

Predictors of Neonatal Sepsis Among Post Delivery Mothers at Kitete Regional Referral Hospital in Tabora Region: A Cross Sectional Study

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Abstract

Background

Neonatal sepsis is the clinical infection categorized as early and late-onset. It is a public health challenge all over the world despite of maternal health interventions. Tabora Region is still the region with a high morbidity of neonatal sepsis at the western zone of Tanzania by 6.8%. Risk factors are still obscure. The aim of this study was to assess predictors associated with neonatal sepsis in Kitete Hospital.

Methods

Quantitative and hospital based cross-sectional study with a total number of 328 of neonates with their mothers were selected to participate into the study by using a simple random sampling with lottery method. Blood culture and sensitivity test as well as interviewer administered questionnaires were used to collect data. SPSS version 20 was used for data analysis and descriptive and inferential statistics were employed.

Results

The prevalence of neonatal sepsis in Tabora region is 23.2%. Predictors which were associated with neonatal sepsis were antenatal care < 4 visits (AOR 4.297; 95% CI: 2.163, 8.534), more than four per vagina examination (AOR 2.735; 95% CI: 1.111, 6.734), premature rupture of membrane > 18 hrs during labor (AOR: 2.735; 95% CI: 1.235, 6.911) and prolonged/obstructed labour (AOR: 3.517; 95% CI: 1.521, 8.113).

Conclusion

Neonatal sepsis is still a public health challenge in Tabora region with the prevalence of 23.2%. Important factors noted to contribute neonatal sepsis were antenatal care attendance less than 4 visits, prolonged labour/obstructed labour, premature rupture of membrane for more than 18 hours during labour and per vagina examination for more than three examinations. All pregnant mothers should be encouraged to attend at least 4 antenatal care visits during pregnancy with thorough examination during antenatal care visits and appropriate health education delivery to pregnant mothers, are key strategies against factors associated with neonatal sepsis.

Conclusions: In general, the more the physician believe that there is openness among his professional community to the treatment of medical cannabis, the more open he is to treatment using medical cannabis.

Keywords: Neonates, Neonatal Sepsis, Predictors

List of Abbreviations

ANC	Antenatal care
SBA	Sheep Blood Agar
CEmONC	Comprehensive Emergency Obstetric and Newborn Care
CHOC	Chocolate Agar
DC	District Council
HMIS	Health Management Information System
HRS	Hours
IMR	Infant Mortality Rate
IRB	Institutional Review Board
MAC	Mac Conkey Agar
MH	Muller Hinton Agar
MoHCDGEC	Ministry of Health, Community Development, Gender, Elderly and Children
MSAF	Muconium Stained Amniotic Fluid
NGERCI	National Guideline on Essential Reproductive and Child Health Intervention
NS	Neonatal sepsis
PDM	Post-delivery mothers
PROM	Premature Rupture of Membrane
PVE	Per Vaginal Examination
RCHS	Reproductive Child Health Strategy
SOP	Standard Operating Procedures
STI	Sexual Transmitted Diseases
TDHS	Tanzania Demographic and Health survey
TSB	Tryptic Soy Broth
USAID	United State Agency for International Development
UTI	Urinary Tract Infections
WHO	World Health Organization

1. Introduction

Neonatal sepsis is the clinical syndrome characterized by signs and symptoms of infection with or without accompanying bacteremia in the first month of a neonate life [1].

It may be categorized as an early onset associated with acquisition of microorganisms from the mother's trans placental infection or an ascending infection from the mother's genitourinary tract via the cervix where by 85% of cases, occur within 24 hours and 5% occurs at 24 to 48 hours; and late-onset associated with poor hygiene, poor cord care, bottle-feeding and prelactal feeds that occurs within 48-72 hours. These onsets are public health challenge all over the world contributing to increased neonatal mortality [2].

Out of 15% of neonatal mortality in 2016 globally was contributed by neonatal sepsis [3]. And nearly 3 million of newborn die during the first 28 days of life that accounts 46 percent of all under-five deaths [4]. In North Africa, specifically in Sudan 14.5% of all neonatal mortality were caused by neonatal sepsis cases [5]. More than 80% of all newborn death occurred among small babies in low and middle income countries (Southern Asia and Sub Saharan Africa) [6].

