

# Knowledge and Practices of Health Workers on Prevention of Puerperal Sepsis among Mothers at Fort Portal Regional Referral Hospital

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## ABSTRACT

Puerperal sepsis encompasses infections after birth usually in the first 42 days following the postpartum period and is the major cause of maternal morbidity and rendered the major cause of death worldwide. Globally, puerperal sepsis is estimated to account for 15% of the 500,000 maternal deaths annually. It is the third most common cause of maternal deaths worldwide. The purpose of the study was to assess the Knowledge and Practices of health workers on the prevention of puerperal sepsis among mothers at Fort Portal Regional Referral Hospital, Fort Portal City. The study was a cross-sectional descriptive study design that used quantitative methods. A consecutive sampling method was used to select respondents. The sample size was 96 but 81 respondents were interviewed using self-administered questionnaires, where data was coded, entered using SPSS 20.1 and presented in tables, graphs and pie charts. The results showed that health workers had inadequate knowledge of puerperal sepsis where 30(45.5%) correctly described puerperal sepsis. 31(38.3%) and 29(35.8%) reported repeated vaginal exams and caesarean section as risk factors for puerperal sepsis, respectively. Practices of health workers to prevent puerperal sepsis are hand washing 45(55.5%), wearing gloves 81(100%), screening for risk factors 76(93.6%) and use of prophylactic antibiotics. In conclusion, health workers have inadequate knowledge of puerperal sepsis prevention and good practices on puerperal sepsis prevention. And the researcher recommends that all health workers in the maternity ward should undergo special training on puerperal sepsis prevention methods and more research to evaluate the techniques of the practices applied and their association with the prevention of puerperal sepsis be conducted.

**Keywords:** Puerperal sepsis, Infections after birth, Postpartum period, health workers, Caesarean section.

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## INTRODUCTION

Puerperal infections date back to at least the 5th century BCE in the writings of Hippocrates [1]. These infections were a very common cause of death around the time of childbirth starting in at least the 18<sup>th</sup> century until the 1930s when antibiotics were introduced. In 1847, in Austria, Ignaz Semmelweis through the use of hand washing with chlorine decreased death from the disease from nearly 20% to 2% [2]. In the 19<sup>th</sup> century,

Igaz Semmelweis showed that puerperal sepsis was contagious and that it could be prevented with adequate hand hygiene. An obstetrician called Alexander Gordon was the first to prove the contagious nature of puerperal sepsis and he also advocated the need for good hygiene for its prevention in a thesis published in 1795 [3], [4]. Puerperal sepsis is a genital tract infection occurring at any time within the rupture of extra placental membranes or labour and

the 42<sup>nd</sup> day postpartum, characterized by symptoms like pelvic pain, fever (oral temperature of 38.5°C or higher on any occasion), abnormal vaginal discharge (the presence of pus and abnormal smell/foul odour), and delay in the involution of the uterus [5]. The predisposing factors to puerperal sepsis include anaemia in pregnancy, prolonged labour, frequent vaginal examination, premature rupture of membranes, and use of unsterilized or unwashed instruments during delivery [6]. A variety of bacterial pathogens has been implicated in causing puerperal sepsis including a wide range of anaerobes like peptostreptococcus, clostridia, pseudomonas and bactericides fragilis and facultative aerobes such as E. coli, enterococci, klebsiella spp, beta-hemolytic Streptococci and staphylococci [7]. Group A streptococcus (GAS) is the most feared pathogen and up to 30% of the population are asymptomatic carriers of GAS [8]. Puerperal sepsis is one of the five leading causes of maternal mortality worldwide and accounts for 15% of all maternal deaths annually [8]. Postpartum sepsis accounts for most maternal deaths between three and seven days postpartum, the rate of an incidence is very high and consequently the mother and newborn virtually higher infection risk [9]. In developed countries such as the USA, the rate of puerperal sepsis has declined significantly. For example, in the USA, puerperal sepsis in only 5.5% of vaginal deliveries and 7.4% of caesarean section deliveries [10]. Low-resource countries account for 99% (286000) of 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% [11]. A study conducted in Nandi County, Kenya revealed that there was a lack of knowledge on the aetiology of infection and healthcare care facilities were short of the adequate prerequisites to perform puerperal sepsis awareness both in the clinic and community [12]. In Uganda, puerperal sepsis is the leading cause of maternal death accounting for 30.9% of the direct causes of Maternal Mortality at Mbarara RR Hospital. The current Maternal

Mortality Ratio (MMR) in Uganda is 438 per 100,000 live births coming from 550 per 100,000 in 1990. Mortality rates are thought to be higher in areas that lack proper sanitation [11].

#### **Statement of Problem**

Globally, puerperal sepsis is estimated to account for 15% of the 500,000 maternal deaths annually [10]. And it is the third most common cause of maternal death worldwide after haemorrhage and abortion [13]. Despite maternal mortality decreasing by around 44% between 1990 and 2015, recent reports suggest that cases of puerperal sepsis are on arise [14]. Countries in developing regions, especially in sub-Saharan Africa still have a problem as far as the reduction of maternal mortality [15]. Uganda's current maternal mortality ratio is very high with puerperal sepsis being the leading cause. At Mbarara RR Hospital, puerperal sepsis accounted for 31% of maternal deaths, making it the most common cause of maternal mortality at the facility [11]. The major consequences of puerperal sepsis are pelvic inflammatory disease leading bilateral tubal occlusion and infertility, pelvic peritonitis, wound infection, necrotizing fasciitis, anaemia, chronic pelvic pain, ectopic pregnancy, psychological morbidity and maternal mortality [16].

Puerperal sepsis is however a preventable cause of maternal death through improved hygiene, the use of low-cost novel antibiotics for prophylaxis and treatment, ensuring that births occur with the assistance of skilled health personnel, access to obstetric care and an effective referral system. The Millennium Development Goals 5 and Sustainable Development Goal 3 target improving maternal health and ensuring good health and well-being respectively, and some developed countries have made strides toward achieving these targets [17]. It's why the researcher is doing this study to give informed recommendations for corrective interventions.

