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Assessment of neonatal sepsis and associated factors among neonates admitted neonatal intensive care unit in selected public hospitals in Somali region, Ethiopia

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ABSTRACT

Objectives: To assess neonatal sepsis and associated factors among neonates admitted neonatal intensive care unit in selected public hospitals in Somali region, Ethiopia.

Methods: Institution based cross sectional study design was conducted in selected public hospitals. Data was collected using structured questionnaire adopted from other literature, entered into Epi-data version 3.1 and then was exported to SPSS version 23 for analysis. Frequency was used for descriptive analysis. Bivariate analysis was used to determine the association between different risk factors and the outcome variable. Those variables which have significant association at 5% significance level and fulfilling the minimum requirement of 0.2 level of significance with neonatal sepsis was entered for further analysis to multivariate analysis, significance was taken at $\alpha = < 0.05$.

Results: The overall prevalence of this study was 42.9% CI = (38.4-47.8) and associated factors was age of the neonate AOR = 0.085 (CI = 0.01, 0.73), Residence shown AOR = 2.567 (CI = 1.01, 6.5) Gestational age AOR = 1.869 (CI = 1.05, 3.31), Meconium stained Amniotic fluid AOR = 2.718 (CI = 1.89, 6.74), Antenatal care AOR = 8.933 (CI = 4.9, 15.9), and Mechanical ventilation after birth OR = 3.376 (CI = 1.65, 6.88).

Conclusions: The present study found that the overall prevalence of neonatal sepsis in selected hospitals was 42.9%. The study identified, Age of the neonate, Residence, Gestational age, Meconium stained amniotic fluid. Antenatal care, Mechanical ventilation after birth. The findings underscore the importance of routine assessment and close monitoring of neonates. It is therefore recommended to have more skilled health personnel and advanced equipment while providing maternal and new-born health care services.

Keywords: Neonatal sepsis, associated factors, neonates admitted neonatal intensive care unit, selected public hospitals, Somali region, Ethiopia 2017/2018.

Sepsis is defined as a clinical syndrome describe by a set of hemodynamic, respiratory and metabolic shifts secondary to an infectious process that can prompt an unusual systemic inflammatory response syndrome of the organism (SIRS) [1].

Neonatal sepsis is a defined as a clinical syndrome characterized by signs and symptoms of infection in an infant 28 days of life or younger. And it is a major cause of morbidity and mortality in newborns [2]. Early onset of neonatal sepsis defined as occurring in the first 3 days of life and is caused by bacterial pathogens transmitted vertically from mother to infant before or during delivery while late-onset sepsis (LOS) is sepsis occurring after 72 h in NICU infants

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and 7 days of life in term infants, has been variably defined as occurring up to the age of _90 or 120 days, and may be caused by vertically or horizontally acquired pathogens [3]. According to WHO the epidemiology of sepsis is better known in adults than in children, yet neonatal and child death due to sepsis is a major problem. There are an estimated 2.9 million deaths worldwide from sepsis every year (44% of them in children under 5 years of age) and one quarter of these is due to neonatal sepsis [4]. In 2012, an estimated 6.9 million (uncertainty range 5.5 – 8.3 million) possible severe bacterial infections occurred in neonates in Latin America, South Asia, and sub-Saharan Africa [5]. Neonatal sepsis is the third most common cause of death in this age group with an estimated 0.401 millions of deaths (uncertainty range [0.280-0.522], 6.8% [4.7-8.6]) in 2015, the vast majority of which are in developing countries [6].

Another report showed Globally the leading causes of death among children under age 5 included preterm birth complications (18%), pneumonia (16%), and intrapartum related events (12%), congenital anomalies (9%), diarrhea (8%), neonatal sepsis (7%) and malaria (5%) [7].

Based on the 2014 WHO/CHERG estimates for Ethiopia the major causes of children less than 5 years mortality, were acute respiratory infection (ARI) (18%), diarrhea (9%), prematurity (11%), sepsis (9%), birth asphyxia (14%), injuries (6%), and measles (2%) and others (21%) [8].

As it shows the 2016 Ethiopia Demographic and Health Surveys (EDHS), neonatal mortality declined from 49 deaths per 1,000 live births in 2000 to 29 deaths per 1,000 births in 2016, a reduction of 41% over the past 16 years and in Somali region is 41 deaths per 1000 live births [9].

