Open Access

SCHOLARENA

Journal of Neonatal Studies

RESEARCH ARTICLE

Assessment of Reason for Admission and Factors Associated with their Treatment outcome of Neonates in Dil Chora Referral Hospital, Eastern, Ethiopia: Institutional Based Cross-Sectional Record Review Study

Serbesa ML[1*], Oumer A[2] and Iffa MT[3]

[1]*Department of Midwifery, Harar Health Science College, Harar, Ethiopia*
[2]*Department of Public health, Harar Health Science College, Harar, Ethiopia*
[3]*Department of Nursing and Midwifery, Haramaya University, Harar, Ethiopia*

[*]**Corresponding author:** Serbesa ML, Department of Midwifery, Harar Health Science College, Harar, Ethiopia, Tel: +251-0911947787, E-mail: masreshaleta3@gmail.com

Citation: Serbesa ML, Oumer A, Iffa MT (2018) Assessment of Reason for Admission and Factors Associated with their Treatment outcome of Neonates in Dilchora Referral Hospital, Eastern, Ethiopia: Institutional Based Cross-Sectional Record Review Study. J Neonatal Stud 1: 103

Abstract

Background: Neonatal mortality and newborn compromise is a major concern in sub-Sahara Africa and its rates reflect a nation's socioeconomic status, efficiency and effectiveness of the health care services. Dile Chora Referral hospital also a part of this problem, to show the gap at Dile Chora Referral hospital means showing the other part of Ethiopia.

Objective: assessment of reason for admission and factors associated with their treatment outcome of neonates in Dil Chora referral hospital, eastern, Ethiopia from April 11to April 18 2018 GC.

Methods: institutional based retrospective cross sectional record review study were conducted at Dil Chora referral hospital from February to September 2018. A total of 388 neonatal cards were re-viewed. Sample size was calculated by using single population proportion formula. Final study subjects were selected using systematic random sampling methods. Two data collector and one investigator were participating in data collection. Data was collected and checked for its completeness manually, enter and analyzed by using spss window version 20 statistical software package.

Result: Total population 388. This study considers 388 neonates, from this sample of neonate age from 1 up to 3days account 191(49.2%). Regarding sex 237(61.1%) of them were male and the rest 151(38.9%) were female. The leading cause of admission was early onset neonatal sepsis (EONS) which accounts 157 (40.5%) of the total population, 361 (93.0%) were improved and discharged.

Conclusion: This study identified in DCRH, NICU received a wide range of Neonates; majority of them was admitted by neonatal sepsis. Neonatal sepsis is the leading cause of admission in DCRH and majority of admitted neonates were discharged with satisfactory condition .emphasis has be given to prevent neonatal sepsis.

Keywords: Neonatal Admission; Neonatal Sepsis; Outcome; Cause of Death; Harar; Ethiopia

List of Acronyms and Abbreviation: AGA: Appropriate for Geustational Age; APGAR: Apgar Scor; C/S: Caesarean Section; EVLBW: Extremely Very Low Birth Weight; DCRH: Dile Chora Referral Hospital; NICU: Neonatal Intensive Care Unit; LBW: Low Birth Weight; LGA: Large For Gestational Age; MAS: Meconium Aspiration Syndrome; Ngos: Non-Governmental Organization; NB: New Born; PNA: Pre Natal Asphyxia; PT: Post Term; PT: Pre Term; RDS: Respiratory Distress Syndrome; SGA: Small for Gestational for Age; SVD: Spontaneous Vaginal Delivery; VLBW: Very Low Birth Weight; WHO: World Health Organization

Background

The term neonatal originated from Greek word neo means new and natus from Latin word means to be born; both are coordinated to form neonatal (new born). Neonatal is described the first month of life of a person's life or the first month after baby born. Neonatal intensive care unit (NICU) also known as an intensive care nursery (ICN) is a unit specializing in the assistance of ill or premature newborn infant. The first American ICU designed by Louis Gluck, was opened October 1960 at Yale – New Haven Hospital, in the city of New Haven Connecticut. NICU has become a cornerstone for the treatment of premature infants worldwide.