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

To assess the Knowledge and Practices of health workers on the prevention of puerperal sepsis among mothers at FPRRH

### Specific Objectives

- i. To assess the knowledge of health workers on the prevention of puerperal sepsis among mothers at FPRRH
- ii. To assess practices of health workers on the prevention of puerperal sepsis among mothers at FPRRH

### Research questions

- What is health workers' knowledge towards the prevention of puerperal sepsis among mothers at FPRRH?
- What are the health workers' practices towards the prevention of puerperal sepsis among mothers at FPRRH?

## METHODOLOGY

### Research design

The study was a cross-sectional descriptive study [18] that employed quantitative data collection methods. The researcher selected the above method because it allows easy collection of data at a single point in time.

### Area of Study

The place of study was FPRRH in Fort Portal City, Kabarole District. FPRRH serves the area of Fort Portal City and districts Kabarole, Kasese, Bunyangabu, Kamwenge and Bundibugho districts. The Hospital is linearly located in, Western Uganda. The hospital has departments ranging from paediatrics, ART clinic, Maternity, antenatal services, outpatient department, inpatient departments, ophthalmology, ENT, Dental Surgery and Rehabilitation (physiotherapy and occupational therapy). The study was conducted specifically in the maternity ward where cases of puerperal sepsis were basically found. The researcher selected this Hospital because of its status as a regional referral hospital.

### Study population

The study targets all qualified health workers including doctors and nurses.

### Inclusion criteria

All health workers working in the maternity ward.

### Exclusion criteria

All health science students and qualified health workers in other departments did not participate in this study. Health workers in other departments (e.g. Laboratory, paediatrics and medical wards Radiology and Rehabilitation departments) were excluded. Also, unwilling health workers working in the maternity ward were excluded from this study.

### Data Collection Procedures

Data were collected by administering a questionnaire to a single participant. The

### Sample size determination

The required sample size was determined using Slovin's (1960) formula with a precision of +/-5% at a confidence level of 95%.

The formula was given by the expression below.

$$N = \frac{n}{1 + n(E)^2}$$

Where;

N = Number of participants.

n = Target population, n=56 (Maternity ward has about 56 health workers who fit inclusion criteria for this research).

E = Fixed error, E= 0.05

Therefore;

$$N = \frac{56}{1 + 56(0.05)^2}$$

$$N = \frac{56}{1 + 0.14}$$

$$N = \frac{56}{1.14}$$

N = 49.1, therefore 49 participants were recruited for the study.

### Dependent variable

- Prevention of Puerperal sepsis at FPRRH, Fort Portal City.

### Independent variables

- Health workers' knowledge on prevention of puerperal sepsis at FPRRH, Fort Portal City.
- Health workers' practices to prevent puerperal sepsis at FPRRH, Fort Portal City.

### Sampling procedure

A consecutive sampling technique was used, where every participant meeting the inclusion criteria was selected until the required sample size was achieved, and a form of non-probability sampling method was used. This is because there was no sampling frame available for this type of study design especially for the first-time respondents. The researcher administered questionnaires to the respondents.

## RESULTS

researcher explained to the respondents the research project, the purpose, and the kind of questions that were asked.

Confidentiality was assured, consent was asked for and a consent form was signed. Filling out the questionnaire could take spend 10 to 20 minutes. At the end of filling out the questionnaire by the respondent, the researcher thanked the respondent for their cooperation.

#### **Data management**

This involved manual checking for errors and omissions in the filled tools to ensure consistency, completeness, validity, relevancy and accuracy of the data that was collected this was done every day after data collection and every respondent would be counted once.

#### **Data Analysis**

Data were analyzed using Microsoft Excel, calculators and papers and also SPSS version 20.1. Data analysis started by allocating codes for each question, tallying, counting frequencies and computing percentages. Tabulation was done and data was put in their respective figures. This was done to facilitate the process for easy analysis and interpretation of the findings. The percentages were further analyzed by establishing the relationship between the independent and the dependent variables where the information obtained was

Allan presented using the cross-tabulation method (cross-tabulation analysis) and hence appropriate tables, graphs, and pie charts among others.

#### **Quality Control**

The researcher trained the research assistants prior to data collection. The research questionnaires were first administered to 30 respondents prior to the date of data collection for the purpose of pretesting and ensuring validity.

#### **Ethical Consideration**

All participants were informed about the nature of the study and they were given the option of withdrawing from the study or omitting answering certain questions without any negative repercussions [19]. Anonymity and confidentiality were assured. Ethical approval was obtained from the Research and Ethics Committee of KIU-WC before data collection.

#### **Socio-demographics of health workers on prevention of puerperal sepsis.**

Respondents were identified by gender, designation, working experience and level of education, owing to the nature of the study and interpreting data from the field regarding the knowledge and practices of health workers on the prevention of puerperal sepsis.

**Table 1: The socio-demographics of the respondents**

VARIABLE	FREQUENCY (n)	PERCENTAGE (%)
n=49		
<b>GENDER</b>		
Male	21	42.9
Female	28	57.1
<b>Total</b>	<b>49</b>	<b>100</b>
<b>DESIGNATION</b>		
Midwife	16	32.7
Nurses	22	44.9
Clinical officer	05	10.2
Medical officers	6	12.2
<b>Total</b>	<b>49</b>	<b>100</b>

Table 1 above shows that the majority of 28 (57.1%) of the respondents were female and that 21 (42.9%) were male. It also shows that majority 22(44.9%) of the

respondents were nurses, 16(32.7%) were midwives, 06(12.2%) were medical officers and minority 05(10.2%) were clinical officers.

