

Morbidity and Mortality Profile of Neonates Admitted in Special Newborn Care Unit in Tertiary Care Centre in Rural Area of Telangana State, India

Suresh Babu Mendu¹, Venu Kota², Aruna Rekha Neela³, Subhan Basha Bukkapatnam²

¹Associate Professor and Head, Department of Pediatrics, Government Medical College, Siddipet, Telangana, India, ²Assistant Professor, Department of Pediatrics, Government Medical College, Siddipet, Telangana, India, ³Associate Professor, Department of Obstetrics and Gynecology, Government Medical College, Siddipet, Telangana, India

Abstract

Background: India contributes to one-fifth of global live births and >25% of neonatal deaths. In spite of advances in perinatal and neonatal care, neonatal mortality is still high in developing countries, such as India. Special neonatal care units (SNCUs) have been set up to provide quality newborn care services to meet this challenge. This study aims to determine the causes of morbidity and mortality in admitted neonates.

Materials and Methods: This is a retrospective observational study carried out at SNCU, Government Medical College Siddipet, providing advanced level II Neonatal care at rural part of Telangana State. Data of all the admitted babies during 2015–2021 were recorded from by case sheets from records section and SNCU online software database. Excel sheet and Epi info were used for analyzing and tabulating the data.

Results: In the mentioned study period, a total of 7141 neonates were admitted. Major causes of admission were Sepsis 1439 (20.15%), Prematurity 1356 (19%), Transient Tachypnea of Newborn 1104 (15.46%), Jaundice 1100 (15.40%), and Birth asphyxia 688 (9.8%). Extreme low birth weight (23.61%) was the major cause of mortality. Discharge percent among the patients was 85.73%, 2.61% had left hospital against medical advice, 1% died and 10.33% were referred. The overall survival rate of SNCU is 98.49%.

Conclusions: Establishing SNCU's in high delivery points has great impact in reduction of Neonatal mortality and morbidity in India. With the availability of this unit the indicators of mortality and morbidity was reduced significantly as the common causes are identified and treated appropriately.

Key words: Morbidity, Mortality, Neonate, Rural India, Special neonatal care unit

INTRODUCTION

The first 28 days of life – the neonatal period – is the most vulnerable time for a child's survival. The growth and development of any nation is reflected in its health indicators especially the neonatal and child health indicators. Globally, 2.5 million children died in the 1st month of life in 2018, approximately 7000 newborn

deaths every day with about one third dying on the day of birth and close to three quarters dying within the 1st week of life.^[1]

In India, 26 million babies are born every year and 1.2 million die in the newborn period, which accounts for a quarter of global neonatal death. India thus faces the biggest newborn health challenge in the world.^[1]

Neonates face the highest risk of dying in their 1st month of life. The average global neonatal mortality rate (NMR) is 17 deaths/1000 live births in 2019, down by 52% from 37 deaths/1000 live births in 1990. Neonatal mortality has reduced at much lesser rate than post-neonatal deaths, thereby increasing the contribution of neonatal deaths from 41% of under-5 deaths in 1990 to 56% in 2012.^[2] Even

Access this article online



www.ijss-sn.com

Month of Submission : 09-2021
Month of Peer Review : 10-2021
Month of Acceptance : 11-2021
Month of Publishing : 11-2021

Corresponding Author: Dr. Subhan Basha Bukkapatnam, Assistant Professor, Department of Pediatrics, Government Medical College, Siddipet, Telangana, India.

now, 0.76 million newborns die each year mainly due to preventable causes.

Many health programs were launched by Government of India (GOI) and Facility-Based Newborn Care (FBNC) program is one of the key initiatives under the National Rural Health Mission (NRHM) and Reproductive Child Health II to improve the status of newborn health in the country.^[3] Under this program, Newborn Care Corners (NBCCs), Newborn Stabilization Units (NBSUs), and Special Newborn Care Units (SNCUs) are being established at different levels of health care facilities. In this regard, the GOI has recently developed a FBNC Operational Guideline to facilitate the states in planning, establishment, operationalization, and monitoring of newborn care.