Numerous factors associated with the high mortality due to infections were due to delays in the early identification and treatment of newborns with infection, particularly; under-recognition of illness, delay in care seeking at the household level, delay in initiation of treatment, and lack of access to both appropriately trained health workers and to high quality services to manage sepsis. It is particularly affecting that many neonatal deaths occur in the community, without the newborn ever having contact with the appropriate health care services [10, 11].

The third Sustainable Development Goal for child health (United Nations 2015), which aims to end preventable deaths of neonates and children under five years of age by 2030, may not be met without substantial reduction of neonatal sepsis-specific mortality in the developing countries [12].

In the world and especially sub-Saharan African countries Newborn survival is a problem of great concern, although Ethiopia made big efforts on maternal and child health programs and advancing healthcare system, most of the neonatal admission to the NICU with sepsis, has been increased. Many studies have been done in Ethiopia but there were limited studies tried to substantiate the risk factors of neonatal sepsis in the study areas (pastoral areas) of the country as a whole. This study was therefore, carried out to find out neonatal sepsis and factors contributing among neonates in three public hospitals of Somali region, Ethiopia.

METHODS

Study Area

This, study was conducted in Jigjiga, Godey, Kabri-dahar hospitals of Somali Region, Eastern Ethiopia from December-May2017/2018. Jigjiga town is the capital city of Somali regional state located 626 km east from Addis Ababa, capital city of Ethiopia & 101 km east from Harar town. As of 2009 EFY Jigjiga city has total population of 199,431 of which 45,570 are in reproductive age group (15-49 years). Current it has 30 Kebles of which 20 are urban & 10 are rural. Majority of people are Somali ethnic (97%) & Muslim in religion (98%). People of Jigjiga city are mostly agro-pastoral, their main source of income depends on farming and livestock, other source of income like small business, government employees etc. Jigjiga city has one Referral hospital, one Zonal hospital, two health centers & ten health posts, Two public hospitals and two health center are providing delivery service [13].

Godey Council is located in the Shebelle Zone of the Somali Region it is located 600 km away from Regional capital, Jigjiga (capital town of Ethiopian Somali region). It is Semi-arid weather condition and low altitude with flat land surfaces [14]. Administratively, it consists 10 Kebeles. Total population of the council is estimated to be 75,000 in 2016 (33,000 male and

42,000 females). In terms of health delivery system, the council has one Hospital, 1 NGO clinics and 4 Health Posts [15].

Based on figures from the Central Statistical Agency in 2005, Kabri-dahar has an estimated total population of 100,191 of whom 51,327 are men and 48,864 are women. The two largest ethnic groups reported in this town were the Somali (89.02%), and the Amhara (2.58%); all other ethnic groups made up 8.4% of the population. City has one zonal hospital and two health centers 2 heath posts [14].

Study Design

An institution based cross-sectional study design was employed.

Source Population

All neonates who were admitted to NICU of hospitals during the study period in Somali region were the study population for this study.

Study Population

All new-born ≤ 28 days of life and who were admitted in neonatal ward randomly selected to involve in the study.

Inclusion Criteria: All neonates who were admitted to intensive care unit were included in this study.

Exclusion Criteria: Neonates who were early discharged before data collection was completed but only card was available, incomplete patient chart information, and died on arrival (neonates expired without taking any investigation and treatment on arrival) were excluded from this study.

Sampling Procedure and sampling technique

There are nine regional hospitals in Somali region and three of them were selected by using lottery method (Fig. 1). The number of study subjects for each hospital was allocated proportionally after identifying the number of admissions in each hospital for the specified period (last three months). The number of admission in karamara was 5210; Gode hospital was 3460 and 1571 was Kabri-dahar hospital.