Neonatal admission generally refers to the admission of the new born under 29 days old in to a health facility for medical care. Cause neonate are fragile and yet to develop competent Immune system, they are prone to infection, and most of the illnesses they acquire usually require critical care, hence there admission to the neonatal intensive care unit (NI-CUs). Neonatal infection began in- uterus causes include metabolic, genetic and developmental defect. Globally, every year over nine million children die during the perinatal and neonatal periods and 98% of them occur in developing countries and 40-70% of them are infants [1]. The World Health Organization estimates that neonatal mortality continues to constitute 44% of childhood deaths under the age of five (WHO, 2013), However; Over the past few years, there has been a decline in neonatal mortality rate. Approximately 4 million neonatal deaths were reported in 2005 [1]. But gradually declining to, 3.1 million and 2.9 million neonatal deaths were reported in 2010 and 2014, respectively [2].

Internationally, major causes of neonatal mortality in the NICU include birth before 37 weeks gestation (28%), infections (26%), and asphyxia (23%) [3]. In Western countries such as the United States, congenital malformations account for a significant cause of neonatal mortality (20%). Over the past three decades, global mortality rates of NICU neonates have dramatically improved due to the introduction of surfactant, steroids, and perinatal care, thereby enabling improved survival of very low birth weight infants as young as 23 to 28 weeks [4,5].

Despite a steady decline, the decline in neonatal mortality is not satisfactory and is slower than the reduction in overall child mortality, particularly in African countries [2]. Most of the neonatal deaths occur in developing countries particularly in sub Saharan African and south central Asian countries. Despite improvements over the past decade, Ethiopia's current neonatal mortality rate 29 deaths per 1,000 live births (EDHS 2016) and it is still one of the highest in the world [6].

Furthermore , In most developing countries , almost 50% of these deaths are related to severe infection, tetanus and complications related to LBW in countries like Bangladesh and India with higher neonatal mortality rates (NMR >45 [7-9] .

In general, neonatal morbidity and mortality rates reflect a nation's socioeconomic status, as well as the efficiency and effectiveness of their healthcare services particularly for Sub Sahara African countries. These important indicators are useful in planning for improved healthcare delivery [10].

The prognosis for these neonates depends upon their underlying condition, its severity and the subsequent management. Neonatal disease pattern and outcomes are important indices for adequate health care planning. Furthermore, Newborn health has now captured the attention of policy makers at the highest level. Various efforts have demonstrated the country's strong political commitment to recognize newborn health as a national development necessity. Therefore, information on assessment of reason for admission and factors associated with their treatment outcome of hospitalized neonates should reflect the major causes of illnesses and standard of care provided to neonates in a particular locality [11]. Such information was identifying gaps and provides a basis on which interventions to improve neonatal outcomes will be designed. Hence, evaluating the reason of neonatal morbidity and mortality at facility level is an essential step toward improving the quality of existing practices.

Despite the scarcity of information about reason for admission and factors associated with their treatment outcome of hospitalized neonates in Ethiopia particularly in our study area, this study aimed to describe the reason at admission of neonates attended in the neonatal care unit of Dil Chora referral Hospital and to study factors associated with their treatment outcomes in the unit.

Method and Material

Institutional based cross-sectional record review study design was employed from April 11to April 18, 2018 GC, among 388 systematically selected neonatal cards from Dil Chora referral Hospital. The study was conducted at Dil Chora referral Hospital which is found in diredawa city administration, which is 526 Km East of the capital of Ethiopia, Addis Ababa. DCRH is the only referral hospital in the city. It provides general outpatient, inpatient and emergency services for more than 45,000 populations in diredawa administrative city population and other nearby communities, for most East oromia region and some of the Somali region peoples. According to DCRH information desk report, the bed occupancy rate in the hospital is 200, eight trained clinical nurse, one general practitioner, one pediatrician. The bed occupancy rate in the NICU is 20.

The NICU at DRH receives high risk babies delivered within the institution and referrals from other health facilities or from home.

