International Journal of Nursing & Midwifery Research
Volume 8, Issue 2&3 - 2021, Pg. No. 3-10
Peer Reviewed & Open Access Journal

Research Article

Neonatal Morbidity and Mortality Pattern in a Mission Hospital in Nigeria: A Facility-Based One Year Retrospective Study

Elizabeth Urenna Ike[1], Oyeninhun Abimbola Oluwatosin[2], Chizoma Millicent Ndikom[3], Joel Ojo Aluko[4]

[1]Department of Clinical Nursing, University College Hospital, Ibadan, Nigeria.
[2]Department of Nursing, University of Ibadan, Ibadan, Nigeria.
[3,4]Department of Nursing Sciences, University of Ilorin, Ilorin, Nigeria.
DOI: https://doi.org/10.24321/2455.9318.202106

I N F O

Corresponding Author:
Elizabeth Urenna IKE, Department of Clinical Nursing, University College Hospital, Ibadan, Nigeria.
E-mail Id:
elizabeth_ike@yahoo.com
Orcid Id:
https://orcid.org/0000-0002-0155-3040
How to cite this article:
Ike EU, Oliwatosin OA, Ndikom CM, Aluko JO. Neonatal Morbidity and Mortality Pattern in a Mission Hospital in Nigeria: A Facility-Based One Year Retrospective Study. Int J Nurs Midwif Res. 2021; 8(2&3):3-10.
Date of Submission: 2021-01-17
Date of Acceptance: 2021-03-10

A B S T R A C T

Neonatal period is sensitive due to the physiological adaptations newborns make to adapt to extra uterine environment. High percentage of mortality during infancy occur during this period especially in developing countries. Nigeria neonatal mortality record is among the worst in the world.

This study examined morbidity and mortality pattern of neonates admitted to Our Lady of Apostles (OLA) Catholic hospital, Okeofa Ibadan. This hospital-based retrospective study was carried out among admitted neonates at OLA Catholic hospital Oluyoro Ibadan, for a period of 1 year from May, 2017 to June 2018. Overall, 360 complete case notes were reviewed.

A 5-sectioned structured checklist containing 39 items designed by the researchers was used for data collection. Data was analyzed using descriptive statistics and chi-square test.

Among 360 neonatal case notes that were studied, 310 (86.1%) were admitted within the first and 7th day of life with the mean day of admission being 4 ± 5.5 days. 248 (68.9%) of the neonates had normal birth weight, 59 (16.4%) had low birth weight and 53 (14.7%) were macrosomic babies with the mean weight being 3 ± 0.6 kg. The two main causes of admission were neonatal sepsis 113 (31.4%) and birth asphyxia 94 (26.1%).

A total of 248 (68.9%) neonates survived and were discharged home, 79 (21.9%) were discharged against medical advice, 25 (6.9%) were referred to a higher centre and 8 (2.2%) died. There is a significant association between neonates' gender (P0.025), birth weight (P0.013) and neonatal outcome.

Sepsis and birth asphyxia were the leading causes of neonatal morbidity and mortality. Efforts should be intensified to improve the care provided to women and their newborns during labor and immediate postpartum period respectively.

Keywords: Neonatal, Morbidity, Mortality Pattern, Neonatal Care

Introduction

The slow decline in neonatal mortality in Nigeria calls for the attention of all stakeholders. In other words, if the target of Sustainable Development Goal (SDG) must be achieved, efforts to step down neonatal mortality must be intensified. Nigeria neonatal mortality record is among the worst in the world.[1] Currently, one in every two deceased children under 5 years of age in Nigeria is a neonate. More specifically, 27 Nigeria newborns die every hour.[1]

Neonatal period is of great importance due to the physiological adaptations to the extrauterine environment and the high mortality of neonates indicates its sensitivity.[2] Although, under 5 mortality is reducing drastically worldwide, but neonatal mortality is not following the same trend contributing 40% of all under five mortality and nearly 60% of infant (under one) mortality.[3] Globally, about four million newborns die every year within the neonatal periodand up to three quarters of all newborn deaths take place in the first week of life while as much as half of these deaths occur in the first day of life.[4] About 99% of the overall neonatal deaths occur in the low and middle income countries.[5] In low-income countries, the average newborn mortality rate is 27 deaths per 1,000 births, as against 3 deaths per 1,000 deaths in high income countries. In Nigeria neonatal mortality rate is 36 per 1000 live births. Given that the majority of these deaths are preventable and treatable, indicates that the world is failing the newborn babies.[6]

