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Prevalence and Risk Factors of Puerperal Sepsis among Reproductive Aged Women at Jinja Regional Referral Hospital from January 2019 to June 2020

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ABSTRACT

Puerperal sepsis (P. sepsis) is the third chief cause of maternal deaths after hemorrhage and hypertension globally, and the second chief cause after hemorrhage in Asia and Africa. However, among 139 maternal deaths from Uganda, P. sepsis was observed to be the most frequent cause (30.9%), followed by hemorrhage (21.6%), hypertensive disorders (14.4%), and abortion complications (10.8%). The annual maternal sepsis admissions rate at health facilities in Uganda increased gradually from 28/10000 live births in 2013 to 50/10000 live births in 2017. In Jinja Regional Referral Hospital, the exact prevalence of puerperal sepsis is unknown though it remains a major problem. This study aimed at assessing the prevalence and risk factors of puerperal sepsis among reproductive aged women at Jinja Regional Referral Hospital. This was a hospital based cross sectional observational and analytic study. A total of 200 randomly selected participants were recruited to participate in the study. A pre-tested semi structured questionnaire was used to collect data from the study participants after verbal and written consent were obtained. Descriptive analysis and chi square test of association were done using STATA version 14.0 to identify factors associated with puerperal sepsis. The prevalence of puerperal sepsis among women in Jinja regional referral hospital was 26.50% with 95% Confidence interval of 20.33 – 32.67. Age; $X^2(4, N=200) = 28.95$, P=0.011. Education level; $X^2(3, N=200) = 9.151$, P=0.027 and alcohol consumption; $X^2(1, N=200) = 9.807$, P=0.002 were the socio-demographic factors associated with puerperal sepsis meanwhile Mode of delivery; $X^2(2, N=200) = 16.457$, P=0.002, Frequency of pelvic examinations in hours; $X^2(3, N=200) = 8.283$, P=0.004, Number of ANC visits; $X^2(3, N=200) = 20.404$, P<0.001, and parity; $X^2(3, N=200) = 29.990$, P=0.025 were the obstetric factors associated with puerperal sepsis. This study has shown that the prevalence of puerperal sepsis among women attending Jinja regional referral hospital is very high when compared to majority of studies done in low resource settings. Puerperal sepsis poses a public health burden on Jinja regional referral hospital which ultimately has an impact in achieving target 3 of sustainable development goals.

Keywords: Puerperal sepsis, Hemorrhage, Hypertension, Maternal mortality, Women

INTRODUCTION

Almost 80% of maternal mortality, resulting from pregnancy complications, are brought about by the causes, which are preventable as they strongly depend on the quality of the provided care. Puerperal sepsis is among the preventable causes of maternal death [1]. Puerperal sepsis is an infection of genital tract, which occurs at any time from the rupture of membranes or time of labor and up to 42nd day from parturition. It is accompanied with 2 or more of the following conditions: pelvic pains, high body temperature (that is oral temperature 38.5 °C or above on any occasion, abnormal genital discharge (presence of pus), bad smell or foul odor of discharge, delay in the reduction of the size of the uterus (< than 2 cm / day with in the first Eight days) [2]. Puerperal sepsis (P. sepsis) is the third chief cause of maternal deaths after hemorrhage and hypertension globally, and the second chief cause after hemorrhage in Asia and Africa. However, among 139 maternal deaths from Uganda, P. sepsis was observed to be the most frequent cause (30.9%), followed by hemorrhage (21.6%), hypertensive disorders (14.4%), and abortion complications (10.8%) [3]. In Africa and Asia, puerperal sepsis (9.7%) was the second commonest cause of maternal mortality after hemorrhage (11.6%) [4]. Above 70% of maternal deaths in the developing world are caused by sepsis