Sample size was determined by using a single proportion sample size calculation formula with a source of population size greater than 10,000. Assuming the proportions of taking respiratory problem (36.6%) (p=0.366) from a study done in Addis Ababa ,St Paul's Hospital Millennium Medical College and, margin of Error 5% and 95% confidence interval and adding non-responses rate of 10% [12]. Since our source population was less than 10,000, finite population correction was made. Accordingly, the sample size of 388 was obtained.

A pre-tested checklist was used for collecting the data. Data were collected from April 11 to April 18, 2018 GC by trained three (Bachelor of Science) BSc midwives, using pretested checklist from the patient charts and registry books of neonates admitted from September1 2016 to September1 2017, was included in the study. Through a systematic sampling method, in case the selected card not fulfills the inclusion criteria, next card was selected until calculated sample size reached. Before actual data collection, the checklist was pre-tested in 5% of neonatal cards at Hiwot fana specialized referral hospital , Harari region Ethiopia , which

was not selected for the study using randomly selected eligible neonatal cards who were admitted from September 1 2016 to September1 2017 and modified the checklist based on the problems identified. This helps to ensure the clarity, ordering, consistency and acceptability of the checklist. After this, the checklist was ready after necessary corrections and training was given for data collectors for 3 days at the time of data collection. During data collection, the checklist was checked for completeness on daily basis by the data collector themselves and the supervisors. The completed checklist was also rechecked by the principal investigators to maintain the quality of data.

After data collection, each checklist was checked for completeness, then coded and entered into Epi-info version 3.5.1 and exported to SPSS for Windows version 20 for cleaning, editing, and analysis. Binary and multiple logistic regressions were used to observe the association (p-value < 0.2 for binary and p-value < 0.05 for multiple) between independent variables and dependent variable. Odds ratio with 95% Cl was calculated using multiple logistic regression models to control confounders and identify maternal and neonatal factors associated with their treatment outcomes in the NICU. The results was presented in the form of tables, figures and text using frequencies and summary statistics such as mean ,mode , standard deviation and percentage to describe the study population in relation to relevant variables.

In order to confirm the ethical and legal standard of the investigator, approval was obtained from the ethical review board of Harar Health Science College. The survey was commencing after written consent obtained from Dil Chora referral hospital.

Results

Characteristics of neonate admitted to NICU

This study considered 388 neonates admitted at NICU of DCRH during the study period. From this, age of neonate that ranges from 1- 3 days were about 191(49.2%), and 237(61.1%) of them were male. The lowest frequency was recorded in the gestational age less than 29 weeks, which accounts 16(4.7%). Regarding their weight minority neonate were below <1500 g with a frequency of 20(5.2%). Majority 283(72.9%) of the neonate were having appropriate weight for gestational age (Table 1).

Characteristics		numbers	%percentage
AGE	< 1 DAY	123	31.7
	1-3 DAY	248	63.9
	4-7 DAY	4	1.0
	>7 DAY	13	3.4
SEX	MALE	237	61.1
	FEMALE	151	38.9
GESTATIONAL AGE	<29 WEEK	16	4.1
	30-32 WEEK	89	22.9
	34-37 WEEK	144	29.4
	37-42 WEEK	169	43.6
WEIGHT	>4000 gm	20	5.2
	2500-3999 gm	234	60.3
	1500-2400 gm	114	29.4
	<1000 gm	20	5.2
SIZE OF BIRTH	AGA	283	72.9
	SGA	77	19.8
	LGA	28	7.2

Table 1: characteristics of neonates admitted to DCRH NICU from Sept. 2016 - sept.2017 DIREDAWA, Ethiopia (n=388)

Place of Delivery and Mode of Delivery of Neonates

About the Intrapartum history of neonates, around 388(97%) of them were delivered at hospital. Majority 220(56.7%) of them were delivered with C/S mode followed by SVD accounting 152(39.1%) and the rest 16(5.3%) of them were delivered by instrumental delivery. Admission diagnosis, outcome and cause of death in neonates admitted at NICU of DCRH (n=388).