SNCUs have been established at district hospitals and sub district hospitals with annual delivery load more than 3000 to provide care for sick newborns, that is, all type of neonatal care except major surgeries. It is a separate unit in close proximity to the labor room with 12 or more beds, and managed by adequately trained doctors, staff nurses and support staff to provide 24 × 7 services. GOI started 253 SNCUs throughout the country in April 2011 and increased to 391 by March 2013. Till March 2015, 525 SNCUs (3), 1904 NBSUs and 14,163 NBCCs were functional in the country.^[4]

NBSUs

NBSUs are established at community health centers (CHCs)/first referral units. These are 4 bedded units with (Neonatal Resuscitation Program [NRP] trained doctors and nurses for stabilization of sick newborns).

NBCCs

These are 1 bedded facility attached to the labor room and operation theatre for provision of essential newborn care.

With the launch of various initiatives under National Health Mission, India has made a concerted push to increase access to quality maternal and newborn health services and reduce the large number of preventable, neonatal and infant deaths. Schemes such as Janani Suraksha Yojana and Janani Shishu Suraksha Karyakram brought significant gains in increasing institutional deliveries and helped in improving coverage as well reducing out of pocket expenditures. As a result, institutional delivery rates improved from a mere 38% in 2005 to 79% in the year 2015–2016.

India Newborn Action Plan (INAP) is India's committed response to the Global Every Newborn Action Plan, launched in June 2014 at the 67th World Health Assembly, to advance the Global Strategy for Women's and Children's Health. INAP lays out a vision and a plan for India to end

preventable newborn deaths, accelerate progress, and scale up high-impact yet cost-effective interventions toward attainment of the goals of "Single Digit NMR by 2030" and "single digit stillbirth rate by 2030."^[5]

Despite ongoing challenges, major progress has been made in improving neonatal survival. In India, the NMR is 21.66/1000 live births in 2019 from 25.87/1000 live births in 2015 at the beginning of the plan.

As per the National Family Health survey (NFHS) 5 by GOI, Telangana State, has at present Neonatal Mortality of 16.8 mean (Urban 13.8 and Rural 18.8) when compared the NMR of Telangana State in NFHS survey 4 was 20 (2015–2016). In India, highest NMR is seen in Bihar state which has reduced from 36.7 to 34.5 where as in Kerala state lowest NMR which has reduced from 4.4 to 3.4. The NMR of all states of India is decreasing with implementation of such programs.^[6]

The government has also set a target of fewer than ten neonatal deaths per 1000 live births by 2030 under the INAP. The majority of newborn deaths (80%) are due to complications related to preterm birth, intrapartum events such as birth asphyxia, or infections such as sepsis or pneumonia. Thus, targeting the time around birth with proven high impact interventions and quality care for small and sick newborns may prevent up to 80% of newborn deaths.

KCR Kit Scheme

The KCR Kit scheme was announced by the Telangana state government in 2017 for pregnant women and new born baby. Under this scheme, along with financial assistance to below poverty pregnant women, a kit is provided containing some essential items for pregnant women and new born baby to manage the pregnancy complications and encourage institutional delivery and newborn care. The scheme is designed to get pregnant women nutritious food and to take care of the new born after delivery. KCR Kit scheme is aimed at well-being of mother and child and reducing the NMR. After the KCR Kit scheme initiation, there is 22% increase in public sector institutional deliveries there by better obstetric and Neonatal care would be given.^[7]

Advancement in perinatal and neonatal care has significantly helped in reducing NMR in developed countries, but the mortality and morbidity are still high in developing countries. This study was undertaken to study the disease pattern and outcome of neonates admitted to the SNCU of a secondary care teaching hospital located in Siddipet district, a rural area in Telangana state, India, to provide a facility based view of morbidity and mortality profile of

rural area for further evaluation, assessment and planning of future programs.

MATERIALS AND METHODS

This is an observational retrospective study carried out in the SNCU, Department of Pediatrics, Government Medical College Siddipet located in rural area of Telangana State, India, after approval by the institute review board, for 6 years from July 2015 to July 2021.