Proportionally allocated sample size of 203, 135 and 61 for karamara, Gode and Kabri-daharHospitals respectively. Participants' was selected consecutively

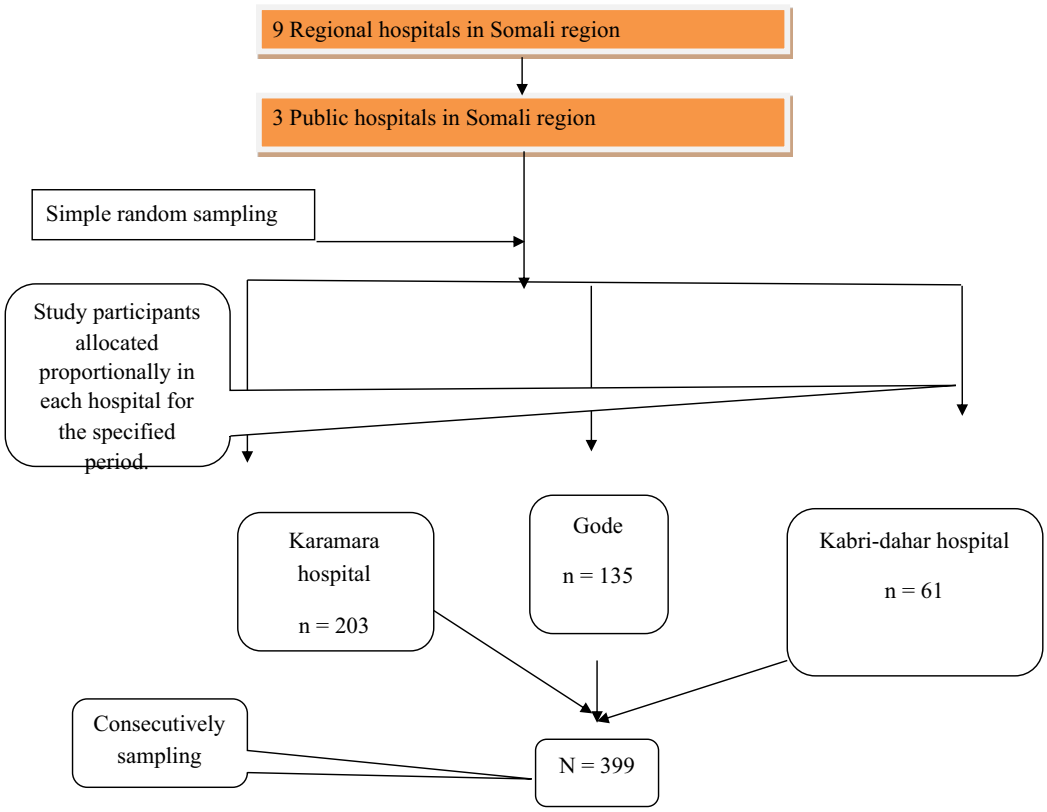

Fig. 1. Sampling Procedure and sampling technique

recruitment and was continued until the sample size allocated fulfilled/met.

Data Collection Technique and Tools

A pre-tested interviewer-administered questionnaire and check lists were used to collect the data. The tools were developed by reviewing different literatures. The information was collected during the admission of neonate to NICU and by reviewing the registration book records in labor ward, NICU, and gynecologic ward in each hospital.

Sample Size Determination

The sample size was determined by using single population proportion formula and the proportion was taken from the previous literature in Ethiopia. According to study conducted at Black Lion specialized hospital, the prevalence of neonatal sepsis was 44.7% and by considering 95% confidence interval (CI) and 5% marginal error the, sample size was calculated as follows:

$$\text{Where } n = (Z_{\partial/2})^2 \frac{P(1-p)}{d^2}$$

n = required sample size

Z = the standard normal deviation at 95% confidence interval; =1.96

P = prevalence of neonatal sepsis among neonates admitted in NICU with prevalence of 44.7% (16).

d= margin of error that can be tolerated, 5% (0.05)

1-p = proportion of population that do not possess the character of interest.

Therefore,

n = (Z∂/2)2 p (1 − p)/d2 = (1.96)2 (0.447) (0.553)/ (0.05)2= 380

By adding non response rate 5%, our total sample size was 399 neonates.

Study Variables

Dependent Variable: Neonatal sepsis

Independent Variable: Socio-demographic characteristics of mothers, socio-demographic characteristics of neonates, and obstetric characteristics of mothers were independent variables for this study.

Data Quality Control

Three training was given for two data collectors in each hospital with an academic background of diploma/degree in nursing/midwifery working outside the study hospitals The training was focused on introducing the data collection tools, the initial and end of the data collection period, how they are collected the data, using the time wisely, data handling, and submit the collected data. Pretest was done 5% to pave the way any solution/modification in appropriate time. Data completeness was checked, cleaned and compiled by the investigator on daily basis.

