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PREVALENCE AND DETERMINANT FACTORS OF NEONATAL SEPSIS AMONG NEONATES ADMITTED AT HIWOT-FANA SPECIALIZED REFERRAL HOSPITAL, HARAR, ETHIOPIA, 2020

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Abstract

Background: Neonatal sepsis is a systemic infection occurring in neonatal life and is a major cause of morbidity and mortality in newborns .It accounts for five million newborn deaths
Objectives:- The objective of this study was to assess Prevalence of neonatal sepsis and its determinant factors among neonates admitted in Hiwot-Fana Specialized Referral Hospital, Harar, Ethiopia, 2020
Methods: An institution based cross-sectional study with retrospective document review method was conducted in Hiwot-Fana Specialized Referral Hospital in Harar town. Sample size was calculated by using single population proportion sample formula and the final sample size was 292.The study subject was selected by using systematic random sampling method, and adopted data collection tool was used. Data was analyzed by using SPSS version-20. Descriptive analyses were performed and bivariate analyses were used to find out the association of independent variables.
Result: The overall prevalence of neonatal sepsis in this study was 52.7%..This study found out that PROM of the mother, gestational age of neonates and birth weight of the neonate were significantly associated with neonatal sepsis..
Conclusion: The associated risk factors for neonatal sepsis were identified as PROM of the mother, gestational age of neonates and birth weight of the neonate.
Recommendation:Therefore, preventive efforts should focus on high risk neonates such as neonates born from mothers who have PROM, neonate with low birth weight and neonates born prematurely. Thus, a careful monitoring and follow up as well as rigorous treatment are needed.

Keywords: *Prevalence; Neonatal Sepsis; Determinants; Hospital; Harar; Ethiopia*

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INTRODUCTION

Neonatal sepsis is a systemic infection occurring in neonatal life and is a major cause of morbidity and mortality in newborns.1 Based on the onset of clinical features It is categorized as early and late onset neonatal sepsis.2Early Onset Neonatal Sepsis occurs within seven days and Late Onset Neonatal Sepsis occurs after the seventh days of life.3

Neonatal sepsis accounts for five million newborn deaths, and is mostly diagnosed in underdeveloped countries, 4 the risk of neonatal death is 6 times higher in developing countries when it compared to developed countries. Evidence concealed that neonatal deaths accounted for 52% of all under five children mortality in South Asia, 53% in Latin America and Caribbean, 34% in sub-Saharan Africa,5 41 % in Ethiopia 6

Neonatal sepsis signs and symptoms are nonspecific, may be unclear for some time and wrong for conditions distinctive of this period of life, such as respiratory disorders caused by prematurity. Also, there are many infants with presumed suspected clinical sepsis for every septic newborn.3
Timely diagnosis is difficult due to its nonspecific clinical manifestations. Besides, treating neonates with antibiotics simply by slight manifestations is likely to over treat non infected neonates.7 Identification of risk factors and timely initiation of treatments can significantly decrease neonatal mortality and morbidity.5

Different literatures showed that, neonatal sepsis is caused by both maternal and neonatal factors such as prolonged rupture of membrane (PROM), urinary tract infection, intra-partum fever, instrumental delivery, prematurity, chorio-amnionitis, frequent vaginal examination, never attend antenatal care (ANC), home delivery, meconium stained amniotic fluid, contaminated foods intake, low birth weight, complicated or instrument-assisted delivery, low appearance pulse grimace activity respiration (APGAR) scores and invasive procedures during hospital admission.8–14

This study was conducted in Harari regional state, Harar, to find the current prevalence of neonatal sepsis and its determinants among neonates admitted to the Neonatal Intensive Care Unit (NICU) in Hiwotfana specialized teaching and referral hospital in the past one year. So the study will give a picture from harari regional state, Ethiopia and will create opportunity for stake holder to reduce the problem based on factors identified.