This SNCU caters to the population of Siddipet District with babies delivered in-house and referrals from CHCs, primary health centers (PHCs) and private hospitals of the district. Approximately, 6200 deliveries are conducted per year in the hospital. Each delivery is attended by Pediatrician and NRP trained staff nurse. A retrospective case record review and analysis of all the newborn babies admitted to the SNCU during the study period was done and neonates satisfying inclusion and exclusion criteria were included in the study.

Inclusion Criteria

All live newborn weighing 500 g or more and gestational age 24 weeks or more, admitted in the neonatal care unit during the study period.

Exclusion Criteria

Neonates who left hospital against medical advice (LAMA) and neonates who were referred due to surgical intervention and other high-risk cases were excluded from the study. These neonates were categorized as inborn if delivered in the Medical college Hospital and rest as out born. The data were recorded in predesigned Pro forma.

Statistics

Data collected were compiled and entered in MS Excel 2010 spreadsheet and analyzed using appropriate statistical tools in Open Epi statistical software version 3.01.

RESULTS

A total of 7141 neonates [Table 1] were admitted during the study period. Out of this 5910 (82.76%) babies were inborn and rest 1231 (17.23%) were out born. Total male babies were 4074 (57.05%), and female babies were 3067 (42.94%) giving a male: female ratio of 1.3:1 (1.3:1 inborn vs. 1.27:1 out born). Term and preterm babies were 5776 (80.88%) and 1359 (19.04%), respectively. Out of all admitted neonates 4138 (57.94%) general category, 1186 (16.60%) Other Backward Classes (OBC), 1615 (22.61) Scheduled Castes (SC), 202 (2.82%) shows that all category of neonates are being treated at public sector.

In the admitted babies 4938(69.14%) delivered by lower segment Cesarean section (LSCS), 2203 (30.85) Normal vaginal delivery.

The majority of inborn babies [Table 2] admitted were in the First 72 h of life 5308 (89.83%), while 10% of babies were admitted from day 4th to 7th. Significantly higher number of inborn babies were admitted compared to out born babies in first 3 days of life (75.75% vs. 14.07%). Average stay duration of babies in SNCU is 5.9 days with 72 (1%) neonates stayed in SNCU for more than 30 days.

Table 1: Patient demographic data

Demography	Inborn (%)	Outborn (%)	Total	Percentage
Place of delivery	5910 (82.76)	1231 (17.24)	7141	100
Gender				
Male	3385 (47.40)	689 (9.65)	4074	57.05
Female	2525 (35.36)	542 (7.59)	3067	42.95
Total	5910 (82.76)	1231 (17.24)	7141	100.00
Gestation				
Term	4934 (69.09)	842 (11.79)	5776	80.89
Preterm	970 (13.58)	389 (5.44)	1359	19.03
Post term	6 (0.084)	0	6	0.08
Total	5910 (82.76)	1231 (17.24)	7141	100.00
Category				
General	3436 (48.12)	702 (9.83)	4138	57.95
OBC	951 (13.32)	235 (3.29)	1186	16.61
SC	1359 (19.03)	256 (3.58)	1615	22.62
ST	164 (2.29)	38 (0.53)	202	2.83
Total	5910 (82.76)	1231 (17.24)	7141	100.00
Delivery type				
NVD	1796 (25.15)	407 (5.70)	2203	30.85
LSCS	4114 (57.61)	824 (11.54)	4938	69.15
Total	5910	1231	7141	100.00

OBC: Other backward classes, SC: Scheduled castes, ST: Scheduled tribes, NVD: Normal vaginal delivery, LSCS: Lower segment cesarian section