Sub Saharan Africa countries alone, contributed two third of neonatal deaths(4) that accounted for almost 5.29-8.75 million of neonatal death in the year 2016 [7]. Particularly 50% of neonatal death occurred in Nigeria, DR Congo, Ethiopia, Tanzania and Uganda. The top three leading diagnoses for neonatal mortality were infections by 39%, Birth asphyxia 24%, Pre term complications 25% [8].

In Tanzania newborn deaths accounted for 40 percent of all under-five deaths. Approximately 39,500 newborns die annually; nearly 50% of all deaths occur within the first 24 hours after birth and 75 % within the first 7 days of life. Three conditions accounting for three-quarters of all newborn deaths are: Birth asphyxia 31%, preterm complications 25% and infections 20%. Neonatal mortality is closely related to quality of care during pregnancy, labour and delivery and immediate post-delivery [9]. The aim of this study was to determine the risk factors for neonatal sepsis in Kitete Regional Referral Hospital

2. Materials and Methods

2.1 Study Area

The study was conducted in Tabora region at Kitete Region Referral Hospital which, is located in Mid-Western part of Tanzania on the

central plateau between latitude 40-70 South and longitude 310-340 East. The region has the population of 3,087,195 distributed by 1,527,195 Males and 1,559,219 Females NBS projections based on 2002 census and 2012 Census general report [10]. It shares a border with Shinyanga region in the North, Singida region in the East, Mbeya and Rukwa regions in the South while the Western border is shared with Kigoma region. Tabora region has an area of 76,151 square. Kilometer, where by 34,698 square. Kilometer is forest reserves and 17,122 square. Kilometer. are Game Reserves.

2.2 Study Design

This study was used a hospital based cross sectional analytical study with quantitative approach to assess predictors associated with neonatal sepsis conducted in Kitete Hospital by using blood culture and sensitivity test and interviewer administered questionnaires to collect data to estimate the prevalence of diseases as well as to find out the association between the exposure and outcome of interest between 8th April to 8th May 2019.

2.3 Study Population

Study populations were neonates with their index mothers from day 0-28 days post-delivery.

Sample size The sample size was estimated by using the formula for quantitative studies [11].

The formula states that; $n = \frac{Z^2 PQ}{d^2}$

n = minimal sample size

Z = constant, standard normal variation (1.96 for 95% confidence level)

P = prevalence of neonatal sepsis 31.4% Study done at Tanzania [12].

Q = 1-p

d = acceptable margin of error 5%

$$n = \frac{Z^2 PQ}{d^2}$$

$$n = \frac{1.96^2 \times 0.31 \times 1 - 0.31}{0.05^2}$$

$$n = \frac{3.84 \times 0.31 \times 0.69}{0.0025}$$

$$n = 328$$

2.4 Sampling Technique

Tabora region was selected purposively because it has high increase number of neonatal sepsis by 6.8% compared to Kigoma region that neonatal sepsis increased by 3.4% from 2017 to 2018 respectively in western zone [13].

Kitete hospital was selected purposively due to high number of neonatal morbidities 6.8%, and is the only referral hospital within the region which perform blood culture and sensitivity test, and

receiving referrals not only from its adjacent district hospitals but also from nearby region of Kigoma and Katavi.

Participants were selected by a simple random sampling procedure using lottery method (A list of numbers of post delivery mothers were obtained from delivery book number 12 blindly selection were done to the sample size required for the study). The average daily deliveries in Kitete Regional Referral Hospital were 15 to 20 deliveries. Each day 10 neonates were selected from the sampling frame of 15 to 20 deliveries. During the period of data collection for 33 days, total number 328 neonates were selected to participate in the study together with their mothers from sampling frame of 520 neonates where by 328 neonates were checked for body temperature. 206 neonates out of 328 had high body temperature and they were recruited by collecting their blood sample for laboratory culture and sensitivity test.

3. Data Collection Tools

The matrix table was used to record the prevalence results from the tested blood culture and sensitivity; While modified structured questionnaires adopted from Chhetri and Mandal were used to collect data for the demographic characteristics information, factors for neonatal sepsis and the level of knowledge on prevention of neonatal sepsis from neonates mothers [14].