As it has been evidenced from the charts, type of admission in 388(100%) of neonate was medical reason. Early Onset Neonatal Sepsis (EONS) was the major diagnosis in 157(40.5%) of neonates, while prenatal asphyxia 8(2.1%) observed type of admission diagnosis. From the total admission, neonates who were discharged to home with satisfactory condition were about 361(93%) and those who died were about 27(7%). From the total admission diagnose, the three leading cause of death were early onset of neonatal sepsis 157(40.5%), preterm 85(21.9%) and MAS 79(20.4%) the first, second and third respectively. Regarding the length of stay, majority 191(49. %) of the neonates stayed for 3 days followed by 104 (26.8%), greater than 7days & 93(24%), 4-7days respectively.

Relationship of variables

Outcome of admission versus characteristics of neonate: Statistically significant, association has been seen in some of the independent variables with the dependent one (final admission outcome). There was relationship (p=0.038) has been ob-served between weight of a neonate and final admission outcome, (Neonate whose weight range between 1000-1500g and 1500gm -2499g died more than those whose weight is greater than or equal to 2500g. There was also association seen between gestational age and outcome with (P=0.029), (Those who are preterm or delivered at gestational age of 30-33wks were died more than those who were delivered at term (Table 2).

Variable	Categories	Discharge (N=388)	Death (N=27)	COR	AOR
AGE	<24hr	44(17%)	8(34.1%)	.489(.054-4.397)	.169(.009-3.235)
	1day – 3days	164(63.3%)	20(45.5%)	1.367(.156-11.937)	.579(.032-10.446)
	4day – 7days	45(17.4%)	15(18.2%)	.937(.937-8.865)	.361(.019-7.001)
Sex	Female	113(43.6%)	18(40.9%)	1.118(.584-2.140)	1.155(.561-2.376)
GA	<29weeks	1(0.4%)	2(4.5%)	.090(.008-1.022)	.060(.004-.841)
	30 – 33weeks	10(3.9%)	6(13.6%)	**.299(.101-.885)**	**.142(.039-.513)****
	34 – 37weeks	81(31.3%)	6(13.6%)	2.425(.971-6.060)	1.889(.670-5.323)
Wt	<999gm	1(0.4%)	2(4.5%)	.076(.007-.865)	.038(.003-.577)
	1000 – 1499g	9(3.5%)	5(11.4%)	**.273(.085-.876)**	**.136(.036-.516)****
	1500 – 2499g	71(27%)	10(22.7%)	1.077(.496-2.340)	.877(.349-2.200)
	> 2500g	290(74.7%)	0	1	
Size of birth	AGA	212(81.9%)	34(77.3%)	1.039(.223-4.848)	1.366(.264-7.080)
	SGA	35(13.5%)	8(18.2%)	.729(.36-3.922)	1.056(.170-6.555)
	Categories	Discharge	Death	COR (CI 95%)	AOR
Place of birth	Home	9(3.5%)	1(2.3%)	1.019(.109-9.493)	.892(.088-9.099)
	Hospital	197(76.1%)	37(84.1)	.603(.242-1.504)	.544(.196-1.511)
Admitted to Nicu	TASH	128(49.4%)	23(52.3%)	.795(.169-3.733)	.879(.166-4.653)
	Referred	117(45.2%)	19(43.2%)	.880(.185-4.182)	1.230(.231-6.550)
APGAR	1st 5-7,5th 5-7,10th 5-7	33(12.7%)	16(36.4%)	1.031(.171,6.235)	1.205(.186,7.818)
	1st 8-10,5th 8-10,10th 8-10	205(79.2%)	21(47.7%)	**4.881(.843,28.251)**	**4.695(.756,29.146)****
	1st <5,5th 7-10,10th 7-10	17(6.6%)	5(11.4%)	1.700(.237,12.173)	1.728(.226,13.204
Admission Dx	RDS	73(28.2%)	28(63.6%)	.061(.008,.462)	.067(.009,.510)
	Prematurity	43(16.6%)	6(13.6%)	.167(.019,1.443)	.573(.043,7.710)
	EONS	138(53.3%)	14(31.8%)	**3.943(.699,22.230)**	**5.677(.930,34.667)****
	PNA	18(6.9%)	8(18.2%)	.900(.143,5.662)	.945(.143,6.241)
	MAS	33(12.7%)	6(13.6%)	2.200(.344,14.079)	2.259(.351,14.559)
Length of stay	Birth -24hr	10(3.9%)	6(13.6%)	.417(.126,1.374)	.300(.082,1.093)
	1day-3days	76(29.3%)	14(31.8%)	**1.357(.579,3.180)**	**1.243(.510,3.032)****
	4days-7days	125(48.3%)	12(27.3%)	2.604(1.095,6.195	2.143(.869,5.286)