Table 2: Stay duration and intervention at birth data

Stay duration (Days)	Inborn (%)	Outborn (%)	Total	Percentage
0	235 (3.29)	102 (1.43)	337	4.72
1	291 (4.08)	104 (1.46)	395	5.53
2	397 (5.56)	126 (1.76)	523	7.32
3	467 (6.54)	114 (1.60)	581	8.14
4	884 (12.38)	167 (2.34)	1051	14.72
5	1173 (16.43)	178 (2.49)	1351	18.92
6	794 (11.12)	121 (1.69)	915	12.81
7	510 (7.14)	71 (0.99)	581	8.14
8–30 days	1107 (15.50)	228 (3.19)	1335	18.69
31+days	53 (0.73)	19 (0.28)	72	1.01
Total	5910	1231	7141	100.00
Resuscitation at birth				
No resuscitation	4533 (63.48)	933 (13.07)	5466	76.54
Only O ₂	1135 (15.89)	260 (3.64)	1395	19.54
Tactile stimulation	131 (1.83)	23 (0.32)	154	2.16
Bag and mask	84 (1.18)	11 (0.15)	95	1.33
Chest compression	16 (0.22)	3 (0.04)	19	0.27
Intubation	8 (0.11)	0	8	0.11
Adrenaline	3 (0.04)	1 (0.01)	4	0.06
Total	5910	1231	7141	100.00

Among the babies admitted neonates, 5466 (76.54%), did not require any kind of intervention at birth. While resuscitation measures required for remaining includes tactile stimulation 154 (2.15%), Bag and Mask ventilation 95 (1.33%), chest compression 19 (0.26%), intubation 8 (0.11%) adrenaline 4 (0.05%), and 1395 (19.53%) required only oxygen supplementation at the time of delivery.

Major cases of morbidity [Table 3] of admissions were sepsis 1439 (20.15%), prematurity 1359 (19%), transient tachypnea of newborn (TTNB) 1104 (15.46%), jaundice 1100 (15.40)%, meconium aspiration syndrome (MAS) 887 (12.42%), birth asphyxia 703 (9.8%); others were respiratory distress syndrome (RDS) 244 (3.4%), low birth weight (LBW) 766 (10.7%), Extreme prematurity 128 (1.7%), seizures 77 (1%), congenital malformations 74 (1%), hypoglycaemia 110 (1.5%), shock 97 (1.35%), and hypothermia 52 (0.7%).

If respiratory distress is taken as morbidity of admission in broad term it includes TTNB, MAS, RDS, and Birth Asphyxia which will then be a major morbidity cause comprising 41.08% of all admissions. Extreme LBW (ELBW) 17(23.61%) was the major cause of mortality [Table 4], followed by RDS 14 (19.44%), MAS 10 (13.8%), prematurity 10 (13.88%), birth asphyxia 6 (8.3%), and sepsis 5 (6.9%).

In our study [Table 5], 6122 (85.73%) neonates were discharged successfully, 187 (2.61%) had LAMA, 72 (1%) died, and 738 (10.33%) were referred to neonatology department, institute of child health institutions for specialized treatment. Our SNCU survival rate is 98.49% (excluding the referrals and LAMA cases [6122/7141–(187 + 738)*100]).

DISCUSSION

Data pertaining to disease pattern and mortality are useful for health care providers and policy makers to modify and plan treatment or interventions and evaluate the effectiveness of health care initiatives respectively. In our study, total of 7141 neonates were admitted of which 5910 (82.76%) neonates were inborn and rest were out born babies 1231 (17.23%), Significantly higher number of inborn babies (82.76%) were admitted compared to out born (17.24%) babies%. As ours is the only referral center in the district for high-risk pregnancies the admissions are more of inborn babies which is similar in studies of Kumar *et al.*^[8] (60.80% vs. 39.20%), Randad *et al.*^[9] (76.46% vs. 23.54%), Mundlod and Thakkarwad^[10] (62.5% vs. 37.4%), and Prasanna *et al.*^[11] (58.3% vs. 41.7%) but outborn are more in the study of Sharma and Gaur^[12] (45.13% vs. 54.86%).