**Table 2: Working experience and level of education of respondents**

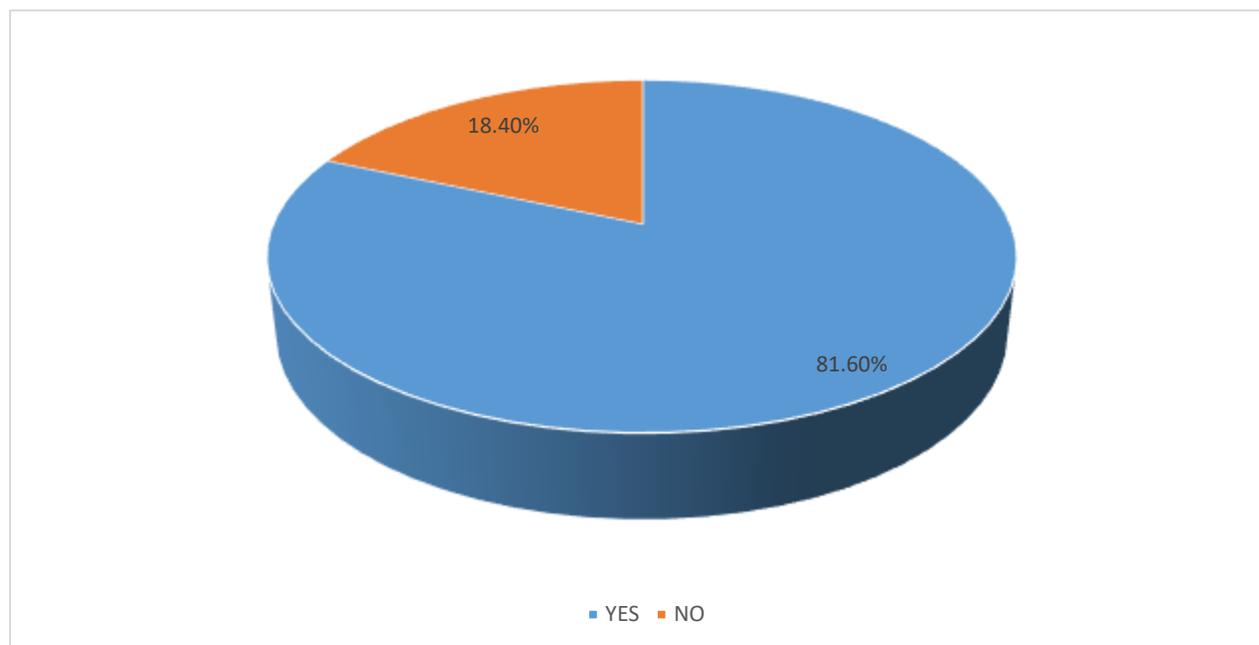
N=49

VARIABLE	FREQUENCY(n)	PERCENTAGE (%)
<b>Working experience</b>		
1-3 years	24	49.0
4-6 years	14	28.6
More than 6 years	11	22.4
<b>Total</b>	<b>49</b>	<b>100</b>
<b>Level of education</b>		
Certificate	17	34.7
Diploma	25	51.0
Bachelor's degree	7	14.3
Masters	00	00
<b>Total</b>	<b>49</b>	<b>100</b>

Table 2 above shows that the majority 24(49.0%) of the respondents had worked for a duration of 1-3 years, 14(28.6%) for a duration of 4-6 years and a minority of the respondents 11(22.4%) had worked for more than 6 years. It also shows that the

majority 25(51.0%) of the health workers were diploma holders, 25(34.7%) had a certificate and the minority 7(14.3%) of the health workers were degree holders. No respondents had a master's degree.

### Health workers' knowledge of the prevention of puerperal sepsis



**Figure 1 shows health workers' knowledge of puerperal sepsis**

Figure 1 above shows that the majority of 40(81.6%) of the respondents had knowledge of puerperal sepsis and the minority 09(18.4%) of the respondents had no knowledge of puerperal sepsis.

**Table 3: Description of puerperal sepsis by health workers regarding knowledge of puerperal sepsis**

Variable	Frequency (n)	Percentage (%)
n=49		
<b>Description of puerperal sepsis</b>		
Bacterial infection of the female reproductive tract after childbirth/miscarriage in 6 weeks	21	42.8
Infection of mother after delivery in 6 weeks	14	28.6
Infection after delivery by caesarian section in 6 weeks	09	18.4
Infection of newborn baby in 6 weeks	05	10.2
<b>Total</b>	<b>49</b>	<b>100</b>
Correct description	21	42.8
Incorrect description	28	57.2
<b>Total</b>	<b>49</b>	<b>100</b>

Table 3 above shows that 21(42.8%) of health workers described puerperal sepsis as a bacterial infection of the female

reproductive tract after childbirth in 6 weeks, 14(28.6%) described it as an infection of the mother after childbirth in

6 weeks, 09(18.4%) described it as infection of a mother after delivery by caesarian section in 6weeks and least 05(10.2%) of the respondents described puerperal sepsis as the infection of the newborn baby within 6 weeks. The table

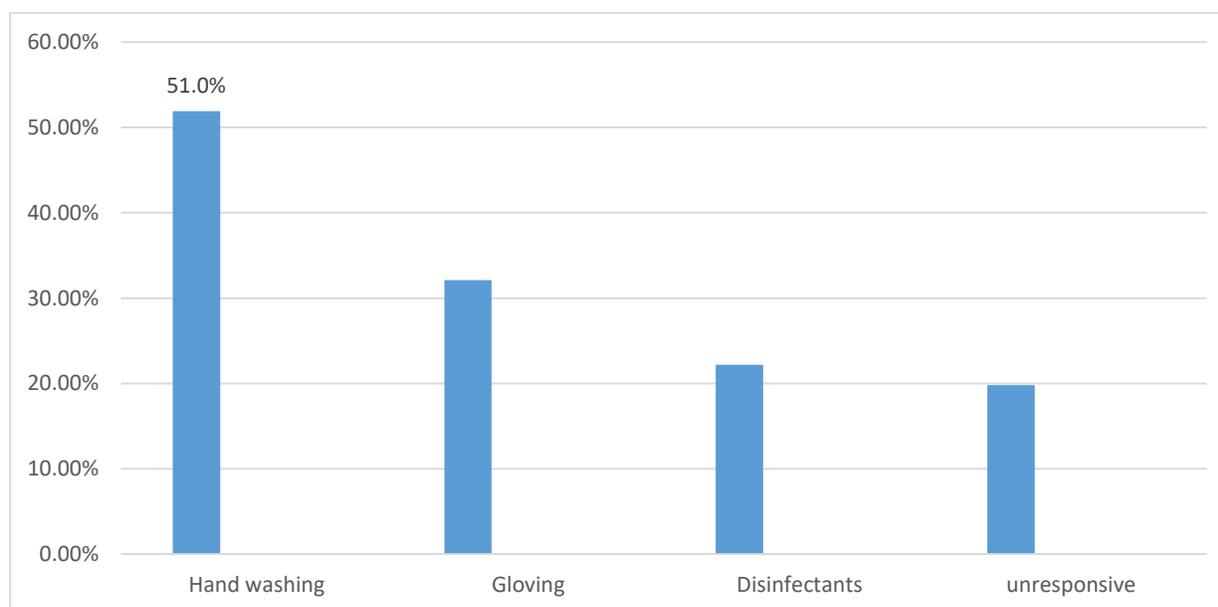
also shows that the majority 28(57.2%) of the respondents described puerperal sepsis incorrectly and that a significant number 21(42.8%) of the respondents described puerperal sepsis correctly.