among other causes including: hemorrhage, hypertension disorders, unsafe abortion, and obstructed labor. Sepsis was the most frequent underlying cause of maternal morbidity and mortality in the 19th century, responsible for 50% of all cases and it is the leading cause of death in the intensive care unit in the United States [5]. Puerperal sepsis is usually polymicrobial infection and occurs from endogenous (vaginal colonizers) or exogenous organisms (contamination during delivery). Following a vaginal delivery, infection which involves placental site or vaginal lacerations and after a cesarean section (CS), infection involves the uterine incision. Septic shock may result following infection with Gram-negative bacilli (Enterobacteriaceae). Some predisposing factors are: home delivery, prolonged rupture of membranes, five vaginal examinations, postpartum hemorrhage (PPH), CS, retained placental tissue, poor nutrition, and lack of postnatal care [3]. Postpartum infection occurs in about 1- 8% of vaginal deliveries, and it is five to ten times higher following a caesarean section. Puerperal sepsis morbidity affects 2 - 10% of patients. 12 Pregnancy-related sepsis was the commonest cause of all maternal deaths. It is clear that the absence or inappropriate use of management protocols has been a major factor in a large number of maternal deaths due to pregnancy-related sepsis [5]. About 99% of deaths from puerperal sepsis in low- and middle-income countries are preventable with simple, low cost solutions such as healthcare provider, hand washing at the time of delivery. Failure to observe recommended Infection Prevention and Control (IPC) in maternity units by both the patients and midwives may result in women developing puerperal sepsis. The provision of sterile instruments, hand hygiene, personal protective clothing and general environmental cleanliness in health facilities can decrease infection rates [6-8]. Standard infection prevention and control measures such as hand hygiene, use of sterile equipment and proper waste disposal are a cornerstone of peripartum infection prevention [4]. Puerperal sepsis is a serious type of septicemia contracted by women during or soon after child birth, miscarriage or unsafe abortion. It has been reported that some morbidities associated with puerperal sepsis includes: Septicemia, Vaginal discharge, Peritonitis or abscess formation leading to surgery, Endotoxic shock, Pelvic abscess, mortality, among others [5]. World health organization reported about 358,000 maternal deaths occurring during labor and childbirth and 15% were related with puerperal sepsis. Puerperal sepsis is among the preventable conditions in developing and developed nations. It mainly occurs after discharge in the first 24 h of parturition. It is ranked as the sixth leading cause of disease burden for women of age 15-44 years, next to depression, HIV/AIDs, tuberculosis, abortion and schizophrenia. As many as 5.2 million new cases of maternal sepsis are annually occurring and an estimated 62,000 of maternal deaths will result from the condition. Even though maternal mortality is slightly decreasing globally, most maternal mortalities occurrence during childbirth is high. If it does not cause death, puerperal sepsis can cause long-term health problems such as chronic pelvic inflammatory disease (PID) and infertility [9]. Despite the discovery of antibiotics over eighty years ago, there is still a strong need for their proper and prophylactic utilization. Some developing countries have experienced increased use of health facilities for labor and delivery care but there is a lack of proper monitoring or checks and balances and there is a possibility that this trend could lead to rising rates of puerperal sepsis. Drug and technological developments need to be combined with effective health system intervention to reduce infection including puerperal sepsis [10]. This highly important maternal issue requires special attention. There should be no excuse for delaying targeted, global action to implement and evaluate infection control measures during labor and delivery for the prevention and reduction of puerperal sepsis and other related conditions. The choice of the specific combination of components to be evaluated could be informed by what is known from the wider infection control literature, from existing information on ways to improve quality in maternity care and by tailoring strategies to address underlying problems of infection control. Globally, it is estimated that 358,000 women die from the complications of childbirth annually and up to 15% of these are due to puerperal sepsis [4]. Above 70% of maternal deaths in the developing world are caused by sepsis among other causes including: hemorrhage, hypertension disorders, unsafe abortion, and obstructed labor. Sepsis bacterial infections around the time of childbirth are responsible for about ten percent of maternal deaths and contribute to severe morbidity as well as long-term disability among many women. The most common associated morbidities are chronic pelvic pain, fallopian tube blockage and secondary infertility [4]. Despite the fact that puerperal sepsis is preventable by simple and low cost solutions such as hand washing at the time of delivery, damp dusting and use of sterile equipment, it is still a major problem in most developing nations. In Jinja Regional Referral Hospital, the exact prevalence of puerperal sepsis is unknown though it remains a major problem. The objective of this research was to assess the prevalence and risk factors of puerperal sepsis among reproductive aged women at Jinja Regional Referral Hospital.

METHODOLOGY

Study Design

The study design was cross-sectional and retrospective in nature.

Area of Study

This study was conducted at Jinja Regional Referral Hospital, commonly known as Jinja Hospital, in the city of Jinja district, in the Eastern Region of Uganda.

Study Population

The study focused on reproductive aged women who are brought to Jinja regional referral hospital.

Inclusion criterion

- All women with puerperal sepsis who were previously admitted in Jinja RRH and whose consent was obtained.

Exclusion criteria

- The women who had puerperal sepsis but were not willing to participate in any study involving the condition.
- All women who had puerperal sepsis without medical records in the hospital.

Sample Size Determination

For the cross sectional study, the sample size that achieved a 5% level of precision at 95% confidence level was calculated using the formula described by Kish Leslie [11].

$n = Z^2 P(1-P)/E^2$

Where

n = sample size

Z = Standard deviate at 95% confidence interval which is equal to 1.96.

P= Proportion of a characteristic in a sample (Khaskheli et al. [12]) E= the acceptable degree of Error (taken as 5%)

From the formula,

$$n = \frac{(1.96)^2 X\ 0.15(1-0.15)}{(0.05)^2} = 195.9216$$

This gave a sample size of approximately 200 participants will be used.