The major factors contributing to neonatal mortality include prematurity, events during childbirth and neonatal infections.[6] Other factors that have been linked with neonatal mortality comprise of maternal education, sex of the neonate, duration of pregnancy, home delivery without skilled provider, pregnancy complication, birth weight, delay in seeking care during illness, lack of preparedness of families and care providers, harmful cultural practices, economic status, social exclusion, maternal illiteracy, negative parental attitudes arising from the social environment, gender bias, inability to pay for care, lack of basic prenatal, natal and postnatal services.[7]

It was reported that prevention of neonatal deaths require greater prenatal care by skilled health care workers before birth rather than improved neonatal care after birth.[8] This confirms the assertion that prevention is better and cheaper than cure.

In addition UNICEF documented that neonatal deaths can be prevented with access to well-trained midwives during prenatal and postnatal visits, delivery at a health facility, early initiation of breastfeeding within the first hour of birth, skin-to-skin contact, proper cord care and good nutrition.[6] This implies that shortage of skilled attendants will result in newborns not receiving the care and support they need to survive. Improved neonatal care can lead to increased neonatal survival rate.[6]

Accelerated progress for neonatal survival and promotion of health and wellbeing requires strengthening quality of care as well as ensuring availability of quality health services for the small and sick newborn. This Mission based hospital services are often orderly and unique for effective quality care as it operates as a secondary health facility and also provides approved Medical Residency and Nursing training programmes. There appears to be dearth of published mission hospital based studies in Oyo State that documented the pattern of neonatal morbidity and mortality. Therefore, this study was undertaken to examine pattern of morbidity and mortality among the neonates admitted to a mission hospital in Ibadan.

Material and Method

Study Design

A health facility based retrospective study carried out among admitted neonates at Our Lady of Apostles Catholic Hospital, Oluyoro, Okeofa Ibadan, for a period of 1 year from May, 2017 to June 2018.

Study Area

Our Lady of Apostles (OLA) Catholic Hospital Oluyoro, Okeofa is a Roman Catholic mission hospital located within Ibadan north east local government area of Oyo State, Nigeria. The hospital has bed capacity of 200. It serves the indigenous population of Ibadan and its surrounding villages. It also serves as a secondary care centre. The hospital runs a school of midwifery and school of medical laboratory technology and it is an accredited centre for postgraduate residency training in family medicine and obstetrics and gynaecology. The infant Jesus ward and neonatal ward attend to children zero to 14 years.

As a secondary care center, most of the babies referred to the centre are babies with serious health challenges.

Study Population and Sample Size

All case notes that had complete records of newborn babies admitted at OLA hospital within the period of study from May 2017 to June 2018 were included and reviewed. A total of 360 case notes were reviewed.

Instrument for Data Collection

A 5 sectioned structured checklist containing 39 items designed by the researchers after extensive literature review was used for data collection relevant to aim of the study. Information captured in the checklist includes the following: age on presentation, sex, date of birth, weight at birth and on presentation, mother's profile, diagnosis on admission, outcome of management (defined as survived,

ISSN: 2455-9318
DOI: https://doi.org/10.24321/2455.9318.202106

discharged against medical advice, referred to another hospital or died).

The validity of the instrument was attested to by experts in the field of Maternal, Child and Newborn Health Nursing. Ethical clearance for the study was obtained from ethical Institution Review Committee (IRC) of Our Lady of Apostles Catholic Hospital.

Method of Data Analysis

Checklist collected was checked for completeness and accuracy. Serial numbers were assigned to each neonate's checklist for easy identification and for correct data entry and analysis.

Data retrieved were entered into Statistical Package for the Social Sciences (SPSS) version 21.0 (IBM Inc, Armonk, New York, USA) spreadsheets. The data were analyzed descriptively using mean, frequencies/ percentages to answer the research questions, while chi-square test was used to test hypotheses, level of significance (p) being 0.05.