**Table 4: Knowledge of the signs and symptoms of puerperal sepsis**  
n=49

Variable	Frequency(n)	Percentage (%)
<b>Knowledge of signs and symptoms of puerperal sepsis</b>		
Yes	39	79.6
No	10	20.4
<b>Total</b>	<b>49</b>	<b>100</b>
<b>Identifying signs and symptoms of puerperal sepsis</b>		
Able to identify signs and symptoms of puerperal sepsis as fever, abdominal pain and bad smelling per vaginal discharge	37	75.5
Unable to identify signs and symptoms of puerperal sepsis	12	24.5
<b>Total</b>	<b>49</b>	<b>100</b>

Table 4 above shows that the majority 39(79.6%) of the respondents indicated that they knew the signs and symptoms of puerperal sepsis while the minority 10(20.4%) did not. It also shows that the

majority 37(75.5%) of the respondents were able to identify correctly the signs and symptoms of puerperal sepsis while the minority 12(24.5%) were unable.



**Figure 2: components of hand hygiene suggested by health workers**

Figure 2 above shows that the majority 25(51.0%) of the respondents mentioned washing hands while the minority 11(22.2%) of the respondents mentioned

the use of disinfectants. 15(30.6%) mentioned putting on gloves while 10(20.4%) did not respond.

**Table 5 shows health workers' responses on the role of hand hygiene in the prevention of puerperal sepsis**

Variable	Frequency(n)	Percentage (%)
<b>n=49</b>		
<b>Whether hand hygiene is important in puerperal sepsis prevention</b>		
Yes	38	77.6
No	11	22.4
<b>Total</b>	<b>49</b>	<b>100</b>
<b>How hand hygiene prevents puerperal sepsis</b>		
Eradicates bacteria	09	18.4
Reduces infection spread	25	51.0
Unresponsive	15	30.6
<b>Total</b>	<b>49</b>	<b>100</b>

Table 5 shows that the majority 38(77.6%) of the health workers accepted that hand hygiene is important in the prevention of puerperal sepsis while the minority 11(22.4%) did not accept. It also shows that the majority 25(51.0%) of the respondents suggested that hand hygiene prevents

puerperal sepsis by reducing the spread of infection/microorganisms while the minority 09(18%) of the respondents suggested that hand hygiene prevents puerperal sepsis by eradicating the bacteria. A significant number of 15(30.6%) health workers did not suggest anything.

**Table 6: showing suggested risk factors for puerperal sepsis**

Risks to puerperal sepsis	Frequency (n)	Percentage (%)
<b>n=49</b>		
Anaemia/malnutrition	22	44.9
Early rupture of membrane/ Prolonged labour	30	61.2
Repeated vaginal Examinations	18	36.7
Caesarian section delivery	18	36.7
Urinary tract infections	24	49.0
Chronic illnesses eg DM, HIV	25	51.0
Retained products of conception/manual removal of placenta	10	20.4

Table 6 above shows that most 30(61.2%) responses indicated early rupture of membranes and prolonged labour as a risk factor of puerperal sepsis while retained products of conception and manual removal of placenta as the least 10(20.4%) risk factors. A significant number of

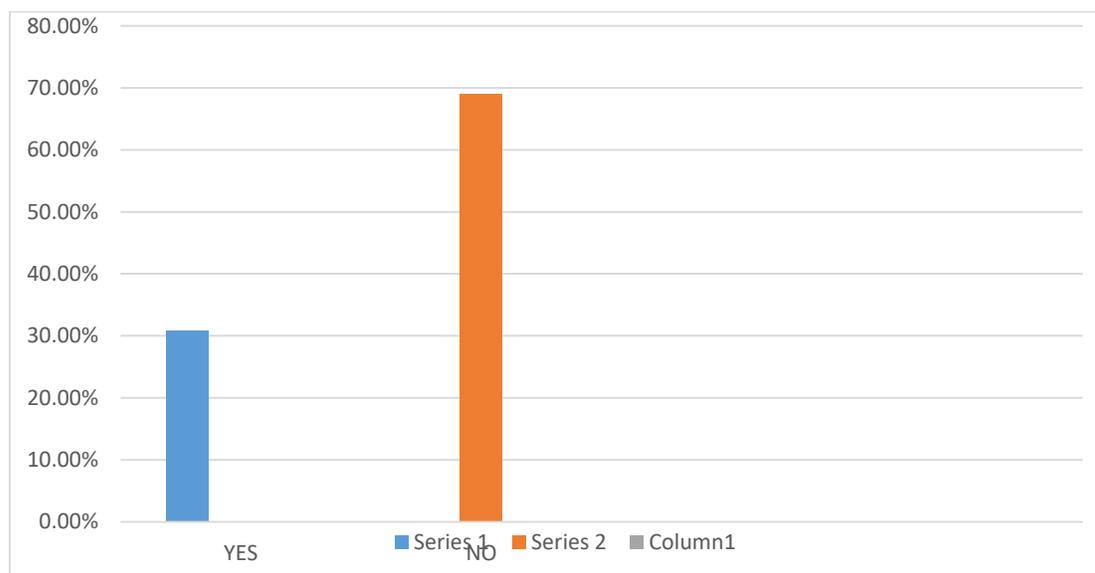
responses indicated chronic illnesses like HIV/AIDS and DM 25(51.0%), Urinary Tract Infection 24(49.0%), caesarian section 18(36.7%), repeated vaginal examinations 18(36.7%) and anaemia/malnutrition 22(44.9%).