Table 3: Morbidity data

Diagnosis	Inborn	Outborn	Total	Percentage
Sepsis	1177 (16.48)	262 (3.67)	1439	20.15
TTNB	942 (13.19)	162 (2.27)	1104	15.46
Jaundice	960 (13.44)	140 (1.96)	1100	15.40
MAS	789 (11.05)	98 (1.37)	887	12.42
LBW	512 (7.17)	254 (3.56)	766	10.73
Birth asphyxia	578 (8.09)	110 (1.54)	688	9.63
Others	261 (3.65)	25 (0.35)	286	4.01
RDS	210 (2.94)	34 (0.48)	244	3.42
Extreme prematurity	85 (1.19)	43 (0.60)	128	1.79
Hypoglycemia	97 (1.36)	13 (0.18)	110	1.54
Shock	79 (1.11)	18 (0.25)	97	1.36
Nseizures	5 (.80)	20 (0.28)	77	1.08
Cong malformations	63 (0.88)	11 (0.15)	74	1.04
Hypothermia	34 (0.48)	18 (0.25)	52	0.73
Pneumonia	22 (0.31)	13 (0.18)	35	0.49
ELBW	15 (0.21)	4 (0.06)	19	0.27
HIE	12 (0.17)	3 (0.04)	15	0.21
HDN	9 (0.13)	2 (0.03)	11	0.15
Hyperthermia	5 (0.07)	0	5	0.07
ARF	2 (0.03)	1 (0.01)	3	0.04
Pneumothorax	1 (0.01)	0	1	0.01
Total	5910	1231	7141	100.00

TTNB: Transient Tachypnea of Newborn, MAS: Meconium aspiration syndrome, RDS: Respiratory distress syndrome, LBW: Low birth weight, ELBW: Extreme low birth weight, HIE: Hypoxic ischemic encephalopathy, ARF: Acute renal failure

Table 4: Mortality data

Cause of mortality	Inborn	Outborn	Total	Percentage
ELBW	14 (19.44)	3 (4.17)	17	23.61
RDS	10 (13.89)	4 (5.56)	14	19.44
MAS	9 (12.50)	1 (1.39)	10	13.89
Prematurity	9 (12.50)	1 (1.39)	10	13.89
Others	7 (9.72)	0	7	9.72
HIE	5 (6.94)	1 (1.39)	6	8.33
Sepsis	3 (4.17)	2 (2.78)	5	6.94
Major cong anomaly	1 (1.39)	2 (2.78)	3	4.17
Total	58 (80.56)	14 (19.44)	72	100.00

MAS: Meconium aspiration syndrome, RDS: Respiratory distress syndrome, LBW: Low birth weight, ELBW: Extreme low birth weight, HIE: Hypoxic ischemic encephalopathy

Table 5: Survival data

Outcome	Inborn	Outborn	Total	Percentage
Discharged	5172 (83.20)	950 (15.28)	6122	98.49
Expired	57 (0.92)	14 (0.23)	71	1.14
On bed	20 (0.32)	3 (0.05)	23	0.37
Total	5249 (84.44)	967 (15.56)	6216	100.00

There is a male preponderance in admissions with 57.05% were male babies and 42.95% babies were female. Similar findings were reported from various studies conducted in different rural parts of India like Modi *et al.*^[13] (67.51% vs. 32.49%), Kumar *et al.*^[8] (59.54 vs. 40.46), Mundlod and Thakkarwad^[10] (58.78% vs. 41.22%), Prasanna *et al.*^[11] (53.4% vs. 46.6%), and Sharma and Gaur^[12] (63.07% vs. 36.92%).

Average stay duration of babies in SNCU is 5.9 days, 72 (1%) babies have stayed more than 1 month in the SNCU for the Newborn care and Kangaroo Mother Care (KMC). With early intervention and appropriate use of noninvasive ventilation continuous positive airway pressure and mechanical ventilation and reduction of exposure to NICU environment with early shifting of baby to KMC which reduced further morbidity and the duration of stay of babies were significantly reduced along with effective implementation of breastfeeding. All high-risk babies were screened for retinopathy of prematurity and hearing test as per standard guidelines at our institute.

Out of all admitted neonates 4138 (57.94%) general category, 1186 (16.60%) OBC, 1615(22.61) SC, 202 (2.82%) Scheduled Tribes (ST) shows that this SNCU is rendering services to all categories of neonates at public sector which shows that they have faith in public sector hospitals, and it is mainly serving the low income generation.