3.1 Data Collection Method

3 methods were used to collect data. Blood culture and sensitivity test was used to confirm neonatal sepsis prevalence, where interviewer administered structured questionnaire method was used to collect data for predictors of neonatal sepsis, knowledge on infection prevention and social demographic data. and documentary review was used to collect data on gestation age, birth weight and Apgar score.

The researcher trained 2 nurse midwives as research assistants to collect and fill the questionnaires; as well 2 laboratory microbiologists were employed for blood culture and sensitivity process.

3.2 Dependent Variable

Neonatal sepsis was first diagnosed by raised body temperature $\geq 37.5^\circ\text{C}$, measured by nominal scale, then blood culture was done to confirm neonatal sepsis, measured by nominal scale (positive and negative results).

3.3 Independent Variables

Maternal and neonatal factors were parity of the woman, antenatal attendance during pregnancy, gestation age at birth, history of UTI/STI during third trimester, premature rupture of membrane for 18 hours during labour, history of foul smelling liquor, type of delivery, birth weight of the newborn, Apgar score at birth, resuscitation and maturity of the baby that were measured by nominal scale. (Yes/No).

3.4 Validity

Validity is the extent to which the measure provides an accurate

representation of what one is intending to measure. Neonatal sepsis has been tested from laboratory for blood culture and sensitivity results to restore the validity of neonatal sepsis prevalence.

3.5 Reliability

The term reliability is used to describe the degree of variable error in measurement. Tools were pre-tested in Urambo District hospital to test the practicability and accuracy of the tools where some modification of question was done. Tools were shared by the supervisor as well as peer group reviewers and experts to increase its reliability.

Furthermore, the English questionnaire was translated into Swahili language to make easy for participants to respond them correctly. And Interviewer administered questionnaire were used to increase the response rate.

4. Data Process and Analysis

Statistical Package for social science (SPSS) Software Version 20, was used for data analysis where before analysis data were checked for accuracy and completeness. Cleaning was done by running frequencies to check missing data that were then coded and entered into the code book. Social demographic characteristics and prevalence were analyzed by descriptive analysis and presented using frequency and percentages. Chi square was used to measure the relationship between independent and dependent variables. The level of significant was considered at the $P\text{-value} < 0.005$. Inferential analysis that includes binary logistic regression analysis was employed and 95% CI was used to measure of the strength of the association and for controlling the confounder

5. Ethical Considerations

The ethical clearance was obtained from the (IRRB) Institutional

Research Review Board of the Dodoma University for the approval for data collection. Permission to carry out the study was obtained from the Regional Municipal together with Kitete Hospital Authorities. Participants were explained about the aim; advantages and disadvantages of the study, those who were willing and eligible to join the study signed the informed consent form and were selected to participate into the study. Confidentiality of the patient's laboratory records and other medical information was restored. All those with positive results were informed through telephone to bring back their babies for treatment and those who were withdrawn from the study had been treated fairly based on the hospital protocol.

6. Results

6.1 Social and Demographic Characteristics of Participants

Under this section, the social demographic characteristics of the respondents were presented as indicated below. Results have highlighted that; Age groups of 15 – 24 years were 147 (44.8%). And that of 25-34 and 35 – 44 years were 129(39.3%) and 52 (15.9%) respectively.

The mean age was $26.74 \text{ std} \pm 6.939$ with a minimum age of 15 years and the maximum was 42 years. Where majority of 192 (58.5%) came from rural areas when compared to 136 (41.5%) of from the urban. Likewise, with the marital status majority of 179 (54.6%) were married.

For the level of education, 153 (46.6%) had completed primary education, while only 8 (2.4%) reached higher education. Those with no formal education were 85 (25.9%). Moreover, 184 (56.1%) were self-employed, none employed post-delivery women were 133 (40.5%) but only 11 (3.4) were employed table 1 below.