**Table 7: showing suggested ways of preventing puerperal sepsis during the antenatal and intrapartum /postpartum period. n=49**

Variable	Frequency (n)	Percentage (%)
<b>During Antenatal</b>		
Health Education of mothers during antenatal	38	77.6
Treatment of risk factors e.g UTI, anaemia, DM	28	57.1
Regular antenatal visits to identify mothers at risk	20	40.8
Good nutrition	18	36.7
Hand hygiene	07	14.2
<b>During Intrapartum/postpartum</b>		
Prophylactic antibiotics	18	36.7
Hygienic environment	07	14.3
Minimal vaginal examinations	11	22.4
Aseptic procedures	21	42.9
Identification and treatment of mothers at risk	17	34.6

Table 7 above shows that the majority 38(77.6%) of the respondents indicated the health education of the mother while the minority 07(14.3%) of respondents indicated hand hygiene. A significant number of 28(57.1%) of respondents mentioned treatment of risk factors while 20(40.8%) respondents suggested regular antenatal visits and 18(36.7%) suggested good nutrition. The table also shows the

prevention of puerperal sepsis during the intrapartum/postpartum period, and the majority 21(42.9%) of respondents suggested aseptic procedures while a minority 07(14.3%) suggested a hygienic environment. 18(36.7%) suggested the use of prophylactic antibiotics and 17(34.6%) suggested identification and treatment of mothers at risk of puerperal sepsis.



**Figure 3 shows whether respondents have ever heard about GAS guidelines recommended by CDC. n=49.**

Figure 3 above shows that the majority 34(69.4%) of the respondents did not know GAS guidelines while the minority

15(30.6%) of the respondents had heard about the GAS guidelines.

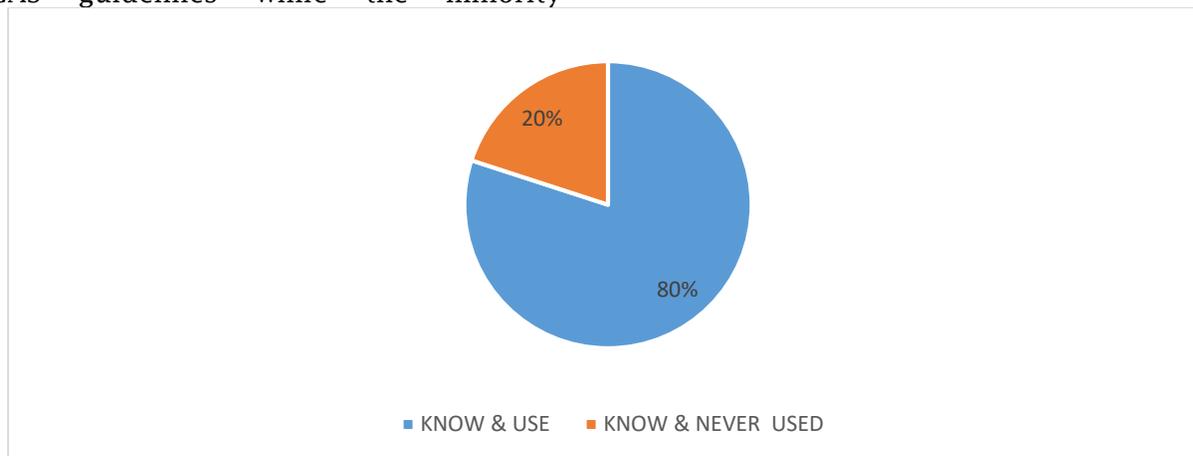


Figure 4 shows respondents who ever heard about GAS guidelines and used it n=25. The figure 4; most 20(80%) of the respondents have ever used the GAS guidelines while the minority 5(20%) of the respondents have never.

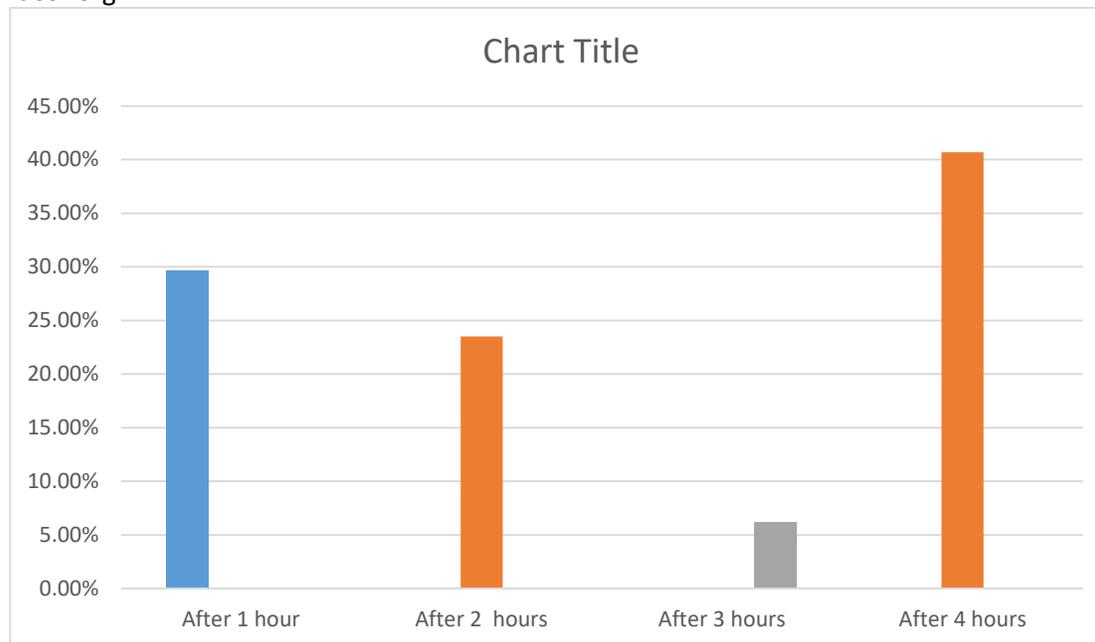
#### Health workers' practices towards prevention of puerperal sepsis

**Table 8: shows how often respondents wash their hands during vaginal examinations n=49**

Variable	Frequency	Percentage
<b>How often hand washing is done during VE</b>		
Very rarely	7	14.3
Each time I do VE	27	55.1
Usually forgets	09	18.4
No need to wash hands & wear gloves	06	12.2
<b>Total</b>	<b>49</b>	<b>100</b>

Table 8 above shows that the majority 27(55.1%) of the respondent washed their hands each time they did a vaginal examination while the minority 06(12.2%) of the respondents did not wash their

hands because they had gloves. 09(18.4%) of respondents usually forgot to wash their hands before conducting the vaginal exam and 07(14.3%) washed their hands very rarely.



