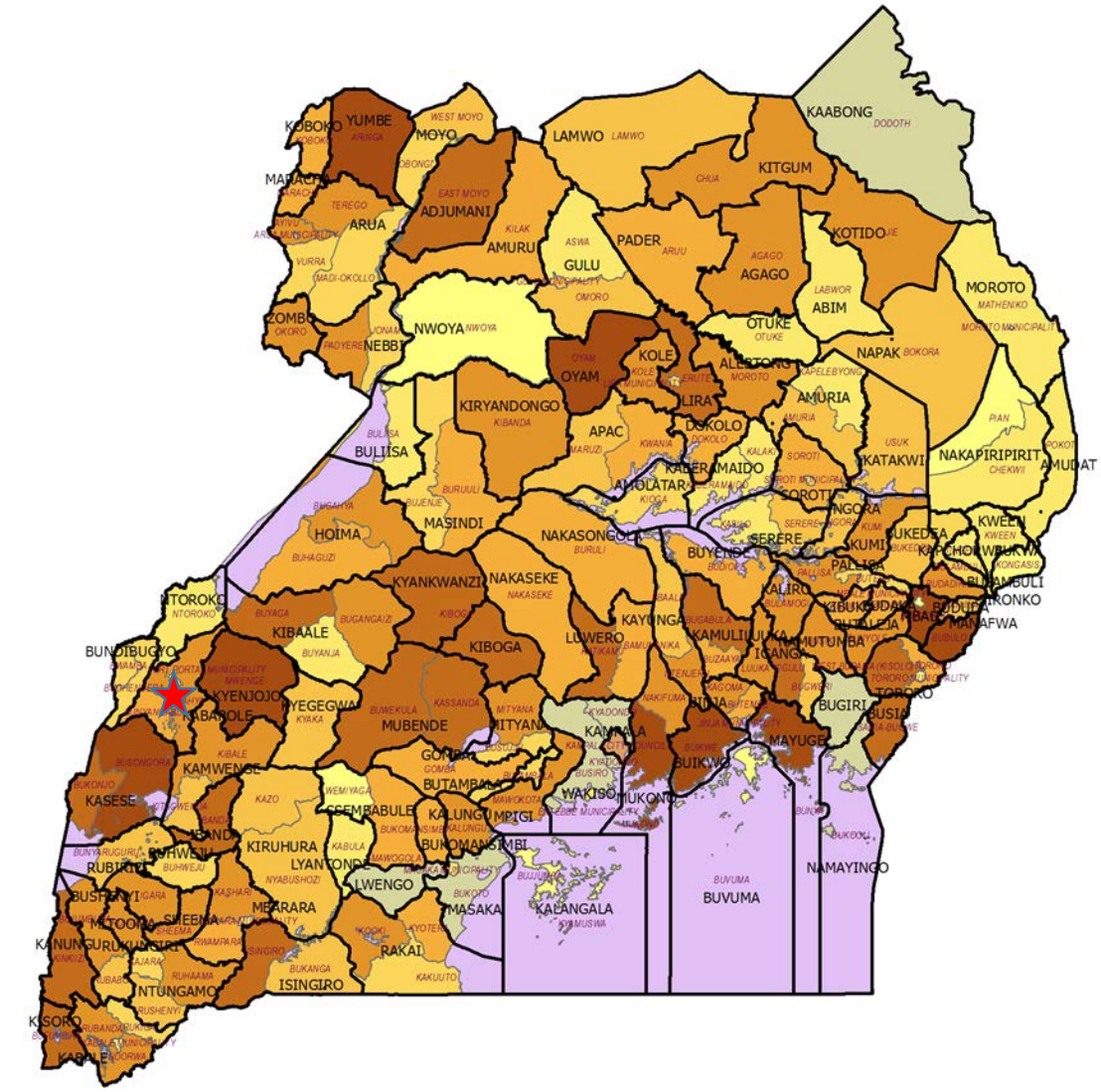
    OBESE ☐

PATIENT HEIGHT	**PATIENT WEIGHT**	**BMI (FROM REFERENCE CHART BELOW)**

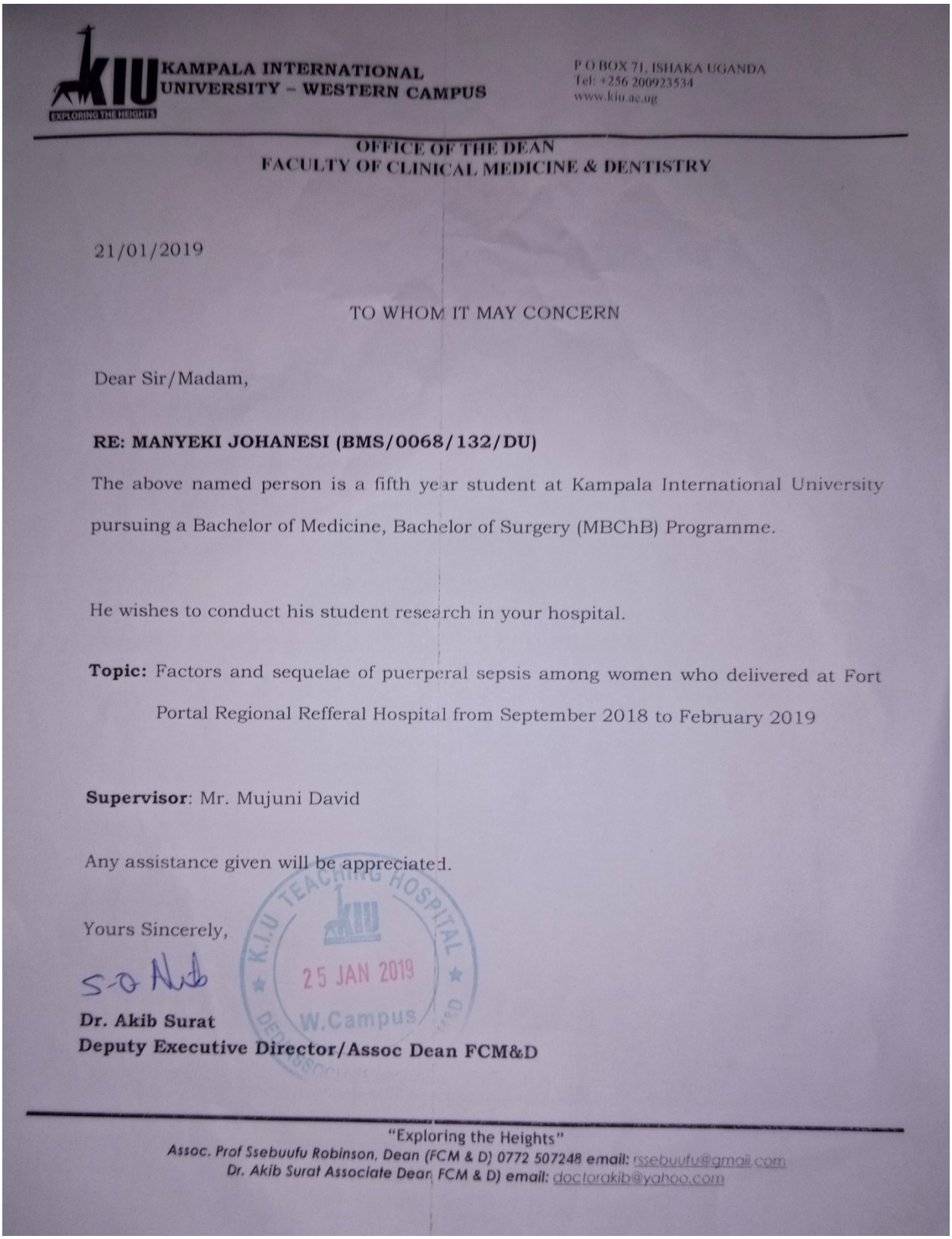
APPENDIX THREE: BMI REFERENCE CHART

WEIGHT lbs	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215
kgs	45.5	47.7	50.0	52.3	54.5	56.8	59.1	61.4	63.6	65.9	68.2	70.5	72.7	75.0	77.3	79.5	81.8	84.1	86.4	88.6	90.9	93.2	95.5	97.7
HEIGHT in/cm	Underweight					Healthy					Overweight					Obese				Extremely obese				
5'0" - 152.4	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
5'1" - 154.9	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	36	37	38	39	40
5'2" - 157.4	18	19	20	21	22	22	23	24	25	26	27	28	29	30	31	32	33	33	34	35	36	37	38	39
5'3" - 160.0	17	18	19	20	21	22	23	24	24	25	26	27	28	29	30	31	32	32	33	34	35	36	37	38
5'4" - 162.5	17	18	18	19	20	21	22	23	24	24	25	26	27	28	29	30	31	31	32	33	34	35	36	37
5'5" - 165.1	16	17	18	19	20	20	21	22	23	24	25	25	26	27	28	29	30	30	31	32	33	34	35	35
5'6" - 167.6	16	17	17	18	19	20	21	21	22	23	24	25	25	26	27	28	29	29	30	31	32	33	34	34