Operational Definition

Neonatal Sepsis: neonate with sepsis within 0-28 days of life

Early Onset Neonatal Sepsis: neonate with sepsis within 0-7 days

Late Onset Neonatal Sepsis: neonate with sepsis within 8-28 days

Low Birth Weight: weight of the child

Ethical Consideration

Ethical clearance letter was acquired from ethical Review Board of Jigjiga University, and after explaining about the purpose and the possible benefit of the study permission to gather datawas secured from regional health bureau and delivered to public hospital administrators. Confidentiality was maintained at all levels of the study.

Statistical Analysis

The data was cleaned for inconsistencies and missing values and modification was considered as necessitate, coded and entered into Epi-data version 4.1 and then was exported to SPSS (Statistical Package for Social science) version 20 for analysis. Frequency was used for the descriptive, after assessing the normality of distribution of the data; Bivariate and multivariate analyses were used to assess the association between each independent variable and the outcome variable by using binary logistic regression. All variables with $P < 0.25$ in the Bivariate analysis were included in the final model of multivariate analysis in order to control all possible confounders. The degree of association between dependent and independent variables was examined using odds ratio with 95% CI. P-value less than 0.05 was considered as significance level for associations between dependent and independent variables. Confidence interval of 95% was

used to be examined the precision of the study and the level of significance was taken at α = < 0.05. Finally, result was presented in Texts, and Tables.

RESULTS

Socio-demographic Characteristics

A total of 380 neonates were involved in the study, with 95% response rate from December 2017 to May 2018 in three selected public hospitals (Karamara, Gode, Kabridahar). Regarding residence 340 (89.5%) resided urban, and 193 (50.8) of those were male and 61 (37.4%) developed neonatal sepsis. Concerning age of the neonates 365 (96.1%) aged between 0-7 days among these 149 (91.4%) developed neonatal sepsis, regarding maternal age 160 (42.1%) and 85 (52.1%) their neonates developed neonatal sepsis, Maternal education 274 (72.1%) of the mothers had never go to school, 114 (69.9%) of then had NS (Table 1).

Prevalence of Neonatal Sepsis

This study, the prevalence and associated risk factors of neonatal sepsis of neonates admitted in the three selected hospitals with in the December-May 2017/2018. The total prevalence of this study was 42.9%, with CI = (37-46) (Table 2).

Neonatal Characteristics

In terms of birth weight of the neonates, 286 (75.3%) of them had normal birth weight (< 2.5kg) and of these 139(85.3%) had EONS. Regarding gestational age 210 (55.3%) were term deliveries 102 (62.6%) had neonatal sepsis. About the Apgar score 323 (85%) had >7said to have Apgar score less than 7. About 225 (67.1%) of neonates who were reported as to have birth asphyxia, 102 (62.6%) of them developed neonatal sepsis (Table 3).

Maternal Characteristics

Among 206 (54.2%) neonates who had history of maternal UTI and developed NS were 77 (47.2%) during delivery and 151 (39.7%) had maternal history of ANC follow up, among these 113 (69.3) had neonatal sepsis, about 49 (12.9%) of the mothers of the neonates had premature rupture of membrane and 24 (14.7%) developed neonatal sepsis, 26 (81.3%) duration < 18 hours. Regarding meconium stained amni-

Table 1. Socio-demographic Characteristics

S/N	Variables	Category	Neonatal sepsis	
			Yes	No
			Number (%)	Number (%)
1	Residence	Urban	138 (84.7)	202 (93.1)
		Rural	25 (15.3)	15 (6.9)
2	Sex of the neonate	Male	61 (37.4)	132 (60.8)
		Female	102 (62.6)	85 (39.2)
3	age of the neonate	0-7days	149 (91.4)	216 (99.5)
		8-28 days	14 (8.6)	1 (0.5)
4	Maternal age	< 19years	16 (9.8)	75 (34.6)
		20-30years	85(52.1)	75(34.6)
		30-40years	52(31.9)	57(26.3)
		> 41 years	10 (6.1)	10 (4.6)
5	Maternal education	Never go to school	114 (69.9)	160 (73.7)
		Primary	45 (27.6)	48 (22.1)
		High school and above	4 (2.5)	9 (4.1)
6	Parity	Nulliparous	36 (22.1)	112 (51.6)
		Multiparious	127 (77.9)	105 (48.4)

Table 2. **Prevalence of neonatal sepsis**

Variable	Category	Frequency	Percent
7. Neonatal sepsis	Yes	163	42.9
	No	217	57.1

otic fluid 60 (15.8%) of the mothers had MSAF and 14 (8.6%) during delivery and 14 (8.6%) developed neonatal sepsis. Regarding duration of labor 255 (67.1%) labored between 6-12 hours of these103 (63.2%) had NS (Table 4).