Sampling Procedures/Technique

Simple random sampling of patient files was used for the study. Study participants' files were being selected as per their meeting the inclusion criteria.

Data Collection

Data collection was mainly through review of patient files and operation notes. This employed a descriptive approach whereby study participants' files and operation notes were reviewed. Information were sought pertaining the patients' duration of admission, and information necessary for the study were recorded according to the subheadings in the data collection tools. An objective-oriented checklist was used that covered patient characteristics such as age, alcohol history, and presence of comorbid conditions.

Data Analysis

Collected data was entered into the computer using Microsoft excel and exported to STATA version 14.0 for analysis. Descriptive statistics were generated and chi square test was used to assess for any possible association between the independent variables and the dependent variable.

Quality Control

The principle researcher ensured that only patients' files who met the inclusion criteria after obtaining informed consent from the hospital were used. Patient data, files and operation notes were carefully reviewed with clarifications sought from relevant authorities where needed. Care was taken while recording the research assigned patient numbers to avoid data mix-up.

Data Presentation

Data was then presented in the form of narratives, graphs, tables and charts.

Ethical Considerations

A letter was sought and obtained from Kampala International University Western Campus faculty of clinical medicine & dentistry through IREC for ethical approval. Written permission to conduct the study was sought from the Research Site or Centre that is Jinja RRH. Hospital Authorities on behalf of the patients were assured of confidentiality and use of the information obtained only for the research. Initials, and not patient names, were used in the study with backing by research assigned patient numbers.

RESULTS

Socio- Demographic Characteristics of the Study Participants

A total of 200 participants were sampled from at Jinja Regional Referral Hospital and the socio-demographic characteristics are presented in table 1 below. Majority of the study participants 63 (31.50%) were in the age group of 22 – 27 Years, belonged to catholic religion 70 (35.00%), had attained secondary education 91 (45.50%), were coming from monogamous families 130 (65.00%) and they were married 119 (59.50%). Results of the study further

revealed that majority of the study participants 84 (42.00%) had 4 – 6 members in their families whereas 167 (83.50%) of the study participants were not alcoholics. The highest proportion of study participants 133 (66.50%) were unemployed, living in rural areas 125 (66.50%) and were earning monthly income of 300,000 shillings or less per month 161 (80.90%).

Table 1: Frequency table of socio-demographic characteristics of the study participants

Age of the participants in Years	16 – 21 Years	38	19.00
	22 – 27 Years	63	31.50
	28 – 33 Years	54	27.00
	34 – 39 Years	32	16.00
	40 Years and above	13	06.50
	TOTAL	**200**	**100**
Religion of study participants	Catholic	70	35.00
	Anglican	55	27.50
	Muslim	19	09.50
	SDA	16	08.00
	Born Again	31	15.50
	Others	09	04.50
	TOTAL	**200**	**100**
Education Level	Primary	48	24.00
	Up to Secondary	91	45.50
	Pre-University & Diploma	37	18.50
	Diploma & Graduate	24	12.00
	TOTAL	**200**	**100**
Type of family	Polygamous	70	35.00
	Monogamous	130	65.00
	TOTAL	**200**	**100**
Marital status	Married	119	59.50
	Not married	41	20.50
	Co-habiting	39	19.50
	Divorced	01	00.50
	TOTAL	**200**	**100**
Number of Family members	1 – 3	50	25.00
	4 – 6	84	42.00
	7 – 9	51	25.50
	10 or +	15	07.50
	TOTAL	**200**	**100**
Alcohol consumption	Yes	33	16.50
	No	167	83.50
	TOTAL	**200**	**100**
Employment status	Employed	67	33.50
	unemployed	133	66.50
	TOTAL	**200**	**100**
Place of Residence	Urban	67	33.50
	Rural	125	66.50
	TOTAL	**200**	**100**
Monthly Income	0 – 300,000 /=	161	80.90
	300,001 – 600,000 /=	34	17.09
	600,001 – 900,000 /=	02	01.01
	Above 900,000 /=	02	01.01
	TOTAL	**200**	**100**

Obstetric Characteristics of the study participants

Table 3 below shows the frequencies and percentages of obstetric characteristics of the study participants. As observed in the table, majority of the study participants 122 (61.00%) had spontaneous vaginal delivery, with the labor having duration of less than 12 hours 123 (61.50%) and 46 (23.00%) had premature rapture of membranes. The study showed that majority of study participants 151 (75.50%) underwent less than 5 pelvic examinations in 4 hours with 68 (34.00%) showering on 1st day of delivery meanwhile 83 (41.71%) had attended two antenatal visits and 44 (22.00%) had Prolonged rupture of membrane > 18 hours. Results of the study revealed that 87 (43.50%) of the study participants had retained products of conception. Majority of the study participants 174 (87.00%) never had hypertension, were free from diabetes mellitus 180 (90%) and had their placenta removed by controlled cord traction 120 (60.00%).