Demographic characteristics	Participants distributions	
	N	%
Age group		
15-24 years	147	44.8
25-34 years	129	39.3
35-44 years	52	15.9
Residence		
Urban	136	41.5
Rural	192	58.5
Marital status		
Not married	75	22.9
Married	179	54.6
Living together	57	17
Separated/widow	17	5.2
Educational level		
No formal education	85	25.9
Primary	153	46.6
Secondary	82	25.0
Higher education	8	2.5

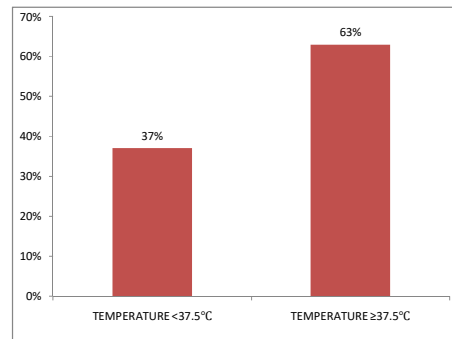
Occupation		
Non employed	133	40.5
Self employed	184	56.1
Employed	11	3.4
(Source Field Survey 2019)		

Table 1: Social Demographic Characteristics N =328

7. The Prevalence of Neonatal Sepsis at Kitete Regional Referral Hospital

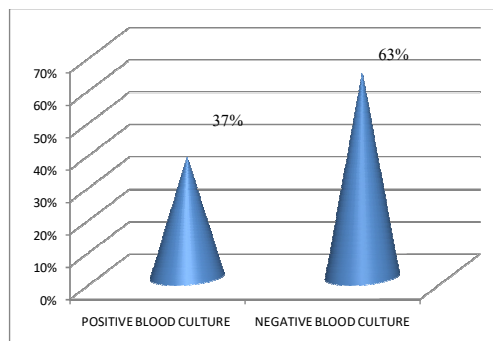
The prevalence of neonates with high body temperature $\geq 37.5^{\circ}\text{C}$ was 206 (63%) from the sample of 328 neonates. Out of 206

neonates with high body temperature, 76 had neonatal sepsis that make the prevalence of neonatal sepsis (37%) after laboratory blood culture test. Whereas the overall prevalence of neonatal sepsis in Tabora region was 23.2% (Fig.3, 4&5 below)



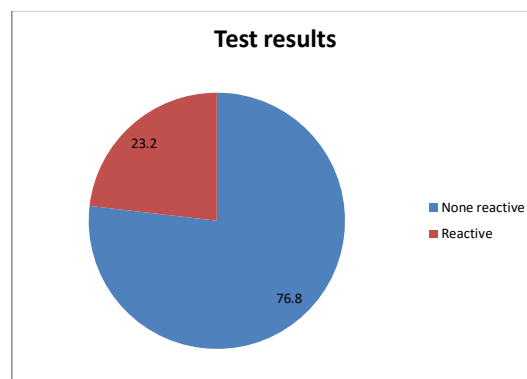
(Source: Field survey 2019)

Figure 1: Shows the Prevalence of Neonates with Fever N=328



(Source: Field survey 2019)

Figure 2: Illustrate the Prevalence of Neonatal Sepsis from Neonates who Had Temp $>37.5^{\circ}\text{C}$ N=206



(Source: Field survey 2019)

Figure 3: Overall Distribution of Participants for Test Result N=328

7.1 Predictors of Neonatal Sepsis

The relationship of neonatal infection factors for the neonatal sepsis among neonates in Tabora, have denoted variability of significance. Some of the studied variables have shown relationship with neonatal sepsis. These variables were residence ($X^2=16.979a$, $P= <0.001$) and the education level ($X^2=33.693a$, $P= <0.001$), ANC visits during pregnancy ($X^2=31.462a$, $P= <0.001$), per vaginal examination more than 4 times during labour

($X^2=9.946a$, $P=0.002$), history of UTI/STI during third trimester ($X^2= 5.886a$, $P=0.015$), PROM for 18hours during labour ($X^2 = 12.362^a$, $P = <0.001$), maternal fever during labor ($X^2 = 8.359a$, $P=0.004$), foul smelling liquor ($X^2= 4.919a$, $P=0.027$), Prolonged and Obstructed labor ($X^2 = 14.494a$, $P= <0.001$) resuscitation procedures ($X^2 = 4.058a$, $P=0.044$) and Apgar score ($X^2 = 5.751a$, $P=0.016$) (table 3 below).