*having significant association with the outcome variable

Table 2: Association of characteristics of neonate and outcome of admission Association of intrapartum history, admission diagnosis and outcome sept.2016 to Feb.2017. (P-value, <0.05)

Intrapartum History, admission diagnosis and admission outcome: There was a strong (p=0.001) association between APGAR Score and final admission out-come (those neonate with APGAR Score of 8-10 recovered more than those whose APGAR Score was below 8 .There was also association between length of stay and the outcome with (p=0.030), (neonate who stayed 1-3days died more than those who stayed less.) Result re-vealed that there was association between admission diagnosis and the outcome (p=0.045), (neonates with a diagnosis of early onset neonatal sepsis were died more than neonate presented with the diagnosis of jaundice (Table 2).

Discussion

Neonatal sepsis is the leading cause of hospital admission and mortality here in our set up. As a result, knowing the reason of admission, outcome and cause of death would be essential in bringing change and reduction of burden.

Results showed in our study that male admission outnumbered the female one which was nearly similar to the findings of study conducted in St. Paul, Kenya, South Africa and India [12-14]. Our study done at DCRH shows that large numbers of neonate's was

admitted during the first 72 hours of life [15]. This is in agreement with the study conducted in Pakistan (Dash N 2010) and India [15].

Our study which was done in DCRH revealed that most of the neonates admitted were delivered at term which was strongly similar with the study conducted in St. Paul's and India, but it was different from the study conducted in Pakistan [12,15,16]. Their result showed that most of admitted neonates were preterm. This difference might be due to difference in set ups and sample size or difference in socio cultural difference of the two settings.

In our study which is conducted at DCRH Most of admitted neonates were having appropriate size for gestational age, this study is in agreement with a study conducted in St. Paul's. However, this result is not in agreement with the study conducted in India, their result shows that most of their neonates admitted to NICU were delivered being small for their gestational age this difference could be due to socio cultural reason [12]. In our study which is done DCRH revealed that most of neonates admitted at NICU were having weight above 2500gm which is similar with the study conducted in St. Paul's Hospital. Regarding the place of birth of neonates who were admitted at NICU, in our study done at DCRH, which is stated that most of them were born at hospitals, which was strongly agreed with the study conducted in Kenya [12]. In addition, mode of delivery in most of the neonates was C/S, which was in agreement with the study conducted at in Kenya, and in contrast with the study St. Paul's Hospital, their result shows the mode of delivery for the majority of the neonates was SVD [12,13]. This difference might be due to the difference in the study setting or due to some socioeconomic/ cultural reason. In our study done in DCRH showed that resuscitation was not necessity for most of neonates admitted which is in agreement with the results of a study conducted in St. Paul's Hospital [12]. Regarding Apgar score, in our study done at DCRH most of the neonates at the 1st and 5th were having score ranging from 8 – 10 which is different from the findings of the study conducted in Kenya, their result Shows that majority of admitted neonates were having Apgar score of less than 7 within the 1st, 5th & 10th minute [13]. This difference might be due to difference in the study population. In our study done at DCRH has been seen that the major type of admission diagnosis in this study was early onset neonatal sepsis, which was in agreement with the study in Kenya and a study in St. Paul's Hospital [13]. In our study showed that the length of stay for the most of neonates admitted in NICU was 1 -3 days which is in agreement with a study conducted in Pakistan in which their result shows the length of stay in majority of the neonates was 72 hours or three days [12,16]. This study has revealed that from the total neonatal admission in neonatal intensive care unit (NICU) almost all of them were discharged home with satisfactory condition and the rest few neonates were died, this result was in line with study conducted in Pakistan and India [12,16]. The type of diseases that were frequently associated with death in admitted neonates were early onset Neonatal sepsis, prenatal asphyxia and Meconuem aspiration syndrome respectively which is in agreement with the results of study conducted in Paul's hospital, Pakistan and Kenya [12,13,16,17].