Table 2: Obstetric Characteristics of study participants

Mode of Delivery	SVD	122	61.00
	C/Section	61	30.50
	Instrument	17	08.50
	TOTAL	**200**	**100**
Duration of Labor	<12 hours	123	61.50
	12 – 24 hours	54	27.00
	>24 hours	23	11.50
	TOTAL	**200**	**100**
Premature rapture of membrane	Yes	46	23.00
	No	154	77.00
	TOTAL	**200**	**100**
Frequency of Pelvic Examinations in 4 hours	<5	151	75.50
	≥5	39	19.50
	Not done	08	04.00
	Don't Remember	02	01.00
	TOTAL	**200**	**100**
Time of shower after delivery	1st day	68	34.00
	2nd day	51	25.50
	3rd day	29	14.50
	After 3rd day	26	13.00
	Don't remember	26	13.00
	TOTAL	**200**	**100**
Number of ANC visits	One	67	33.67
	Two	83	41.71
	Three or more	49	24.62
	TOTAL	**200**	**100**
Prolonged rupture of membrane > 18 hours.	No	156	78.00
	Yes	44	22.00
	TOTAL	**200**	**100**
Retention of products of conception	Yes	87	43.50
	No	113	56.50
	TOTAL	**200**	**100**
Hypertension	Yes	26	13.00
	No	174	87.00
	TOTAL	**200**	**100**
Diabetes Mellitus	Yes	20	10.00
	No	180	90.00
	TOTAL	**200**	**100**
Placenta removal	Controlled cord traction	120	60.00
	Manual	80	40.00
	TOTAL	**200**	**100**

The Prevalence of Puerperal Sepsis among Reproductive Aged Women at Jinja Regional Referral Hospital.

As presented in table 4 below, the prevalence of puerperal sepsis among reproductive aged women in Jinja Regional Referral Hospital was 26.50% with 95% Confidence interval of 20.33 – 32.67

Table 3: Prevalence of Puerperal Sepsis among Reproductive Aged Women in Jinja Regional Referral Hospital

Puerperal Sepsis	Frequency	Percentage	95% CI
No	147	73.50	67.33 – 79.67
Yes	53	26.50	20.33 – 32.67

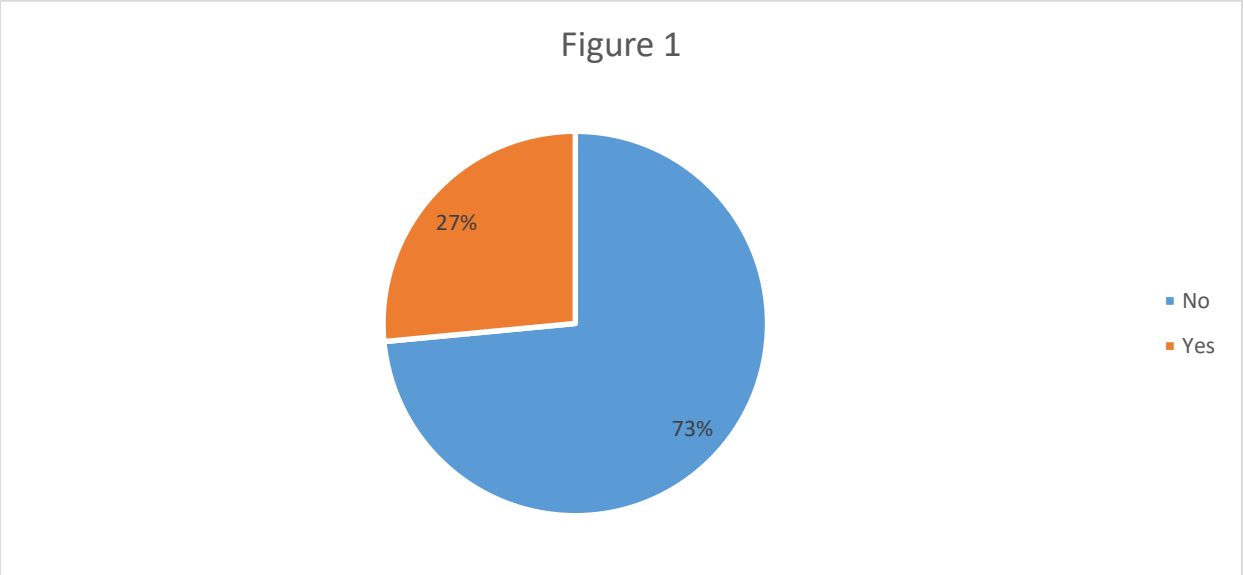

Figure 1: Pie chart showing the Prevalence of Puerperal Sepsis among Reproductive Aged Women in Jinja Regional Referral Hospital

The Socio-Demographic Risk Factors of Puerperal Sepsis among Reproductive Aged Women at Jinja Regional Referral Hospital.