Table 1.Socio-Demographic Characteristics of Neonate (N=360)

Socio-demographic characteristics	Frequency	%	Mean ± SD
Sex			
Male	225	62.5	
Female	135	37.5	
Age on presentation			
1-7 days	310	86.1	4 ± 5.46
8-14 days	20	5.6	
15-21 days	23	6.4	
22-28 days	7	1.9	
Weight at birth (kg)			
Low birth weight (< 2.5 kg)	59	16.4	3 ± 0.58
Normal birth weight (≥ 2.5 kg < 4.0 kg)	248	68.9	
Overweight (≥ 4.0 kg)	53	14.7	
Weight on presentation (kg)			
Low birth weight (< 2.5 kg)	68	18.9	3 ± 4.29
Normal birth weight (≥ 2.5 kg <4.0 kg)	232	64.4	
Overweight (≥ 4.0 kg)	60	16.7	
Height on presentation (cm)			
34-46 cm	168	46.7	47 ± 2.78
47-54 cm	192	53.3	
Occipitofrontal circumference (cm)			
25-34 cm	170	47.2	34 ± 1.99
35-48 cm	190	52.8	

Result

A total of 360 neonate's records were studied. Above Table 1, presents the socio-demographic variables of clients whose hospital records were studied. The result shows that 225 (62.5%) of the neonate were male and 310 (86.1%) of the neonates were admitted at the hospital in the first to 7th day of life, while the rest were admitted in the 8th to 28th day of life, the mean day of admission being 4 ± 5.5 days. Out of the 360 neonates that were studied, 248 (68.9%) were normal birth weight babies at birth while 59 (16.4%), and 53 (14.7%) were low birth weight and macrosomic (big) babies, respectively, the neonates' mean birth weight was 3 ± 0.5.8 kg. In addition, 168 (46.7%) of the neonate were 34-46 cm in length, the mean length of the neonates was 47 ± 2.78 cm. Moreover, 170 (47.2%) neonate had an occipito-frontal circumference ranging from 25-34 cm (mean circumference was 34 ± 1.99 cm).

Most 289 (80.3%) of the mothers were between the ages 18 and 34 years, 293(81.4%) were from the Yoruba tribe, 55(15.3%) were from Igbo tribe, while the rest belong to Hausa tribe. Moreover, 253(70.3%) were Christians, 359(99.7%) were married, 114 (31.7%) were pregnant for the first time (primigravid mothers), but 230(63.9%) had children ranging from I - 4 (para 1 - 4) and the rest had 5 and more children (grand-multipara). Besides, 195 (54.2%) of the mothers reside in urban area of city, Table 2, shows details of other socio-demographic characteristics of the neonates' mothers.

Table 2.Socio-Demographic Characteristics of Neonates Mother (N=360)

Socio-demographic characteristics	Frequency	%	Mean ± SD
Mothers age			
18-34 years	289	80.3	31 ± 4.64
35-44 years	71	19.7	
Tribe			
Yoruba	293	81.4	
Hausa	12	3.4	
Ibo	55	15.3	
Religion			
Christianity	253	70.3	
Islam	107	29.7	
Marital status			
Married	359	99.7	
Single	1	0.3	
Mothers parity			
Primigravida	114	31.7	
Para 1 - 4	230	63.9	
Grandmulti	16	4.4	

ISSN: 2455-9318
DOI: https://doi.org/10.24321/2455.9318.202106

No. of other children alive			
Never had a child (primigravida)	113	31.4	1 ± 1.25
1-4	240	66.7	
5-6	7	1.9	
Residence of parents			
Urban	195	54.2	
Semi-urban	165	45.8	

Majority (113, 31.4%) of the neonates were diagnosed with Neonatal sepsis, 94 (26.1%) were diagnosed with Birth asphyxia, 55 (15.3%) were diagnosed with Jaundice and the remaining were diagnosed with other types of illness. Furthermore, 55 (15.3%) were preterm neonate, 12 (3.3%) were post term, Table 3, shows details of other diagnosis of neonates on admission.