Medical Related Factors

Regarding mode of delivery about 275 (72.4%) delivered spontaneously and 117 (71.8%) had neonatal sepsis and also 305 (80.3%). About 154 (40.5%) were resuscitated by mechanical ventilation, 106 (65%) developed neonatal sepsis (Table 5).

Multivariate Analysis of the Association between Neonatal Sepsis and Other Neonatal Variables

In this study both Bivariate and multivariate level of analysis was investigated to determine the association between late onset neonatal sepsis and other different

Table 3. **Neonatal characteristics**

S/N	Variables	Category	Neonatal sepsis	
			Yes	No
			Number (%)	Number (%)
8	Birth weight	< 2.5kg	24 (14.7)	23 (10.6)
		2.5-4kg	139 (85.3)	194 (89.4)
9	Gestational age	< 37weeks	61 (37.1)	109 (50.2)
		> 37weeks	102 (62.6)	108 (49.8)
10	Apgarscore < 7	< 7	22 (13.5)	35(16.1)
		> 7	141 (86.5)	182 (83.9)
11	Birth asphyxia	Yes	102 (62.6)	153 (70.5)
		No	61 (37.4)	64 (29.5)
12	Not breast feeding	Yes	98 (60.1%)	138 (63.6%)
		No	65 (39.9%)	79 (36.4%)
13	Neonatal fever	Yes	78 (47.9%)	99 (45.6%)
		No	85 (52.1%)	118 (54.4%)

Table 4. **Maternal characteristics**

S/N	Variables	Category	Neonatal sepsis	
			Yes	No
14	Maternal UTI	Yes	77 (47.2)	129 (59.4)
		No	86 (52.8)	88 (40.6)
15	ANC	Yes	113 (69.3)	38 (17.5)
		No	50 (30.7)	179 (82.5)
16	History of chorioamnionitis	Yes	9 (37.5)	154 (43.3)
		No	15 (62.5)	202(56.7)
17	PROM	Yes	24(14.7)	25(11.5)
		No	139(85.3)	192 (88.5)
18	If yes duration	<18hrs	13 (76.5)	13 (86.7)
		>18hrs	4 (23.5)	2 (13.3)
19	MSAF	Yes	14 (8.6)	46 (21.2)
		No	149 (91.4)	171 (78.8)
20	Duration of labour	< 6hours	59 (36.2)	63 (29)
		6-12hrs	103(63.2)	152 (70)

risk factors. Variables those have significant association on Bivariate analysis was taken to multivariate analysis to control the confounders. The current study found that age of the neonate found to be significantly associated with neonatal sepsis, neonates aged 8-28 days were protective by 91% compared to neonates aged 0-7 days. AOR= 0.085 (CI= 0.01, 0.73) (Table 6). Regarding the residence, neonates who were from urban residence were 2.5 times more likely to develop neonatal sepsis compared to neonates from rural residence. AOR=2.567 (CI=1.01, 6.5). Gestational age, neonates who gestational age were < 37 weeks of gestation were 1.8 times more likely to develop neonatal sepsis compared to neonates who gestational age were 37-42 weeks AOR= 1.869 (CI= 1.05, 3.31). Concerning antenatal care, neonates who's their mother had not history of ANC were 8.9 times more likely to develop neonatal sepsis compared to neonates who's their mother had history of ANC flow up AOR= 8.933 (CI= 4.9, 15.9). Neonates who's their mother had meconium stained amniotic fluid were 2.7 times more likely to develop neonatal sepsis compared to neonates who's their mother had not meconium stained amniotic fluid AOR= 2.718 (CI= 1.89, 6.74). About ventilation, neonates who had mechanical ventilation were 3.3 times more likely to develop neonatal sepsis compared to neonates who had not mechanical ventilation after birth AOR= 3.376 (CI =1.65, 6.88) (see Table 6).