During data analysis, a chi square test was done to check for associations between socio-demographic factors and puerperal sepsis among the study participants, results of the analysis revealed that 3 factors had significant statistical association with puerperal sepsis among the study participants sampled. As observed in 5 below, Age was statistically associated with puerperal sepsis; $X^2(4, N=200) = 28.95$, $P=0.011$. Education level was another socio-demographic factor associated with puerperal sepsis; $X^2(3, N=200) = 9.151$, $P=0.027$. Results also showed that alcohol consumption was associated with puerperal sepsis among the study participants; $X^2(1, N=200) = 9.807$, $P=0.002$. All the other factors were found to be having no statistical association with puerperal sepsis.

Table 4; Chi Square Test to Show Association between the Socio-Demographic Risk Factors of Puerperal Sepsis among Reproductive Aged Women in Jinja Regional Referral Hospital

Variable		Total	Puerperal Sepsis		Chi Square (X^2)	P Value
			No Count (%)	Yes (Count (%)		
Age of the Participants in Years	16 – 21 Years	38	20 (52.63)	18 (47.37)		
	22 – 27 Years	63	49 (77.78)	14 (22.22)		
	28 – 33 Years	54	43 (79.63)	11 (20.37)		
	34 – 39 Years	32	27 (84.38)	05 (15.63)	13.028	**0.011**
	40 Years and above	13	08 (61.54	05 (38.46)		
Religion of study participants	Catholic	70	55 (78.57)	15 (21.43)		
	Anglican	55	42 (76.36)	13 (23.64)		
	Muslim	19	11 (57.89)	08 (42.11)		
	SDA	16	08 (50.00)	08 (50.00)		
	Born Again	31	25 (80.65)	06 (19.35)	9.096	0.105
	Others	09	06 (66.67)	03 (33.33)		
Education level	Primary	48	35 (72.92)	13 (27.08)		
	Up to Secondary	91	69 (75.82)	22 (24.18)		
	Diploma	37	23 (62.16)	14 (37.84)	9.151	**0.027**
	Graduate	24	20 (83.33)	04 (16.67)		
Type of Family	Polygamous	70	53 (75.71)	17 (24.29)	0.271	0.603
	Monogamous	130	94 (72.31)	36 (27.69)		
Marital Status	Married	119	96 (80.67)	23 (19.33)		
	Not married	41	24 (58.54)	17 (41.46)		
	Co-habiting	39	26 (66.67)	13 (33.33)	3.894	0.273
	Divorced	01	01 (100.00)	00 (0.00)		
Number of family	1 – 3	50	39 (78.00)	11 (22.00)		
	4 – 6	84	64 (76.19)	20 (23.81)		

members	7 – 9	51	37 (72.55)	14 (27.45)	6.400	0.094
	10 or +	15	07 (46.67)	08 (53.33)		
Alcohol consumption	Yes	33	17 (51.52)	16 (48.48)	9.807	**0.002**
	No	167	130 (77.84)	37 (22.16)		
Employment status	Employed	67	48 (71.64)	19 (28.36)	0.179	0.673
	Unemployed	133	99 (74.44)	34 (25.56)		
Place of residence	Urban	75	51 (68.00)	24 (32.00)	1.863	0.172
	Rural	125	96 (76.80)	29 (23.20)		
Monthly income	0 – 300,000 /=	161	117 (72.67)	44 (27.33)		
	300,001 – 600,000 /=	34	26 (76.47)	08 (23.53)		
	600,001 – 900,000 /=	02	02 (100.00)	00 (0.00)	1.654	0.647
	Above 900,000 /=	02	02 (100.00)	00 (0.00)		

P value is significant when a value is less than 0.05

The Obstetric Risk Factors of Puerperal Sepsis among Reproductive Aged Women at Jinja Regional Referral Hospital

The chi square test revealed that 4 obstetric factors were found to be statistically associated with Puerperal Sepsis among reproductive aged women in Jinja regional referral hospital and the results are presented in Table 5 below. The significantly associated factors include; Mode of delivery; $X^2(2, N=200) = 16.457$, P=0.002, Frequency of pelvic examinations in hours; $X^2(3, N=200) = 8.283$, P=0.004, Number of ANC visits; $X^2(3, N=200) = 20.404$, P<0.001, and parity; $X^2(3, N=200) = 29.990$, P=0.025.