Table 3.Indications/ Diagnoses for Neonatal Admission (N = 360)

Pattern of Neonatal illness/ Gestational age at birth	Frequency	%
Baby's diagnosis on admission/presentation		
Preterm/Low birth weight	41	11.4
Birth asphyxia	94	26.1
Respiratory distress syndrome	16	4.4
Neonatal sepsis	113	31.4
Congenital anomalies	4	1.1
Jaundice	55	15.3
Hypoglycaemia	18	5.0
Seizure	1	0.3
Birth injury	1	0.3
Meconium aspiration	3	0.8
Anaemia	4	1.1
Bleeding circumcision	2	0.6
Eye infection	1	0.3
Congenital malaria	4	1.1
Aspiration pneumonia	2	0.6
Failure to thrive	1	0.3
Gestational age at birth		
Preterm	55	15.3
Term	293	81.4
Post term	12	3.3

Finding shows that 248 (68.9%) neonates admitted at OLA within the period of data collection survived and were discharged home alive, while 8 (2.2%) died. Seventy nine (21.9%) and 25 (6.9%) were discharged against medical advice and referred to another hospital respectively, as indicated in Figure 1.

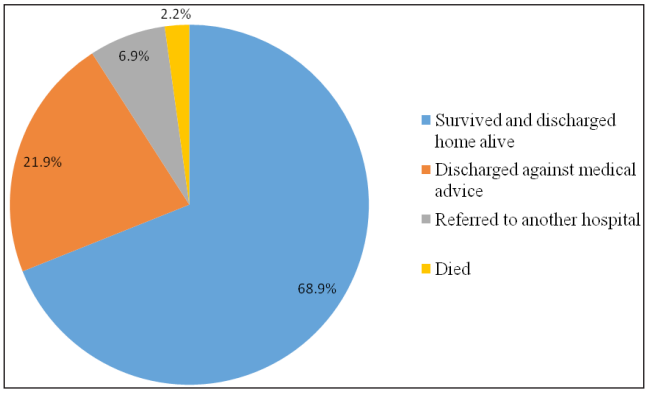

Figure 1.Care Outcomes of Newborns (N = 360)

Most 222 (61.7%) of the neonates were inborn and the rest were out born, 24 (6.7%) neonates were admitted through home, 6 (1.7%) through primary health care facility and 4 (1.1%) from tertiary hospital. Among the neonates, 193 (53.6%) were delivered through spontaneous vertex delivery while 109 (30.3%) and 54 (15.0%) of the neonates were delivered through emergency caesarian section and elective caesarian section respectively.

The Apgar score of 31 (8.6%) were between 1 and 3 while the Apgar score of 78 (21.7%) were between 4 and 6. Only 171 had a temperature from 36.5^{0}C to 37.4^{0}C and 100 (27.8%) had temperature from 35.5^{0}C and 36.4^{0}C respectively, other details as indicated in Table 4.

Table 4.Factors Influencing Survival or Death of Newborns

Factors influencing survival or death of newborns	Frequency	%
Place of delivery		
Inborn	222	61.7
Outborn	138	38.3
Source of admission		
OLA hospital	214	59.4
Private hospital	75	20.8
State hospital	37	10.3
Primary health care facility	6	1.7
Home	24	6.7
Tertiary hospital	4	1.1
Mode of delivery		
Spontaneous vertex delivery	193	53.6
Breech extraction	3	0.8
Vacuum extraction	1	0.3
Emergency caesarian section	109	30.3
Elective caesarian section	54	15.0
Apgar Score at 1 minute		
1 - 3	31	8.6
4 - 6	78	21.7

ISSN: 2455-9318
DOI: https://doi.org/10.24321/2455.9318.202106

7 above	251	69.7
Temperature on admission		
35.5 - 36.4	100	27.8
36.5 - 37.4	171	47.5
> 37.4 - 38	57	15.8
> 38	32	8.9
SpO^2 on admission		
30 - 49	4	1.1
50 - 69	12	3.3
70 - 89	73	20.3
90 - 100	270	75.0
Not done	1	0.3

Testing of Hypotheses

H0: There is no significant association between the neonates' gender and neonatal outcome/ weight and neonatal outcome.

The finding of the study shows significant association between neonates' gender and neonatal outcome in that the male neonates survived better than the female neonates at the setting where this study was conducted (P0.025).