5'7" - 170.1	15	16	17	18	18	19	20	21	22	22	23	24	25	25	26	27	28	29	29	30	31	32	33	33
5'8" - 172.7	15	16	16	17	18	19	19	20	21	22	22	23	24	25	25	26	27	28	28	29	30	31	32	32
5'9" - 175.2	14	15	16	17	17	18	19	20	20	21	22	22	23	24	25	25	26	27	28	28	29	30	31	31
5'10" - 177.8	14	15	15	16	17	18	18	19	20	20	21	22	23	23	24	25	25	26	27	28	28	29	30	30
5'11" - 180.3	14	14	15	16	16	17	18	18	19	20	21	21	22	23	23	24	25	25	26	27	28	28	29	30
6'0" - 182.8	13	14	14	15	16	17	17	18	19	19	20	21	21	22	23	23	24	25	25	26	27	27	28	29
6'1" - 185.4	13	13	14	15	15	16	17	17	18	19	19	20	21	21	22	23	23	24	25	25	26	27	27	28
6'2" - 187.9	12	13	14	14	15	16	16	17	18	18	19	19	20	21	21	22	23	23	24	25	25	26	27	27
6'3" - 190.5	12	13	13	14	15	15	16	16	17	18	18	19	20	20	21	21	22	23	23	24	25	25	26	26
6'4" - 193.0	12	12	13	14	14	15	15	16	17	17	18	18	19	20	20	21	22	22	23	23	24	25	25	26

APPENDIX FOUR: MAP OF UGANDA SHOWING THE LOCATION OF KABAROLE DISTRICT WHERE FPRRH IS FOUND (RED STAR & RED INSET)



APPENDIX FIVE: APPROVAL LETTER TO CONDUCT STUDY



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OFFICE OF THE DEAN
FACULTY OF CLINICAL MEDICINE & DENTISTRY

21/01/2019

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

RE: MANYEKI JOHANESI (BMS/0068/132/DU)

The above named person is a fifth year student at Kampala International University pursuing a Bachelor of Medicine, Bachelor of Surgery (MBChB) Programme.

He wishes to conduct his student research in your hospital.

Topic: Factors and sequelae of puerperal sepsis among women who delivered at Fort Portal Regional Refferal Hospital from September 2018 to February 2019

Supervisor: Mr. Mujuni David

Any assistance given will be appreciated.

Yours Sincerely,

S-O Nub

Dr. Akib Surat
Deputy Executive Director/Assoc Dean FCM&D

K.I.U TEACHING HOSPITAL
25 JAN 2019
W.Campus

"Exploring the Heights"
Assoc. Prof Ssebuufu Robinson, Dean (FCM & D) 0772 507248 email: rssebuufu@gmail.com;
Dr. Akib Surat Associate Dean FCM & D) email: doctorakib@yahoo.com