**Figure 5: shows the duration range of conducting a vaginal examination in labour n=49**

Figure 5 above shows that the majority 20(40.8%) of the respondents conducted vaginal examinations every after four hours while the minority 03(6.1%) conducted vaginal examinations every

after three hours. A significant number of 15(30.6%) conducted vaginal examinations every after one hour and 11(22.4%) conducted vaginal examinations after two hours.

**Table 9 shows protective equipment/gear used during childbirth. n=49**

Variable	Frequency (n)	Percentage (%)
<b>Protective equipment respondents wear</b>		
Gloves	49	100
Gum boots	08	16.3
Protective aprons	21	42.9
Gowns	07	14.3
Face mask	09	18.4
<b>Kind of gloves put on during delivery</b>		
Surgical/sterile gloves	38	77.6
Disposable/clean gloves	11	22.4
Polythene paper (kava) sometimes	00	00
<b>Total</b>	<b>49</b>	<b>100</b>

Table 9 above shows that all respondents 49(100%) wear gloves while conducting childbirth while the minority 07(14.3%) wear gowns. 21(42.9%) put on protective aprons, 08(16.3%) wear gum boots and

Allan only 09(18.4%) put face masks. It also shows that the majority 38(77.6%) of the respondents use surgical gloves while the minority 11(22.4%) use disposable gloves.

**Table 10 shows equipment safety and treatment of mothers at risk of puerperal sepsis n=49**

Variable	Frequency(n)	Percentage (%)
<b>Ensuring delivery sets are germ-free is by</b>		
+Autoclave sterilization	31	63.3
Disinfection with antiseptic	18	36.7
Clean with water and soap	00	00
<b>Total</b>	<b>49</b>	<b>100</b>
<b>Commonest treatment given mothers at high risk of puerperal sepsis</b>		
Aseptic technique	18	36.7
Broad spectrum antibiotic	27	55.1
Reassurance of the mother	04	8.2
Induction of labor	00	00
<b>Total</b>	<b>49</b>	<b>100</b>

Table 10 above shows that the majority 31(63.3%) of the respondents use the autoclave to sterilize delivery sets while a significant number 18(36.7%) use disinfection with antiseptics. No respondents use soap and water. It also

shows that the majority 27(55.1%) of health workers give prophylactic broad-spectrum antibiotics to mothers at risk of sepsis while the minority 04(8.2%) reassure the mother and 18(36.7%) ensure an aseptic technique.

**Table 11: shows the kind of mothers given prophylactic antibiotics to prevent puerperal sepsis**

Variable	n=49	
	Frequency (n)	Percentage (%)
<b>Condition of mother</b>		
Episiotomy	16	32.7
Caesarian delivery	28	57.1
Early rupture of membranes	22	44.9
Urinary tract infection	43	87.6
Malnutrition	13	26.5
Postpartum haemorrhage	10	20.4
Comorbidities e.g. DM, STD, HIV	14	28.6
All mothers onward	45	91.8

Table 11 above shows that the majority 45(91.8%) of the respondents give prophylactic antibiotics to all mothers on the ward while the minority 10(20.4%) of the respondents give prophylactic antibiotics to mothers who develop postpartum haemorrhage. 43(87.6%) of respondents give prophylactic antibiotics to mothers with urinary tract infections,

28(57.1%) give antibiotics to mothers who deliver by caesarian section, 22(44.9%) give mothers with early rupture of membranes, 16(32.7%) give mothers done episiotomy, 13(26.5%) give mothers who are malnourished and 14(28.6%) give prophylactic antibiotics to mothers with comorbidities like HIV/AIDS, STI, diabetes mellitus.

**Table 12: shows a list of puerperal sepsis predisposing conditions screened for in pregnant mother**

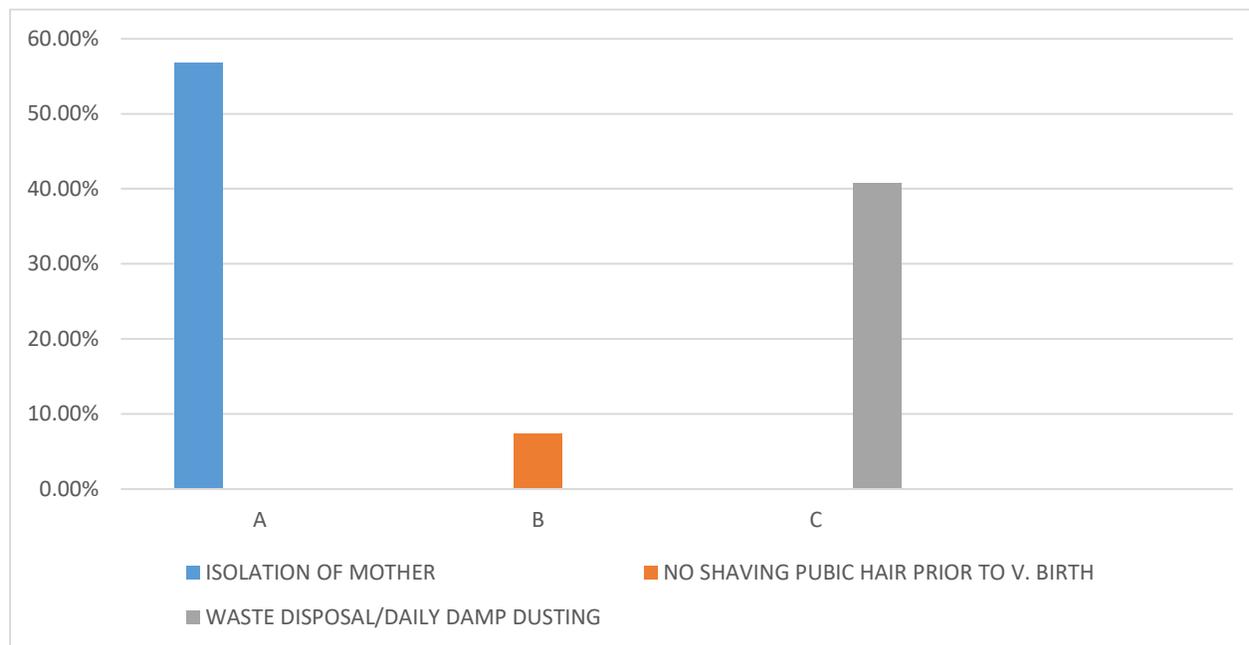
Variable	n=49	
	Frequency(n)	Percentage (%)
<b>Condition</b>		
HIVAIDS	45	91.8
Anaemia	07	14.3
Urinary tract infection	31	63.3
STD	45	91.8
Diabetes mellitus	14	28.6
Malnutrition	41	83.7
Hypertensive diseases	21	42.9