Also the finding shows significant association between neonates' weight and neonatal outcome in that the neonates with normal birth weight survived better than those with low birth weight and overweight babies (macrosomia) at the setting where this study was conducted (P0.013).

vulnerable to diseases and premature death.[12, 13] In another documentation it was attributed to relatively well developed lungs in females at birth compared to males.[9] Also cultural and social factors may contribute to preference for male child and male neonates getting more attention by parents than their female counterparts.[14,15]

Majority 310 (86.1%) of the neonates were admitted between the first day and seven days of life, followed by the age group of 15 to 21 days of life with a mean score of 4 ± 5.46 standard deviation. The high proportion of neonatal admission within the first week of life is in line with other studies.[16,11] This is associated with the stress of labor and the physiological adaptation to extrauterine life the neonate has to make. It is not also surprising because many studies reported high neonatal mortality within this period.[1,4] The average age of admission was 4 ± 5.46 which is in agreement with another study in India.[5]

The weight parameter analysis revealed that majority 248 (68.9%) were normal birth weight babies at birth while 59 (16.4%) and 53 (14.7%) were low birth weight and big babies respectively with the mean score and standard deviation of 3 ± 0.58 kg. This is consistence with similar studies in Nigeria, Pakistan and Bangladesh respectively.[17-19] The fact that most of the admitted babies were having normal birth weight at birth and many of them were admitted at the first week of life is a pointer that something went wrong around the perinatal and immediate postnatal period. In view of this, midwives and other healthcare professionals should step

Table 5.Associations Between Neonates' Gender and Neonatal Outcome/ weight and Outcome

	Neonatal Outcome					
Neonates' Gender	**Survived, Discharged Home n (%)**	**DAMA, Referred, Died n (%)**	**Chi-sq.**	**df**	**P**	**Remark**
Male	165 (66.5)	60 (53.6)	5.530	1	0.025	Significant
Female	83 (33.5)	52 (46.4)				
Weight at Presentation						
Low birth weight (< 2.5 kg)	44 (17.7)	24 (21.4)	8.758	2	0.013	Significant
Normal birth weight (≥ 2.5 kg & < 4.0 kg)	153 (61.7)	79 (70.5)				
Over weight (≥ 4.0 kg)	51 (20.6)	9 (8.0)				

Discussion of Findings

This is hospital based study, perhaps the first published data concerning outcome of neonates admitted at our lady of apostle's hospital. Overall, 360 neonates were included in this study. Consistent with other studies in both developed and developing countries, the male newborns admitted during the period of study were more than the females.[9-11] Previous studies speculated that the male disadvantage might be as a result of genetic and biological makeup, with boys being biologically weaker and more

up the care they provide to women and their infant within this period. However, there are other predictor of neonatal morbidity and mortality apart from birth weight (18).

It was found that 289 (80.3%) of the mothers were between the age range of 18-34 years and were majorly 293 (81.4%) from the Yoruba tribe and mostly Christians 253 (70.3%).

These findings are expected as the age group of the mothers of the admitted neonates is within the World Health Organization (WHO) accepted reproductive age group of 19 to 49 years.[20] It was also observed that less than

ISSN: 2455-9318
DOI: https://doi.org/10.24321/2455.9318.202106

half (45.8%) of the parents of the neonates were of rural background while slightly more than half (54.2%) were of urban background. OLA hospital is located at the urban area of the city of Ibadan and most of its clients come from the area but occasional referrals are from neighboring towns and villages. This is not atone with the study in India where the rural population outnumbered the urban population.[5]

The two most common indication for admission was neonatal sepsis 113 (31.4%) and Birth asphyxia 94 (26.1%) followed by Jaundice 55 (15.3%) and preterm/ Low birth weight 41 (11.4%) respectively. These findings are in congruence with other studies in Nigeria and other developing countries where neonatal sepsis was the leading cause of neonatal morbidity, followed by birth asphyxia, jaundice and prematurity although the pattern varies among different centres.[21,16,5,10,22]

As regards the gestational age, full term birth resulted in a higher rate of admission (81.4%) followed by Preterm Birth (15.3%). This is in congruence with similar studies in Nepal.[11,23] The fact that most of the admitted neonates were fullterm and presenting with neonatal sepsis is a probability that they were from mothers with high risk pregnancy. High risk pregnancies increase the risk of neonatal admission. In addition, Sepsis is the outcome of colonization of the neonate by bacteria in utero or after birth and can be prevented by proper infection control strategies during antennal, labor and immediate postnatal period.