Table 5: Chi-Square Test to Show Association between obstetric factors and puerperal sepsis among reproductive-aged women

Variable		Total	Puerperal Sepsis		Chi Square (X^2)	P Value
			No Count (%)	Yes Count (%)		
Mode of Delivery	SVD	122	89 (72.95)	33 (27.05)		
	C/Section	61	47 (77.05)	14 (22.95)	16.457	**0.002**
	Instrument	17	11 (64.71)	06 (35.29)		
Duration of Labor	<12 hours	123	91 (73.98)	32 (26.02)		
	12 – 24 hours	54	39 (72.22)	15 (27.78)	0.062	0.969
	>24 hours	23	17 (73.91)	06 (26.09)		
Premature rapture of membrane	Yes	46	32 (69.57)	14 (30.43)	0.475	0.491
	No	154	115 (74.68)	39 (25.32)		

Frequency of Pelvic Examinations in 4 hours	<5	151	112 (74.17)	39 (25.83)		
	≥5	39	29 (74.36)	10 (25.64)		
	Not done	08	04 (50.00)	04 (50.00)	8.283	**0.004**
	Don't Rem	02	02 (100.00)	00 (0.00)		
Time of shower after delivery	1st day	68	59 (86.76)	09 (13.24)		
	2nd day	51	37 (72.55)	14 (27.45)		
	3rd day	29	20 (68.97)	09 (31.03)		
	After 3rd day	26	19 (73.08)	07 (26.92)	1.088	0.580
	Don't Rem	26	12 (46.15)	14 (53.85)		
Number of ANC visits	One	67	50 (74.63)	17 (25.37)		
	Two	83	72 (86.75)	11 (13.25)	20.404	**<0.001**
	Three or more	49	25 (51.02)	24 (48.98)		
Prolonged rupture of membrane > 18 hours.	No	156	136 (87.18)	20 (12.82)	6.813	0.583
	Yes	44	11 (25.00)	33 (75.00)		
Parity	Primiparous	87	47 (54.02)	40 (45.98)	29.990	**0.025**
	Multiparous	113	100 (88.50)	13 (11.50)		
Hypertension	Yes	26	20 (76.92)	06 (23.08)	0.180	0.672
	No	174	127 (72.99)	47 (27.01)		
Diabetes Mellitus	Yes	20	15 (75.00)	05 (25.00)	0.026	0.873
	No	180	132 (73.33)	48 (26.67)		
Placenta removal	Cord traction	120	97 (80.83)	23 (19.17)	3.039	0.386
	Manual	80	50 (62.50)	30 (37.50)		

DISCUSSION

The Prevalence of Puerperal Sepsis among Reproductive Aged Women at Jinja Regional Referral Hospital. This study revealed that the prevalence of the puerperal sepsis among reproductive aged women at Jinja Regional Referral Hospital was 26.50% with 95% Confidence interval of 20.33 – 32.67. The results of the present study are lower than the descriptive study conducted in Lusaka Zambia (34.8%) [13]. The difference in the study findings can be attributed to the fact that the two studies were conducted in different geographic regions so there might have been variations among the study participants. The prevalence of puerperal sepsis found in the present study is much higher than estimates from high-resource settings (1.8–2.0%) [14, 15]. Though infection incidence in Jinja appears higher than European and North American estimates, comparing our findings to other low-resource settings is difficult. The reported incidence of postpartum sepsis in sub-Saharan Africa varies widely, likely due to differences in infection definition, surveillance, diagnosis, patient population and healthcare practices. One study at Uganda's largest referral hospital, where HIV prevalence is 21%, reported that 15% patients undergoing emergency cesarean

delivery developed postpartum sepsis [16], almost half of the 26.50% incidence reported here. The higher incidence of postpartum sepsis reported in the present study may reflect differences in practice, inappropriate use of antibiotics and poor infection control procedures at Jinja Regional Referral Hospital. Other studies from sub-Saharan Africa report postpartum sepsis in 1–17% after cesarean delivery [17, 18] and this range is higher than the reported prevalence of 26.50% in the present study. Postpartum infection may be more common in sub-Saharan Africa as a result of increasing cesarean delivery rates coupled with rising incidence of nosocomial infections [19]. The result of the present study is not in agreement with the result of a study result of a study done among mothers in University of Gondar referral hospital by Atlaw et al. [20] who found that the occurrence of puerperal sepsis in the study area was found to be 17.2 %, (95%CI 12.0-22.5). The discrepancy in the study findings can be attributed to the fact that the previous study was conducted in a university teaching hospital which has a number of specialists as opposed to the regional referral hospital where the present study was conducted. The result of this study is not in line with the study conducted in Chhainsa village, in Khyber Agency – Pakistan (16.2%), in Gadchiroli district (12.2 %), in Karachi Pakistan (11.2%) and 11.4% in Enugu, Nigeria [21, 22]. The possible reason for the discrepancies in the finding may be due to differences in the data collection place and period. Data collected from the maternity ward and the community will be different from data collected from the postnatal ward. Moreover, the results of the present study are much higher than the study conducted in Obafemi Awolowo University, Osun State, Nigeria (1.7%), in Sindh Pakistan (3.89%), In Liquat University Hospital, Hyderabad, Sindh (6.28%), In hospitals in Gujarat state, India 3.9%, in BeniSuef Governorate (1.5%) [23-26]. This study was conducted among postnatal mothers utilizing postnatal care service and most of these mothers visit postnatal care when they feel ill or sick and after developing signs and symptoms of disease. There is also differences in the duration of data collection among the literatures. Finally, the findings of the present study are higher than what was found in two studies conducted at Muhimbili, Tanzania where the prevalence was 9.2% [27] and 11.2% [28]. The discrepancy in study findings could be due to variation in management practices.