Conclusion

Early onset neonatal Sepsis was the leading cause of admission at DCRH in NICU, followed by Meconuem aspiration syndrome and prenatal asphyxia respectively. Resuscitation was mandatory in minority of the cases. Regarding the final admission outcome neonates, almost all were discharged home with satisfactory condition. The leading cause of death was early onset neonatal sepsis

Recommendations

For health professionals: Should consider Induction or C/S in mothers with premature rupture of membrane (PROM) to reduce neonatal sepsis [18]. Should consider evaluation of obstetrical care is required to identify the cause of prenatal asphyxia. To improve neonatal outcome it is imperative to be vigilant especially during the first 24hrs of life.

For Policy makers: design neonatal health programs particularly improving antenatal service, neonatal care and timely referred to tertiary care hospitals. Develop national guideline for the appropriate management and timely intervention.

References

1. Joy EL, MRCP, Simon C, Jelka Zupan (2005) 4 million neonatal deaths: When? Where? Why? Lancet 365: 891-900.

2. Lawn JE, Blencowe H, Oza S, You D, Lee AC, Waiswa P, et al. (2014) Every Newborn Study Group. Every newborn: progress, priorities, and potential beyond survival. Lancet 384: 189-205.

3. Feng Y (2011) causes of death in neonatal intensive care units. Aust Med Stud J 41-3.

4. WHO (2013) Global health Observatory (GHO) neonatal mortality.

5. WHO (2015) Maternal and Child Epidemiology Estimation Group (MCEE) provisional estimates.

6. Yvonne F (2011) Causes of death in neonatal intensive care units. Aust Med Stud 41-3.

7. Yared M, Biruk T, Daniel ST, Tedbabe D, Abeba B (2013) Neonatal mortality in Ethiopia: trends and determinants. BMC Public Health 13: 483

8. Yasmin S, Osrin D, Paul E, Costello A (2001) Neonatal mortality of low-birth weight infants in Bangladesh. Bull Wld Hlth Org 79: 608-14.

9. Bang AT, Bang RA, Reddy HM (2005) Home-based neonatal care: summary and applications of the field trial in rural Gadchiroli, India (1993 to 2003). J Perinatol 25: 108-22.

10. Darmstadt GL, Badrawi N, Law PA, Ahmed S, Bashir M, et al. (2004) Topically applied sunflower seed oil prevents invasive bacterial infections in preterm infants in Egypt. Pediatr Infect Dis J 23: 719-25.

11. AAO P (1998) Hospital discharge of the high-risk neonate--proposed guidelines. American Academy of Pediatrics. Committee on Fetus and Newborn. Pediatrics 102: 411-7.

12. Atnafu M , TG, Metaferia A, Yemisrach AT (2016) Reasons for admission and neonatal outcome in the neonatal care unit of a tertiary care hospital in addis ababa: a prospective study. Dove press j Res Rep in Neonatology 6: 17-23.

13. Nkuranga D (2009) neonatal admission. Department of Paediatrics and Child Health, University of Nairobi. (MB Ch.B-NUR).

14. Hoque M, Haaq S, Islam R (2011) Causes of Neonatal admissions and deaths at a rural hospital in KwaZulu-Natal, South Africa. South Afr J Epidemiol Infec 26: 26-9

15. Gann M (2010) Clinical Profile and Outcome of Babies Admitted to NICU. Teaching Hospital Shivamogga, Karnataka. Child Health, University of Nairobi, (MB Ch.B-NUR).

16. Dash NK (2010) neonatology unit national institute of child health. Pakisticjp.

17. Narayan R (2012) A study of the pattern of admissions and outcome in a neonatal intensive care unit at high altitude. Sri Lanka J Child Health 41: 79-81.

18. Caroline S, Mark K (2008) Neonatal Morbidity and Mortality After Elective Cesarean Delivery. NIH Public Access, Clin Perinatol 35: 361.