Variables	Neonatal sepsis					
	NO		YES		X ²	P. Value
	n	%	n	%		
Age group						
15-24 years	112	76.2	35	23.5	0.541 ^a	0.763
25-34 years	98	76.0	31	24.0		
35-44 years	42	80.8	10	19.2		
Residence						
Urban	120	88.2	16	11.8	16.979 ^a	0.000
Rural	132	68.8	60	31.3		
Educational level						
No formal education	46	54.1	34	45.9		
Primary educational	130	85.0	23	15.0	33.693	0.000
Secondary	70	85.4	12	14.6		
Higher education	6	75.0	2	25.0		
Occupation						
Non employed	102	76.7	31	23.3	0.118	0.943
Self employed	142	77.2	32	22.8		
Employed	8	72.7	3	27.3		
ANC visit during pregnancy						
Attended less than (4) four visit	65	58.6	46	41.4	31.462 ^a	0.000
Attended 4 visits and more	187	86.2	30	13.8		
Gestation age at birth						
Bellow 37 weeks (<37)	4	80.0	1	20.0	0.029 ^a	0.866
37 weeks and above (>37)	248	76.8	75	23.2	0.029 ^a	
History of per vagina examination for more than (4) four examination during labour and delivery						
No	71	59.9	8	10.1	9.946 ^a	0.002
Yes	181	72.7	68	27.3		
History of maternal fever during labour delivery						
No	87	87.0	13	13.0	8.359 ^a	0.004
Yes	165	72.4	63	27.6		
History of UTI/STI during third trimester of pregnancy						
No	50	89.3	6	10.7	5.886 ^a	0.015
Yes	202	74.3	70	25.7		
Prom for 18hours during labour and delivery						
No	90	89.1	11	10.9	12.362 ^a	0.000
Yes	162	71.4	65	28.6		
Foul smelling liquor during labour						

No	87	84.5	16	15.5	4.919	0.027
Yes	165	73.3	60	26.7		
Prolonged/ obstructed						
No	107	88.4	14	11.6	14.494	0.000
Yes	147	70.0	62	30.0		
Parity						
Primipara	82	75.9	26	24.1		
Multipara	107	74.8	36	25.2	1.449 ^a	0.482
Grand multipara	63	81.8	14	18.2		
Birth weight						
(<)2.5kg	51	75.0	17	25.0	0.161 ^a	0.688
≥ 2.5kg and above	201	77.3	59	22.7		
Apgar score						
< 7score	113	71.1	46	28.9	5.757	0.016
> 7score	139	82.2	30	17.8		
Resuscitation						
No	136	81.4	31	18.6	4.058 ^a	0.044
Yes	116	72.0	45	28.0		
Maturity						
Premature	4	80.0	1	20.0	0.029 ^a	0.866
Mature	248	76.8	75	23.2		
(Source field survey 2019)						

Table 2: Cross Tabulation on the Predictors of Neonatal Sepsis N=328

7.2 Association of Risk Factors and Neonatal Sepsis

Binary logistic regression analysis was done to identify factors which were associated with neonatal sepsis. Results indicated that, women who were living in rural areas were 0.295 less likely their babies to have neonatal sepsis when compared to those living in urban place (AOR of 0.295; 95% CI: 0.143, 0.609).

Likewise, new born from mothers who had < 4 ANC visits were 4.297 times more likely to have neonatal sepsis compared to those babies born from mothers who attended more than four ANC visits (AOR 4.297; 95% CI: 2.163, 8.534),

Result indicate that neonates who were born from mothers who

had more than four PVE were 2.735 times more likely to have neonatal sepsis compared to those who had less PVE during labour (AOR 2.735; 95% CI: 1.111, 6.734).

Findings shows that mothers who had premature rupture of membrane >18 hours during labor their neonates were 2.922 times more likely to have neonatal infection compared to mothers who had no PROM >18Hours (AOR: 2.922; 95% CI: 1.235, 6.911).

Women who had prolonged/obstructed labour their neonates were 3.517 times more likely to have neonatal infection compared with mother whom had no prolonged/obstructed labour with AOR: 3.517; 95% CI: 1.521, 8.113).