Table 12 above shows that most 45(91.8%) health workers identified HIV/AIDS as one

of the puerperal sepsis predisposing conditions screened for in mothers while

the minority 07(14.3%) screened for anaemia. 45(91.8%) of Respondents screen mothers for STDs, 31(63.3%) screen mothers for urinary tract infections, 41(83.7%) health workers screen mothers

for malnutrition, 25(42.9%) respondents screen mothers for hypertensive diseases and 14(28.6%) of health workers screen mothers for diabetes mellitus.



**Figure 6 shows daily activities done to prevent puerperal sepsis. n=4**

Figure 6 above shows that the majority 28(57.1%) of the health workers isolate mothers with sepsis while the minority 04(8.2%) avoided pubic hair shaving prior

to vaginal birth. And 20(40.8%) of the respondents practice proper waste disposal and daily damp dusting.

**Table 13: Shows training on sepsis and its impact on health workers**

Variable	Frequency (n)	Percentage (%)
n=49		
<b>Ever had training on sepsis</b>		
YES	38	77.6
NO	11	22.4
<b>Total</b>	49	100
<b>The outcome of the training</b>		
Ability to detect early signs and symptoms	33	86.8
Improved care of my patients	25	65.8
No significant impacts	02	5.3

Table 13 above shows that the majority 38(77.6%) of the health workers had been trained on sepsis while the minority 11(22.4%) had not. It also shows that the majority 33 (86.8%) of those who had the training on sepsis benefited from the

ability to detect early signs and symptoms of sepsis, 25(65.8%) benefited from the improved care for mothers with sepsis while the minority 02(5.3%) reported that the training had no significant impact.

#### DISCUSSIONS

##### **Knowledge of Health workers on prevention of puerperal sepsis**

This showed that the majority 40(81.6%) of the respondents had knowledge of puerperal sepsis. This agrees with the study done on preventive measures of puerperal sepsis by [20] which found that most of respondents 30(60%) had knowledge on puerperal sepsis and its preventive measures. The study found that the majority 28(57.2%) of the health workers described puerperal sepsis incorrectly with only 21(42.8%) describing puerperal sepsis as bacterial infection of the female reproductive tract post-delivery within 6 weeks. This finding agrees with the findings of a study done by [21] in the United Kingdom which attributed the occurrence of sepsis to limited awareness of sepsis among health personnel and poor identification with delayed intervention. This study also revealed that the majority of 39(79.6%) of the health workers knew the signs and symptoms of puerperal sepsis with 37(75.5%) of the respondents identifying correctly the signs and symptoms of puerperal sepsis. This

finding contradicts with a study by the World Sepsis Declaration, 2014 which concluded that there is too little knowledge in identifying sepsis signs and symptoms among physicians and nursing staff [22]. This study revealed inadequate knowledge on components of hand hygiene, one of the key measures of prevention of puerperal sepsis with 25(51.0%) of the respondents mentioning washing hands, 11(22.4%) mentioning the use of disinfectants and 15(30.6%) mentioning wearing gloves. This study contradicts a study conducted among medical students which revealed poor knowledge of hand hygiene with more than 40% of the study participants being unaware of the importance of hand washing [23]. The study also revealed that the majority 38(77.6%) of the health workers accepted that hand hygiene is important in the prevention of puerperal sepsis, with majority 34(69.4%) of the respondents suggested that hand hygiene prevents puerperal sepsis by reducing the spread of infection and/or eradication of microorganisms. This study contradicts a

study by [23] which found out more than 40% of the study participants were unaware of the importance of hand washing [23]. In this study, it was revealed that respondents had knowledge of the risk factors of puerperal sepsis as health workers were able to mention some the risk factors like early rupture of membranes/prolonged labour 30(61.2%), retained products of conception and manual removal of placenta 10(20.4%), chronic illnesses like HIV/AIDS and DM 25(51.0%), Urinary Tract Infection 24(49.0%), caesarian section 18(36.7%), repeated vaginal examinations 18(36.7%) and anaemia/malnutrition 22(44.9%). This study contradicts the studies that indicated that female health workers have low knowledge about an emergency to stabilize the patient prior to referral and identify and manage complications arising during pregnancy and prevention and treatment of pregnancy-related problems hence there was an urgent need to redesign the basic training of health workers working in the management of gynaecological problems [24]. This study revealed inadequate knowledge on important measures necessary in the prevention of puerperal sepsis in antepartum, intrapartum and postpartum as 20(40.8%) respondents suggested regular antenatal visits, 07(14.2%) suggested hand hygiene, 21(42.9%) suggested aseptic technique and 18(36.7%) suggested use of prophylactic antibiotics were necessary. This, therefore, puts many mothers at a high risk of developing puerperal sepsis, thus raising its prevalence. The result of this research contradicts the study in Ghana on the knowledge and attitude of health workers and patients on sepsis which indicated that most health workers had knowledge on how to prevent sepsis postpartum with a 100% of the health workers mentioning thorough hand washing with soap as one of the methods [25]. This study is in line with a report by the International Journal of Science and Research on the use of antibiotics and the presence of skilled healthcare staff globally, aseptic precautions advance in investigation tools, improvement in MCH services, and trained

birth attendants at delivery have played a major role in reducing the incidence of puerperal sepsis [26]. This research also showed that the majority 34(69.4%) of the respondents did not know GAS guidelines. This agrees with a study conducted on Provider Knowledge, Attitude and Practices regarding Obstetric and Postsurgical Gynecologic Infections Due to GAS which showed a lack of awareness of GAS guidelines among one of their targeted audiences, which was due to a lack of knowledge of the existence of these guidelines, most likely because the guidelines are published in a journal not read by these respondents [27].