DISCUSSION

This study, the prevalence and associated risk factors of neonatal sepsis of neonates admitted in the three selected hospitals with in the December-May 2017/2018. The total prevalence of this study was 42.9%,with CI =(38.4-47.8) this was near to compared to study conducted in Black lion specialized hospital in 2010 which was 44.7% [16]. And also to different studies in different countries showed very close figures India 35.1% Saudi Arabia (37%), Nigeria 33.1% Tanzania (31.4%) [17-20]. But its large different study finding in Mexico this could be due to the difference in study design, and the sample size which shown 4.3 % considerable low when compared other studies. This difference may have been contributed by the presence of more skilled personnel in Mexico and advanced or modernized equipment compared to other studies [21].

The current study found that age of the neonate found to be significantly associated with neonatal sepsis, neonates aged 8-28 days were protective by 91. % compared to neonates aged 0-7 days. AOR= 0.085 (CI= 0.01, 0.73) compared to Study conducted in Nigeria showed almost similar significance < 3 days compared to above these days above. the possible explanation of the difference can be the sample included who were age of less than three days [22]. This could

Tablo 5. Medical related factors

S/N	Variables	Category	Neonatal sepsis	
			Yes	No
			Number (%)	Number (%)
21	Mode of delivery	Spontaneous	117 (71.8)	158 (72.8)
		C/S	15 (9.2)	25 (11.5)
		Instrumental	31 (19)	34 (15.7)
22	Place of delivery	Hospital	124 (76.)	181 (83.4)
		Health center	30 (18.4)	30 (13.8)
		Clinics	2 (1.2)	1 (0.5)
		Health center	7 (4.3)	5 (2.3)
23	Mechanical ventilation	Yes	23(20.5)	140 (52.2)
		No	89 (79.5)	128 (47.8)

Table 6. Multivariate analysis of the association between NS and other neonatal variables

Variables	Category	Neonatal sepsis				
		Neonatal sepsis		COR (CI: 95%)	AOR [95%CI]	*p* value
		Yes	No			
Sex of the neonate	Male	61	132	2.5 (1.70, 3.94)	1.519 (0.87, 2.63)	0.127
	Female	102	85	1	1	
Age of the neonate	0-7days	63	173	1	1	
	8-28 days	100	44	0.16 (0.10, 0.25)	0.085 (0.01, 0.73)	**0.025**
Maternal age	< 19 years	16	75	4.68(1.67, 13.1)	2.504 (0.64,9.7)	0.186
	20-30 years	85	75	0.88 (0.34, 2.23)	0.930 (0.30, 2.80)	0.897
	30-40 years	52	57	1.09 (0.42, 2.84)	1.06 (0.34, 3.24)	0.919
	> 41 years	10	10	1	1	
Parity	Nulliparous	36	112	3.7 (2.38, 5.93)	1.79 (0.85, 3.76)	0.123
	Multiparious	127	105	1	1	
Residence	Urban	138	202	2.44 (1.24, 4.8)	2.567 (1.01, 6.5)	**0.047**
	Rural	25	15	1	1	
Gestational age	< 37weeks	61	109	(1.15, 2.55)	1.869 (1.05, 3.31)*	0.032
	37-42 weeks	102	108	1	1	
Birth asphyxia	Yes	102	153	1.43 (0.92, 2.20)	0.943 (0.53, 1.66)	0.840
	No	61	64	1	1	
Maternal UTI	Yes	77	129	1.63 (1.08, 2.4)	1.287 (0.73, 2.25)	0.376
	No	86	88	1	1	
ANC	Yes	113	38	1	1	
	No	50	179	10.6(6.56, 172)	8.933(4.9, 15.9)	**< 0.001**
MSAF	Yes	14	46	2.86 (1.5, 5.4)	2.718 (1.89, 6.74)	**0.031**
	No	149	171	1	1	
Mechanical ventilation	Yes	23	140	4.23 (2.52, 71)	3.376 (1.65, 6.88)	**0.001**
	No	89	128	1	1	

be due neonates with smaller ages had low immunity compared to those aged greater than first week of life. This difference might be due to the nature of age transfer as the physiologic events and changes associated with it.

Regarding the residence, neonates who were from urban residence were 2.5 times more likely to develop neonatal sepsis compared to neonates from rural residence. AOR= 2.567 (CI= 1.01, 6.5) this may be most of the neonates from urban residence were born health facility and they might acquire the nosocomial infection. Other thing is that some of the neonates were living urban slum areas where hygiene and sanitation, maternal and child health services are most commonly low.