METHOD

Study setting and participants

Retrospective cross-sectional study was conducted for last one year data. Data was collected from April 1 to May 30, 2019. All charts of Neonatal sepsis from January, 2018 to January, 2019 G.C was retrieved from registration book that met the inclusion criteria at Hiwot fana specialized referral hospital which is found in Harar town, located in the far-east of Ethiopia, about 514 km from the capital city of Addis Ababa. The hospital was constructed and began services in the Era of colonial of Italy in 1933 G.C and providing service for the region as well as for neighboring regions
A sample size of 292 was calculated, by using a single population proportion formula for a 77.9%, 15 prevalence of neonatal sepsis taken from a study conducted at Shashemene Town, Oromia Regional State, Ethiopia, and a 10% non-response rate was added. Ethical clearance was obtained from the Harar Health Sciences College Research Review Ethical Committee (Ref.no.HHSC-70/2019). Consent was obtained from the administrative bodies of the hospital.

Data collection tools

The structured data extraction checklist was developed from different peer reviewed published literature this checklist data was collected by reviewing neonates' medical records by 4 trained nurses. Every

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day, after data collection, each questionnaire was reviewed and checked for completeness by the principal investigator and the necessary feedback was given to data collectors for the next day.

Data analysis

After data collection, the questionnaire was checked for completeness and coded. The data were entered into Epi-info version 3.5.3 and exported, cleaned and analyzed by using SPSS version-20. Descriptive analyses were performed and bivariate analyses were used to find out the association of independent variables. Variables with a $p<0.05$ in the bivariate analysis were entered into multiple logistic regression and variables with $p<0.05$ in the multivariate analysis were considered to have statistically significant associations.

Table 1 Socio demographic characteristics of mothers with their index neonates admitted in Hiowt Fana Specialized Referral Hospital neonatal intensive care unit Harar, Ethiopia, 2020

Variables		n	%
Age of mothers	< 35 years	197	67.47
	≥ 35 years	95	32.53
Residence	Urban	139	47.60
	Rural	153	52.40
Marital status Currently	married	248	84.93
	un married	44	15.07
Educational level	Not attended formal education	167	57.19
	Attended formal education	125	42.81
Occupation	House wife	211	72.26
	Employed	81	27.74
Sex of neonate	Male	181	61.99
	Female	111	38.01
Age of neonate	1–7 days	243	83.22
	8–28 days	49	16.78

RESULT

Socio demographic characteristics

A total of 292 chart of neonates reviewed in this study and the index mothers were included in the study among this 197(67.7%) of mothers/care givers/ of the neonates were in the age group less than 35 years, 153(52.40%) of them lives in rural, 181 (62%) were born male, 243(83.22%) were age less than 7 days. See Table 1.

Obstetric characteristics of respondents

From of total of 292 samples included in the study 170 (58.2%) of mothers were multipara, 174 (59.59%) of mothers had ANC follow up during their pregnancy, 173 (59.25 %) were give birth through Spontaneous vaginal delivery and 80 (27.4%) of mothers had history of PROM. See Table 2

Table 2 Obstetric characteristics of respondents with their index neonate who were admitted in Hiowt Fana Specialized Referral Hospital neonatal intensive care unit Harar, Ethiopia, 2020

Variables		n	%
Age of mothers	< 35 years	197	67.47
	≥ 35 years	95	32.53
Residence	Urban	139	47.60
	Rural	153	52.40
Marital status Currently	married	248	84.93
	un married	44	15.07
Educational level	Not attended formal education	167	57.19
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Age of neonate	1–7 days	243	83.22
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Variables		n	%
Parity	Primipara	122	41.78
	Multi para	170	58.22
PPROM	Yes	80	27.40
	No	212	72.60
APH	Yes	9	3.08
	No	283	96.92
ANC follow up	Yes	174	59.59
	No	118	40.41
Place of delivery	Health institution	288	98.63
	Home	4	1.37
Mode of delivery	SVD	173	59.25
	C/S	113	38.70
	Instrumental	6	2.05
Duration of labor	< 24 h	282	96.58
	≥ 24 h	10	3.42
Maternal HIV status	Positive	2	0.68
	Negative	290	99.32
Urinary tract infection (UTI)	Yes	37	12.67
	No	255	87.33