The Socio-Demographic Risk Factors of Puerperal Sepsis among Reproductive Aged Women at Jinja Regional Referral Hospital

The second specific objective of this study was to establish the socio-demographic factors associated with puerperal sepsis among reproductive aged women. Findings of the present study showed that age of the women, education level and alcohol consumption were the socio-demographic factors associated with puerperal sepsis. Age: The present study showed that age of the women was a risk factor for puerperal sepsis. This finding is in line with the results of a study conducted from Mbarara regional referral hospital in Uganda [10]. Additionally, the result of the present study is in line with the result of a study done in Bangladesh which revealed that puerperal sepsis was significantly associated with the age <25 years [29]. However, Atlaw et al. [20] found no significant association between age and puerperal sepsis in their study carried out among women attending postnatal care service at University of Gondar Referral Hospital. Furthermore, Demisse et al. [2] in their study conducted in Ethiopia did not find any significant association between age of the study participants and puerperal sepsis. Unlike in the present study, the results of a descriptive study among postnatal women who attended Kilimanjaro Christian Medical Centre did not show age to be a risk factor for puerperal sepsis. The result of the present study is slightly in agreement with a study conducted in Egypt which shows that 71.4% of cases were <25 years old comparing 32.4% among the controls [30]. Similar findings have been found in another study from Nigeria where they identified that the maternal age below 24 years is associated with puerperal sepsis with an OR 1.32 [31]. A study from Hyderabad also identified that 67.2% of the mothers who developed puerperal sepsis were below 30 years of age [32]. Probably, the reason of such a finding is physical vulnerability of inexperienced young mother. Level of Education: The present study revealed that the level of education was statistically associated with occurrence of puerperal sepsis among the study participants. The result of the present study is consistent with the results of a study done among post-partum women at public hospitals in west SHOA zone Oromia regional State, Ethiopia [2]. Similar findings have been revealed in a study where it was found that 96% women were uneducated and only the rest were below primary level education who developed puerperal sepsis [33]. Another study from Karachi found that almost two thirds of the women having puerperal sepsis did not have any formal education, 21.4% had 1-5 years of formal schooling, 9.5% had 6-10 years of formal schooling and only 7.6% had more than 11 years of schooling [34]. Similar findings revealed that 96% of women were uneducated and only the rest had a primary level of education from those developed puerperal sepsis [29]. Alcohol Consumption: The current study showed that consumption of alcohol was significantly associated with occurrence of puerperal sepsis. Alcohol has been shown to be a risk factor for many medical conditions and it's no surprise that in the present study alcohol was found to be significantly associated with puerperal sepsis among the study participants. The morbidity and all consequences of puerperal sepsis have an

impact on the life of individual, family, society, and country as a whole. The consequences of puerperal sepsis are increased medical costs, long-term disabilities like prolonged hospital stay and sterility [35]. Alcohol affects all tissues of the body. Its effects on immune function and the systemic inflammatory response syndrome (SIRS) remain topics of active investigation. In regard to immune function, alcohol consumption alters the response at several points along the inflammatory cascade. Due to these potent modulating effects on immune function, alcoholic patients have an increased incidence and severity of infection, particularly in the lung. Majority of previous studies done to identify factors associated with puerperal sepsis, they did not establish association between alcohol consumption and puerperal sepsis among the study participants [36].

The Obstetric Risk Factors of Puerperal Sepsis among Reproductive Aged Women at Jinja Regional Referral Hospital.