Variable	OR	P-value	95% CI		AOR	P- value	95%CI	
			Lower	Upper			Lower	Upper
Residence								
Urban Ref.								
Rural	3.409	<0.001	1.863	6.239	0.295	<0.001	0.143	0.609
Education level								
No formal education	2.543	0.269	0.485	13.526	2.111	0.480	0.266	16.747
Primary education	0.531	0.455	0.101	2.793	0.495	0.496	0.066	3.738
Secondary education	0.514	0.447	0.093	2.853	0.490	0.503	0.061	3.939
Higher education	Ref							
ANC visit during pregnancy								

Attended less than (4) visits	4.411	<0.001	2.572	7.567	4.297	<0.001	2.163	8.534
Attended 4 visits and more	Ref.							
PVE more than (4) examinations								
No	Ref.							
Yes	3.334	0.003	1.525	7.290	2.735	0.029	1.111	6.734
Maternal fevers during labour								
No	Ref.							
Yes	2.555	0.005	1.333	4.900	1.400	0.414	0.625	3.138
History of UTI/STI								
No	Ref.							
Yes	2.888	0.019	1.187	7.028	1.899	0.250	0.836	5.666
Premature of membrane 18hours during labour								
No	Ref.							
Yes	3.283	0.001	1.648	6.538	2.922	0.015	1.235	6.911
Foul smelling liquor								
No	Ref.							
Yes	1.977	0.028	1.075	3.637	0.996	0.992	0.454	2.185
Prolonged/obstructed labour								
No	Ref.							
Yes	3.268	<0.001	1.738	6.145	3.517	0.003	1.521	8.113
Apgar score								
< 7 score	1.886	0.017	1.118	3.181	26959029	0.999	0.000	
> 7 score	Ref.							
Resuscitation								
No	Ref.							
Yes	1.702	0.045	1.012	2.863	0.000	0.999	0.000	
(Source from field survey 2019)								

Table 3: Bivariate and Multivariate Logistic Regression Analysis for Factors of Neonatal Sepsis

8. Discussion

8.1 Social Demographic Characteristics of Participants

The fact that age groups of 15 – 24 years were 147 (44.8%) compared to 52 (15.9%) of 35 – 44 years which suggests the domination of the increased delivery in 15 – 24 years reproductive age, this could be due to an early marriage specifically in Sub Saharan Africa [15].

Majority of participants 192, (58.5%) came from rural areas when compared to those from urban area 136, (41.5%). This implied that Kitete Regional Hospital as Regional Referral points; receives more clients for deliveries from the peripheral areas.

Most participants (46.6%) completed primary education when compared to the least (2.4%) that reached higher education. This information concurs with that of an early marriage at 18 years previously discussed in the increased deliveries with age group 15 – 24 years. Following failure to complete secondary education, with their parents pressure, most girls end up by remaining with only the option of marriage [15].

8.2 Prevalence of Neonatal Sepsis Among Neonates

The prevalence of neonates with the raised body temperature of $\geq 37^{\circ}\text{C}$ and above was 63% (206) when compared to the total sample selected, but only 37% were tested positive with the neonatal sepsis.

This implies that, approximately half of febrile neonates used to be treated syndromically and inappropriately, for the neonatal sepsis if high body temperature is taken as the sign of infection especially in hospitals which do not execute blood culture and sensitivity test.

The overall findings for the neonatal sepsis prevalence of 23.2% explain that the prevalence of neonatal sepsis is still high compared to the national target of reducing neonatal death by 21-16, per 1000 live birth by the year 2020 [16].

This situation might as well be due the availability of laboratory culture and sensitivity reagents test during the period of the study which made easier the confirmation of neonatal sepsis diagnosis. The current findings were different with the results reported at Temeke and Mwananyamala municipalities in Dar es Salaam and

in Sudan, that the prevalence of neonatal sepsis were 31.4%(12) and 17.5%respectively [17]. Nevertheless, in Ethiopia the prevalence was 77.9% though the design and methodology used were retrospectively review of file to ascertain neonatal sepsis information Findings revealed that neonates from mothers who resided in rural areas were less likely to have neonatal sepsis when compared to those from urban mothers [18]. These findings suggest a remarkable delay in receiving medical services and even lack of appropriate management of conditions during ANC that will complicate to the neonatal sepsis. Long distance and financial constrain and decision making to seek medical help from rural pregnant mothers, might predisposed the probability of their babies to acquire neonatal sepsis post-delivery.