From 292 samples included in the study 185 (63.4%) had birth asphyxia, concerning their gestational age, 203 (69.5%) were term and 180 (61.6%) of them had weighed between 2.5 – 4kgs. See Table 3

Table 3 Characteristics of neonate who were admitted in Hiowt Fana Specialized Referral Hospital neonatal intensive care unit Harar, Ethiopia, 2020

Variables Category Cases n=112(%) Control n=223(%)		**n**	**%**
Birth asphyxia			
	Yes	185	63.36
	No	107	36.64
Gestational Age	Preterm	19	6.51
	Term	266	91.10
	Post term	7	2.40
Birth weight	LBW	112	38.36
	Normal	180	61.64

The major morbidity profile among all neonates admitted in NICU of Hiowt Fana Specialized Referral hospital was Neonatal sepsis 154(52.7%) followed by 65 (22.3%) Perinatal Asphyxia and 27 (9.2%) Meconium Aspiration Syndrome respectively.

Factors Associated with Neonatal sepsis

In Bi-variate logistic regression analysis, Age of mothers, Residence, Sex of neonate, history of PROM, ANC follow up, Gestational Age, Birth asphyxia, were statistically associated with neonatal sepsis. Variables that showed statistically significant associations with neonatal sepsis in the bi-variate analysis were entered into a multivariate logistic regression for controlling possible confounders. After controlling the effect of other predictor variables, the multivariate logistic regression analysis showed statistically significant association between, PROM, Gestational Age, Birth weight and neonatal sepsis with $p<0.05$.

DISCUSSION

The overall prevalence of neonatal sepsis in this study was 52.7%, the study is in line with a study done in Iran which was 51.8%.16 Where as It is lower than studies done in Debrezeit 72.2%,17 Shashamene 77.9% ,18 and Douala (Cameron) 79.1% 19 and it is also higher than studies done in India, 7.6%, 20 Kenya, 23.9%, 21 Temeke and Mwananyamala hospitals, Tanzania,31.4%,22 Egypt 40.7% 23 and Black Lion specialized hospital (Ethiopia) 44.7%. 24 The difference might be due to socio-demographic/economic/ variation, methodological difference like that of sample size, study design.

Neonates born to mothers having PROM had more than 2 times greater risk of having sepsis compared to those neonates born from mothers who do not have PROM (AOR=2.74(95%CI 1.32,4.39) the finding is similar with studies conducted in Mexico ,11Brazil25 and mekelle.26 it is obvious that early rupture of membrane exposed for ascending infection which leads to sepsis.

In this study neonates born at a gestational age>37 weeks had 15% reduction

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in the risk of developing neonatal sepsis compared to babies born preterm (AOR (95%CI=0.85(0.34-0.815). this shows that neonates born at term has lower chance to develop neonatal sepsis compared to neonates who were born pre term. This finding is similar with the studies conducted in Tikur Anbsa,24Gondar,8Tanzania22 and Mexico.27 The possible explanation is that preterm babies are immature; their immune system is not well developed and poor breast suckling which predisposes them poor nourishment and body defense and finally for sepsis

This study found that those neonates who had a normal birth weight (>2500gms) had significant reduction in the risk of developing neonatal sepsis compared to neonates who are low birth weight. This result is similar to the findings in studies done in Mexico, Tanzania, Gondar and tikur anbesa.8,22,24,27 This might be because neonates who are low birth weight had increased risk of hypothermia because of they have little subcutaneous fat, had high body surface area to weight ratio, and poorly developed immune system.

Limitations of the Study

Since the study incorporates only public facility but not private facilities, so the findings may be difficult generalizable for general population.

CONCLUSION

The study found that among a total of neonates admitted in Hiwot-Fana Specialized Referral Hospital, the overall prevalence of neonatal sepsis was 52.7% within the last one year from two hospitals. The factors associated with neonatal sepsis in this study were PROM, birth weight and gestational age .Therefore, preventive efforts should focus on high risk neonates such as neonates born from mothers who have PROM, neonate with low birth weight and neonates born prematurely. Thus, a careful monitoring and follow up as well as rigorous treatment are needed.

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