Also, in this study a higher percentage of neonates admitted for birth asphyxia, suggests that there are problems and inadequacies in the care of women in labor and neonatal resuscitation.

It was observed that out of 360 neonates admitted within the period of review, 68.9% neonates survived while 2.2% died. This is not consistent with the findings from previous studies in Nigeria and other developing countries whereby the mortality rates were 33.9%, 13.8% and 9.73% respectively.[5,24,25] Comparing with the previous studies the high survival rate and low death rate in this study is commendable and could explain the quality of care delivered in the centre to neonates. However, the findings also revealed that a very high proportion (21.9%) of neonates was discharged against medical advice and (6.9%) were referred to a higher center. In contrast with other studies in India, Ethiopia and Nigeria where 0.2%, 1.3% and 6% left against medical advice and only 1% and 1.8% were referred.[5,21,26]

In other words, these neonates who were admitted with life-threatening health problems have not been considered fit for discharge by the managing team while the parents request for discharge against medical advice. This could be as a result of ignorance of the parents feeling that the child is convalescing and can go home or that the child is not getting better as they expected. It may also be as a result of financial constraint since the hospital use cash and carry policy. Nurses should be able to educate and convince parents against any move to take their baby home against medical advice. A good number of neonates that were referred to other hospital indicated that the managing team referred neonates for expert management when they are not in a position to manage the conditions in question. This could also be another reason for the low mortality in this setting.

Findings revealed that most (61.7%) of the neonates were born in the study setting (inborn) while 38% were outborn. Majority being inborn could explain that most of the neonates are from high risk pregnancy and were referred to the centre as unbooked, that is, mothers who did not receive antenatal care in the study setting. This could be the reason why neonatal sepsis is the leading cause of admission in the present study.

A substantial number (30.3%) of the neonates were delivered through emergency caesarian section. This is in keeping with another study that reported a higher morbidity and mortality rate among newborns delivered through emergency caesarian section.[27]

The Apgar score indicates that 31(8.6%) and 78 (21.7%) were severely and moderately asphyxiated at birth. This further strengthens the aforementioned in this study which listed asphyxia as one of the leading cause of admission. Emphasis therefore should be on prevention of asphyxia and neonatal resuscitation.

It was observed that a good number 100 (27.8%) were hypothermic on admission. The fact that majority of these newborns are inborns calls for the need to improve on temperature control in the delivery room as well as during transportation to the neonatal unit. Previous study documented that hypothermia plays a significant role in increasing neonatal death especially in sub Sahara countries.[28]

The finding of the study shows significant association between neonates' gender and neonatal outcome. In other words, the male neonates survived better than the female neonates in this study. This does not corroborate other studies.[14,17] In these studies, male neonates recorded the highest mortality. Furthermore, the findings revealed a significant association between neonates' weight and outcome in that the neonates with normal birth weight survived better than those with low birth weight and overweight babies (macrosomia). These findings show consistency with the results obtained in previous studies[17,29] which confirmed birth weight as a significant predictor of neonatal mortality.

ISSN: 2455-9318
DOI: https://doi.org/10.24321/2455.9318.202106

Conclusion

A total of 360 complete records of neonates who were admitted to OLA hospital from May 2017, June, 2018 were reviewed. Consistent with other studies admissions of male neonates were more than those of females. The most frequent causes of admission diagnosis are neonatal sepsis followed by birth asphyxia and neonatal jaundice. Majority of the neonates were admitted between the first and 7 days of life. Many of the neonates were products of full term gestation and were inborn and majority was delivered through emergency caesarian section.

Out of the 360 neonates reviewed, 68.9% survived and was discharged, 21.9% left against medical advice while 2.2% died. Overall, neonatal mortality was found to be significantly low at OLA Catholic hospital. There is a significant association between neonates' gender/ birth weight and neonatal outcome.

In the light of the findings of this study, it is recommended that efforts should be intensified to improve the care provided to women and their newborn during labor and immediate post partum period respectively. Also training and retraining of midwives to improve their skills on neonatal resuscitation and care of sick newborn. In addition, Obstetricians should be educated and advised on early referral of high risk pregnancies.