#### **Practices of Health Workers on Prevention of puerperal sepsis**

The research found that the majority 27(55.1%) of the respondent washed their hands each time they conducted a vaginal examination. This study's finding contradicts [28] finding that compliance among health workers in regard to regular and frequent hand washings is typically below 40%. The same research finding also disagrees with the statement by [29] that there is a vast amount of evidence that shows there is low compliance to hand washing by health workers, with hands being washed either infrequently or inadequately as only 12(14.8%) of the respondents washed their hands very rarely. This research showed that the majority 29(59.2%) of the respondents did not conduct a vaginal examination every after four hours as it is recommended, with a significant number of 15(30.6%) health workers conducting vaginal examination every after one hour. This finding was practiced against the study recommendations by [30] that limiting digital vaginal examination at the interval of four hours is an important consideration in the prevention of puerperal sepsis. The study also found out that 28(57.1%) of the health workers isolate mothers with sepsis, 04(8.2%) avoided pubic hair shaving prior to vaginal birth and 20(40.8%) of the respondents practiced proper waste disposal and daily damp dusting, which indicated inadequate practice to prevent puerperal sepsis. This is contradicting the founding of [30] that

general improvement of hospital sanitation like appropriate waste disposal, isolation of patients with sepsis, and avoiding routine perineal/pubic shaving prior to vaginal birth are key health workers' practices for the prevention of puerperal sepsis. However, this study did not consider the relationship between waste disposal, isolation of patients with sepsis and avoiding routine perineal/pubic shaving prior to vaginal birth and the occurrence of puerperal sepsis. The table above shows that all respondents 49(100%) wear gloves while conducting child birth, 07(14.3%) wear gowns, 21(42.9%) put on protective aprons, 08(16.3%) wear gum boots and 09(18.4%) wear face masks. This agrees with a Kenyan study by [12] on the use of protective gear, where findings revealed that most health workers conducted deliveries using gloves, aprons, headgear and gumboots. The research also showed that the majority 38(77.6%) of the respondents use surgical gloves while performing vaginal examination as a means of preventing puerperal sepsis. This agrees with [30] that the use of clean equipment such as the use of surgical gloves during the vaginal examination was a recommended practice in the prevention of puerperal infections. The study revealed that the majority 31(63.3%) of the respondents use the autoclave to sterilize delivery sets as one way practiced so as to prevent puerperal sepsis. This agrees with the statement that the use of pre-packed sterilized delivery kits is a recommended practice in the prevention of puerperal infections [30]. This study also showed that the majority 27(55.1%) of health workers give prophylactic broad-spectrum antibiotics to mothers at risk of sepsis. This is in line with the statement that the most common intervention for reducing morbidity and mortality related to maternal infection globally is the use of antibiotics for prophylaxis and treatment [31]. The research revealed that the

majority 45(91.8%) of the respondents give prophylactic antibiotics to all mothers on the ward irrespective of whether there was a need or not. This to some extent agrees with the [31] report that many low-income countries use broad-spectrum antibiotics without confirmation of the infective bacterial agent. The study also revealed that health workers administer prophylactic antibiotics to mothers with risks of puerperal sepsis such as postpartum haemorrhage 10(20.4%), urinary tract infection 43(87.6%), caesarian section 28(57.1%), early rupture of membranes 22(44.9%), malnourished mothers 13(26.5%), and comorbidities like HIV/AIDS, STI, diabetes mellitus 14(28.6%) This agrees with the findings of [32] that antibiotics are widely used (and misused) for obstetric conditions and procedures that are thought to carry substantial risks of infection to the mother. The research also indicated that above shows that most health workers screened mothers for conditions that predispose them to puerperal sepsis such as identified HIV/AIDS 45(91.8%), STDs 45(91.8%), urinary tract infections 31(63.3%), malnutrition 41(83.7%) and diabetes mellitus 14(28.6%) this agrees with a statement that conditions such as diabetes mellitus, urinary tract infections, anaemia, malnutrition and HIV/AIDS are a risk factor to puerperal sepsis and therefore diagnosis and treatment of such conditions during antenatal visits is a key practice in the prevention of puerperal sepsis [30]-[35]. The research above showed that majority 38 (77.6%) of those whom the training on sepsis benefited the ability to detect early signs and symptoms of sepsis and improved care for mothers with sepsis. This agrees with the statement that the need for education and training of healthcare staff helps health workers in the early identification of subtle signs of developing sepsis [33], [36]-[38].

#### CONCLUSIONS

- Health workers have inadequate knowledge and generally good practices on prevention of puerperal sepsis which could be due to limited continuous medical education.
- Puerperal sepsis cases can be greatly reduced through timely screening, appropriate prophylactic antibiotics to reduce pathogenic bacteria and appropriate treatment as well as

prevention of prenatal risk factors to the disease like antepartum haemorrhage, urinary tract infection, and early rupture of membranes which cause ascending infection, malnutrition, anaemia and comorbidities like HIV/AIDS, and diabetes mellitus. These compromise adaptive and innate immunity to pathogens.

- Low social class mothers are at risk of developing postpartum sepsis due to low hygienic settings like limited Mama Kites and habits of mothers using local remedies during pregnancy and postpartum.
- Health workers' use of clean and safe deliveries through practices like the use of protective gear, thorough hand washing with soap and avoidance of frequent vaginal examination during labour and provision of prophylactic antibiotics can reduce the incidence of puerperal sepsis.
- Health education to mothers and health workers training on puerperal sepsis is an important pillar in the prevention and treatment of postpartum sepsis.

### Recommendations

- All health workers should undergo special training on puerperal sepsis pointing out its prevention methods, identification of signs and symptoms and management of the disease.
- Pregnant mothers should also have health education sessions when they come for antenatal care so that risks like poor hygiene which is common among the low social class that predisposes mothers to postpartum sepsis can be overcome.
- Application of GAS guidelines among health workers should be emphasized in order to control and prevent morbidity and mortality of mothers resulting from postpartum infections.
- Follow-up teams should be created at health centres to ensure appropriate care for all pregnant mothers with risks for puerperal sepsis is adequately provided.
- Refresher courses on clean and safe deliveries should be provided to all midwives, nurses and general practitioners.
- Conduct more research to evaluate the techniques of the practices applied and their association with the prevention of puerperal sepsis.

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