This information, was supported with when assessing factors contributing neonatal sepsis and it was observed that, lack of financial support from fathers was factor associated with neonatal sepsis For the predictors of neonatal sepsis, neonates whose mothers' ANC attendances were less than 4 visits during pregnancy were among the maternal factors which were associated with the neonatal infection compared to those whose mothers completed at least four ANC visits [19]. This could be due to the inadequate health education to identify risk factors which could contribute to the neonatal sepsis as well as screening that could have been offered during ANC visits if pregnant mothers would have attended.

Similar finding were observed in Rwanda that incomplete ANC visits were observed to contribute neonatal mortality [20]. Contrary to Mate's report highlighted that failure to ANC attendances was not statistically significant with neonatal sepsis occurrence (P-value 0.787) [21].

Likewise, neonates who were born from mothers who had more than four PVE were more likely to have neonatal sepsis when compared to those born by mothers who had less than four PVE during labour and delivery. This could be due to ascending the infection via birth canal to the fetus, these findings are supported by [22].

Khurana's results indicated that PVE more than three examination was significantly associated with neonatal sepsis not only that but also he further showed that foul smelling liquor, PROM >18 hours, having indwelling catheters, receiving total parenteral nutrition were associated with neonatal sepsis.

The implications of ascending infection secondary to per vaginal examination has been observed by Coetzee in South Africa [23]. Furthermore, a study conducted in Malaysia reported that, multiple digital vaginal examination together with PROM >18hours, MSAF, placement of internal fetal monitoring and uterine device, can contribute to the acquisition of pathogens from mother's colonized birth canal during delivery time via placenta [24].

Prolonged and obstructed labour was a predictor for neonatal infection that was observed under this study that, prolonged labour

and obstruction it can lead to ascending infection during the process of delivery due to the colonized birth canal of the mother which give chance for the neonate to acquired infection .This findings was similar with done by Khurana reported that, prolonged and difficult delivery were associated with neonatal infection.

PROM, was significantly associated with neonatal infection since ascending infections through birth canal which travel to the amniotic sac causing chorioamnionitis as a result of newborn infections, these findings concurred with the study done on risk factors for neonatal sepsis in Ethiopia, that PROM for > 18 hours were associated with newborn infection by 30.8% for the case group when compared to 3.8% from the control group. Theses similarities are suggestive that PROM is a mode of infection transmission ascending to amniotic cavity [25].

Finally the study had found out that, neonatal risk factors like low Apgar score and resuscitation procedures had a relationship with neonatal sepsis after chi-square test with P-value 0.06 and 0.044 respectively but after logistic regression were not statistically significant.

The reason could be due to the satisfactory helping baby breath care given to neonates after delivery helping them breathe promptly. In addition it signifies that, service providers were equipped with the necessary knowledge and skills for life saving.

However, these findings are different with a study executed in Ghana that reported less Apgar score below 7 points and resuscitations procedures, were significantly associated with neonatal sepsis [21].

9. Conclusion

Neonatal sepsis is still a public health challenge in Tabora region with the prevalence of 23.2%. Important factors noted to contribute neonatal sepsis, were residence especially for post-delivery mother living in rural areas, ANC attendance less than 4 visits during pregnancy, prolonged labour/obstructed labour, premature rupture of membrane 18 hours during labour and repeated vaginal examination for more than three examinations. All pregnant mothers should be encouraged to attend at least 4 antenatal care visits during pregnancy with thorough examination during antenatal care visits and appropriate health education delivery to pregnant mothers, are key strategies against factors associated with neonatal sepsis. Standard operating procedures on per vagina examination shouldadhered by service providers during labor and delivery. Requirements to execute this intervention, are preliminary the availability of per vagina examination Standard operating procedures at all delivery room, and that they should be displayed.

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