Results of the chi square test showed that Mode of delivery, Frequency of pelvic/Vaginal examinations, Number of ANC visits, and parity were the obstetric risk factors associated with puerperal sepsis among reproductive aged women at Jinja Regional Referral Hospital. Mode of Delivery: The present study showed that mode of delivery was significantly associated with occurrence of puerperal sepsis. This finding is consistent with the results of a study done in Ethiopia which revealed that delivery by caesarean section was associated with puerperal sepsis [2]. The result of this study is also in line of the results of a study done by Atlaw et al. [20]) among mothers in University of Gondar referral hospital, Ethiopia. This is inconsistent with the study conducted in Netherlands, California, [37-39]. This inconsistency may be due to differences in the setting where data was collected, poor aseptic technique and poor handling of tissue during operation. Cesarean section by itself is not the cause of puerperal sepsis. Most of the mothers participated who in this study delivered at Jinja Regional referral hospital. The hospital is crowded with lots of patient numbers in relation to the health workers and the limited resources. Due to this some patients maybe left unattended to. Frequency of Pelvic/Vaginal Examinations: The finding of the present study is consistent with the results of a study done among post-partum women at public hospitals which revealed that 5 or more vaginal examinations were significantly associated with puerperal sepsis [2]. The result of the present study is in a row with study conducted in Egypt which indicated that having > = 5 times vaginal examination can lead in developing puerperal sepsis [40]. Similarly, systematic review study conducted in south Asia evidenced that putting hands, frequently in vagina end with puerperal sepsis [22]. Similar to the finding of this study, the results of a nested case-control study conducted by Bakhtawar et al. [41] showed that 3 or more vaginal examinations were associated with puerperal sepsis. This frequent manipulation of genital tracts will facilitate ascension of microorganisms from lower genital tract and thereby increase in probability to develop puerperal sepsis. Number of ANC Visits: Similar to results of the present study, Demisse et al. [2]) in their study conducted from Ethiopia found that having 1 to 2 antenatal visits were a risk factor for puerperal sepsis. The result of the present study is also in agreement with the results of a case-control study conducted by Bakhtawar et al.[41] who found that number of antenatal visits had significant association with puerperal sepsis. However, Atlaw et al. [20]) found no association between number of ANC visits and occurrence of puerperal sepsis in their study among women attending postnatal care service at University of Gondar Referral Hospital. It is during antenatal care that the health workers are able to identify risk factors for various complications so that appropriate interventions can be made, but if a pregnant woman makes few antenatal visits, then chances are high that the health workers may miss identifying the risks of complications. It is therefore important for pregnant women to attend all the recommended number of ANC visits. Parity: The finding of the present study is in line with the result of a study done in Ethiopia by Atlaw et al. [20] who found that parity was a risk factor for puerperal sepsis with low parity (primiparous and multipara) being significantly associated with puerperal sepsis. The result of the present study is similar with the population-based retrospective Cohort Study conducted in California, Pakistan and Nigeria [38, 42]. The possible reason is young inexperienced mothers are unfamiliar with the process of labour such as the sign of labor, its length and complications. It is mostly primiparous mothers who take a long course of labor and trials in various hands before reaching the health facility. This long course of labor can be due to the untested pelvis leads to long course of labor and this exposes them to ascending infection. Another possible reason is that because primiparous are not experienced with labor they fear and go to health institution before the onset of labor and for this they will have frequent vaginal examination which is a risk factors for ascending infection. This may be due to lack of previous experience of pregnancy and childbirth whereas multiparas had been experienced obstetric complications which is an important source of their information. Mothers whose placenta is removed manually are about four times more likely to develop puerperal sepsis than those whose placenta is removed by controlled cord traction.

CONCLUSION

This study has shown that the prevalence of puerperal sepsis among women attending Jinja regional referral hospital is very high when compared to majority of studies done in low resource settings. Puerperal sepsis poses a public

health burden on Jinja regional referral hospital which ultimately has an impact in achieving the target 3 of sustainable development goals. Furthermore, age, education level, and alcohol consumption were the socio-demographic risk factors for puerperal sepsis. Meanwhile, mode of delivery, frequency of pelvic/vaginal examinations, number of ANC visits, and parity were the obstetric risk factors for puerperal sepsis.

Recommendations

Education and knowledge plays an important role in the prevention of puerperal sepsis. Young mothers and women of lower parity status need to be informed of puerperal sepsis and its preventive strategies. The women need to be encouraged to utilize antenatal care services through which they can receive counseling on their hygiene and nutrition. The integration of hygiene education and puerperal sepsis awareness into antenatal care services should be performed as a strategy to prevent and control the infection. Additionally, male involvement in family planning issues should be encouraged. This can help to boost decision making and health-seeking behavior in the community. Furthermore, hospitals need to improve their infection control practices. Moreover, adequate resources should be provided for better service provision and prevention of puerperal sepsis. Efforts at reducing the high proportion of cesarean deliveries, increasing antenatal care attendance, and reducing the number of days admitted and days of urethral indwelling catheter need to be optimized. Health care providers should develop programs targeting enhancement of awareness on puerperal sepsis and consequences of unsafe abortions as well as hygiene education. Further community-based research at national level is desirable to evaluate the magnitude of the puerperal sepsis and associated factors.

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