Limitation

Retrieving of neonates' case files was difficult due to shortage of manpower. This made data collection to last longer than intended. Some neonates case file were not complete therefore were not included. Data obtained was for a period of one year, therefore generalization of the present findings is limited.

Authorship Criteria

This is to certify that the authors have worked together and participated sufficiently in the intellectual content of the study, as well as writing of the manuscript. There is no conflict of interest. The manuscript has not been published or being considered for publication elsewhere.

Acknowledgement

We wish to thank the staff and management of Our Lady of Apostles (OLA) Catholic Hospital, Oluyoro Okeofa, Ibadan, for the opportunity to carry out this research. Special thanks to Reverend Sister Lucy, the matron in charge, for her support and hospitality.

Our heartfelt gratitude to the head of department and members of staff, medical record unit, OLA, Catholic Hospital, Oluyoro Okeofa, Ibadan for helping us to retrieve the case files for this research. God bless you all.

Source of Funding: None

Conflict of Interest: None

References

1. Amadi HO, Kawuwa MB. Reducing early neonatal mortality in Nigeria, the solution. In: Barria RM, editor. Selected topics in neonatal care. Intech Open; 2017. [Google Scholar]
2. Kord Z, Tali SS, Karharoudy FA. Evaluation of adherence to oxygen therapy standards before, during and after oxygen hood administration. J Nurs Midwif Sci. 2015;2(4):30-6. [Google Scholar]
3. Zhang B, Dai Y, Chen H, Yang C. Neonatal mortality in hospitalized Chinese population: ameta-analysis. Biomed Res Int. 2019;2019:1-7. [PubMed] [Google Scholar]
4. World Health Organization [Internet]. Newborns: reducing mortality; [cited 2021 Jan 10]. Available from: www.who.int/News-room/Fact-sheets-2019/Detail
5. Kotwal YS, Yatoo GH, Ahmed JF. Morbidity and mortality among neonates admitted to a neonatal Intensive Care Unit of a tertiary care teaching hospital of Jammu and Kashmir (India). NeonatPediatr Med. 2017;3(2):136. [Google Scholar]
6. UNICEF [Internet]. World is failing newborn babies; [cited 2021 Jan 10].Available from: www.unicef.org/nigeria/press-releases/world-failing-newborn-babies 2018
7. Wolde HF, Gonete KA, Akalu TY, Baraki AG, Lakew AM. Factors affecting neonatal mortality in the general population: evidence from the 2016 Ethiopian Demographic and Health Survey (EDHS)- multilevel analysis. BMC Res Notes. 2019;12(1):610. [PubMed] [Google Scholar]
8. Koshida S, Yanagi T, Ono T, Tsuji S, Takahashi K. Possible prevention of neonatal death: aregional population-based study in Japan. Yonsei Med J. 2016;57(2):426-9. [PubMed] [Google Scholar]
9. Tajkia G, Amin SK, Rahman ME, Setu M, Roy K, Halder S, Rahman MM. Pattern of admission and outcome in a Neonatal Intensive Care Unit (NICU) of a tertiary care hospital in Dhaka, Bangladesh. AKMMC J. 2019;10(2):150-8. [Google Scholar]
10. Banstola R, Shrestha S, Ghimire JJ, Gurung R, Sigdel YR. Disease pattern and outcome of neonates at Special Newborn Care Unit (SNCU) of Pokhara Academy of Health Science (PAHS), Nepal. Nepal J Obstet Gynaecol. 2017;12(2):61-4. [Google Scholar]
11. Roma KM, Pyakurel M, Gupta V, Kanodia P. Clinical profile and outcome of neonates admitted to Neonatal Intensive Care Unit of NGMC. J Nepalgunj Med Coll. 2017;15(1):20-2. [Google Scholar]