Gestational age, neonates who gestational age were < 37 weeks of gestation were 1.8 times more likely to develop neonatal sepsis compared to neonates

who gestational age were 37-42 weeks AOR= 1.869 (CI= 1.05, 3.31).Compared to other studies also revealed Preterm delivery as significant risk factors for neonatal sepsis and in fact this factors has been well documented in previous studies [16, 23], In similar study conducted in Bishoftu city indicated that, preterm neonates did not showed significant association with the occurrence of neonatal sepsis [24] this may be due to health care service available or similarity of the design of the study used.

Concerning antenatal care, neonates who's their mother had not history of ANC were 8.9 times more likely to develop neonatal sepsis compared to neonates who's their mother had history of ANC flow up AOR= 8.933 (CI= 4.9, 15.9).This was consistent with study done in Uganda which showed that lack of ANC was significantly associated with neonatal sepsis. Thus Antenatal care is predictor to neonatal sepsis and it suggests to increase the awareness and strength maternal reproductive health utilization including this very important care during pregnancy [25].

The presence of meconium stained amniotic fluid is a significant predictor of neonatal infection to this study, Neonates whose their mother had meconium stained amniotic fluid were 2.7 times more likely to develop neonatal sepsis compared to neonates who's their mother had not meconium stained amniotic fluid AOR= 2.718 (CI= 1.89, 6.74).

Slightly more than this, studies conducted in Ghana displayed neonates who's their mother had meconium stained amniotic fluid were 3.6 times more likely to develop neonatal sepsis AOR= 3.60 (CI=1.73, 8.1) [26]. Other studies done in Ethiopia and Mexico agreed that specifically women who had meconium stained amniotic fluid were more likely to give birth to infants who suffered from neonatal sepsis compared to those without meconium stained amniotic fluid [23, 27]. There is also evidence supporting that when there ismeconium in amniotic fluid there is a greaterchance of the fetus being born with low Apgarscore, which unfortunately has earlier beenassociated with neonatal sepsis [16]. Normally it isexpected that the amniotic fluid should remain clear, however, in times of fetal hypoxia, it could be stained with meconium.

About ventilation, neonates who had mechanical ventilation were 3.3 times more likely to develop neonatal sepsis compared to neonates who had not mechanical ventilation after birth AOR = 3.376 (CI =1.65, 6.88) Similar result of study conducted in Mexico revealed that mechanical ventilation was predictor to neonatal sepsis [23]. These similarities may be due deficiency of knowledge among some of the health care providers on aseptic precautions while resuscitating neonates in all settings.

CONCLUSION

The prevalence of neonatal sepsis in this study at selected public hospitals in Somali region is high. Study found that, the total prevalence of neonatal sepsis in selected hospitals was 42.9%, with CI = (38.4-47.8). The study identified Age of the neonate, Gestational age, Meconium stained amniotic fluid, antenatal care, Mechanical ventilation after birth as significant factors associated with neonatal sepsis. These findings suggest a possibility for routine assessment of neonates in order to identify risk factors for neonatal sepsis.

RECOMMENDATİONS

Policy Makers General

Based on the result the policy makers must It is therefore recommended to have more skilled health personnel and advanced equipment while providing maternal and neonatal health care services and the overall public health services more significantly health promotion and making available each laboratory equipment necessary.

For Regional Health Bureau

It must be focus on the prevention of risk factors rather than treating the disease after it occurs by planning necessary training program for health professionals who works in pediatrics and neonatal ward in these hospitals that helps them to improve their knowledge regarding the problem and strength maternal and child health services and making accessible each laboratory equipment necessary.

For Health Professionals

Based on the study finding, create awareness to the community by giving health education to mothers about different risk factors of sepsis during of ANC

follow up which help them to screened and treated early. And when using treatment for neonatal sepsis they must consider the risk of misdiagnosis and mismanagement.

Authors' Contribution

Study Conception: AN; Study Design: MO; Supervision: MO; Funding: AN; Materials: AN; Data Collection and/or Processing: AN; Statistical Analysis and/or Data Interpretation: AN; Literature Review: MO; Manuscript Preparation: AN and Critical Review: MO.

Conflict of interest

The authors disclosed no conflict of interest during the preparation or publication of this manuscript.

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