12. Pongou R. Why is infant mortality higher in boys than in girls? A new hypothesis based on preconception environment and evidence from a large sample of twins. Demography. 2013;50(2):421-4. [PubMed] [Google Scholar]
13. Zhao D, Zou L, Lei X, Zhang Y. Gender differences in infantmortality and neonatal morbidity in mixed-gender twins. Sci Rep. 2017;7:8736. [PubMed] [Google Scholar]
14. Demisse AG, Alemu F, Gizaw MA, Tigabu Z. Patterns of admission and factors associated with neonatal mortality among neonates admitted to the neonatal intensive care unit of University of Gondar Hospital, Northwest Ethiopia. Pediatric Health Med Ther. 2017;8:57-64. [PubMed] [Google Scholar]
15. Abdullateef RA, Abdulbaqi SZ, Abdulwasiu R, Sulaiman L, Joseph A. Socio-cultural factors and male-child preference among couples in Ilorin-West local government area of Kwara-State, Nigeria. Ethiop JSoc Lang Stud. 2016;3(1):57-73.
16. Okagua J, Obikwu U. Morbidity and mortality pattern of neonates admitted into the Special Care Baby Unit of University of Port Harcourt Teaching Hospital, Nigeria. East Afr Med J. 2017;94(4).
17. Onwuanaku CA, Okolo SN, Ige KO, Okpe SE, Toma BO. The effects of birth weight and gender on neonatal mortality in north central Nigeria. BMC Res Notes. 2011;4:562. [PubMed] [GoogleScholar]
18. Hussain S. Neonatal morbidity and mortality pattern in a tertiary care neonatal unit of a teaching hospital. Ann Pak Inst Med Sci. 2014;10(1):7-11. [Google Scholar]
19. Hamid F, Quaium SM, Rahman A, Ahmad AR, Khan S, Hussain T, Zahra F, Islam TM. Audit of neonatal morbidity and mortality in atertiary care hospital, Sylhet. ChattagramMaa-O-Shishu Hosp Med Coll J. 2016;15(2):45-8. [Google Scholar]
20. World Health Organization [Internet]. Infertility definitions and terminology - WHO. Sexual and reproductive health; 2020 [cited 2021 Jan 10]. Available from: www.who.int/reproductive health/topics/infertility/definitions
21. Abdullahi UI. Neonatal morbidity and mortality in a rural tertiary hospital in Nigeria. CHRISMED J Health Res. 2018;5(1):810. [Google Scholar]
22. Ekwochi U, Ndu IK, Nwokoye IC, Ezenwosu OU, Amadi OF, Osuorah D. Pattern of morbidity and mortality of newborns admitted into the sick and special care babyunit of Enugu State University Teaching Hospital, Enugu state. Niger J Clin Pract. 2014;17(3):346-51. [PubMed] [Google Scholar]
23. Chapagain RH, Basaula YN, Kayatha M, Adhikari K, Shrestha SM. Disease profile and hospital outcome of newbornadmitted to neonatal intermediate care unit at tertiary care center in Nepal. Kathmandu Univ Med J (KUMJ). 2017;58(2):126-9. [PubMed] [Google Scholar]
24. Afolabi BM, Clement CO, Inem V. A review of neonatal morbidity and mortality in an Intensive Care Unit of a paediatric health facility in Lagos, Nigeria. J Trop Dis. 2013;1:115. [Google Scholar]
25. Hoque M, Haaq S, Islam R. Causes of neonatal admissions and deaths at a rural hospital in KwaZulu- Natal, South Africa. South Afr J Epidem Infect. 2011;26(1):26-9. [Google Scholar]
26. Seboka J, Abera AM, Rebitu AD. Pattern of admission and outcome of neonate admitted to Adama Hospital Medical College Neonatal Intensive Care Unit, Adama, Ethiopia. IntJ SciBasic Appl Res. 2018;42(1):59-71.
27. Choudhary B, Choudhary Y, Pakhare AP, Mahto D, Chaturvedula L. Early neonatal outcome in caesarean section: adeveloping country perspective. Iran J Pediatr. 2017;27(1):e7948. [Google Scholar]
28. Bayih WA, Assefa N, Dheresa M, Minuye B, Demis S. Neonatal hypothermia and associated factors within six hours of delivery in eastern part of Ethiopia: a cross-sectional study. BMC Pediatr. 2019;19(1):252. [PubMed] [Google Scholar]
29. Ike EU, Oyetunde MO. Pattern of diseases and care outcomes of neonates admitted in Special Care Baby Unit of University College Hospital, Ibadan, Nigeria from 2007 to 2011. IOSR J Nurs Health Sci. 2015;4(3):62-71.

ISSN: 2455-9318
DOI: https://doi.org/10.24321/2455.9318.202106