According to the United Nation Children's Fund, "The state of world's children's report 28% of neonates were born with LBW in India However, in our study, overall 35.8% of neonates were LBW and 19.03% of neonates are born prematurely. In other studies, the LBW admissions were Mundlod and Thakkarwad^[10] 59%, Sharma and Gaur^[12] 51.47%, Anupama *et al.*^[14] 46.53%, which are higher than our study. This may probably be due to poor maternal health condition, low socioeconomic status, less visits to health care facility, and the delivery points attached are referral centers of high-risk deliveries of that area.

Neonatal Jaundice (NNJ) is also one of the important neonatal morbidities which requiring phototherapy as in our study 15.4% similar studies are Som *et al.*^[15] 25.99%, Kumar *et al.*^[8] 24.72%, Anupama *et al.*^[14] 19.04% which required more babies for phototherapy for NNJ, where as in other studies Sharma and Gaur^[12] 10.65%. Prasanna *et al.*^[11] 9.9% have lower incidence of NNJ than our study.

In our study, clinical sepsis is 20.15%, is comparable with studies of Kumar *et al.*^[8] at Uttarakhand 20.48%, Anupama *et al.*^[14] Assam 21.61%, Sharma and Gaur^[12] 13.77%, Prasanna *et al.*^[11] 13.3%, Som *et al.*^[15] 9.79% and Mundlod and Thakkarwad^[10] 7.7%. At SNCU Siddipet rationale antibiotic policy is followed and adopted guidelines of AIIMS antibiotic policy for our unit. Strict hand hygiene is being maintained before touching each baby, hand sanitizers are used at every next baby touch. AIIMS WHO CC PTC and STPs are being followed for management of preterm and sick newborn at our institute.^[16] Birth asphyxia is important cause of morbidity and mortality. At this hospital morbidity of birth asphyxia is 9.8% but its high in studies of Mundlod and Thakkarwad^[10] (36.1%), Som

et al.^[15] 29.09%, Sharma and Gaur^[12] 24.61%, Prasanna *et al.*^[11] 19.1%, Kumar *et al.*^[8] 18.5%, Anupama *et al.*^[14] 11.65% At SNCU Siddipet every delivery is being attended by pediatrician and staff who are trained in NRP. With high reach of maternal and child health services through PHCs, Accredited Social Health Activists, and Anganwadi Centres most of the high risk and at risk pregnancies are being identified and followed meticulously at community level and are sent to high risk delivery centers such as our institute for delivery, due to which the outcome has improved very much and cases of stillborn and birth asphyxia has reduced.

In our study, ELBW 17(23.61%) was the major cause of mortality, followed by RDS 14 (19.44%), MAS 10 (13.8%), Prematurity 10 (13.88%), Birth asphyxia 6 (8.3%) and sepsis 5 (6.9%) which is comparable with Prasanna *et al.*^[11] (SNCU Nellore) but RDS is high 40.2%, mortality is similar as RDS (11.3%), hypoxic ischemic encephalopathy (HIE) (9.3%), Sepsis (12.6%). When mortality pattern is compared with studies of other SNCUs in India such as Mundlod and Thakkarwad^[10] (SNCU Adilabad) HIE (36.1%), RDS (27.7%) prematurity (21.9%), and sepsis (21.9%) were major causes of mortality. It is comparable to Sharma and Gaur^[12] SNCU Gwalior RDS (37.6%), HIE (26.75%), major congenital malformation 10.35%.

In our study 6122 (85.73%) neonates were discharged successfully, 187 (2.61%) had LAMA, 71 (1%) died and 738 (10.33%) were referred to Institute of Child Health for further treatment. The mortality rate of SNCU is comparable with study of Randad *et al.*^[9] SNCU Mumbai where mortality rate is 1.5%, discharge rate of 95.66%, LAMA 1.3%, referrals 1.5%. Whereas the mortality rate is high in studies of Sharma and Gaur^[12] (25.45%), Mundlod and Thakkarwad^[10] (13.7%), Anupama *et al.*^[14] (12.37%) Prasanna *et al.*^[11] (10.1%), and Kumar *et al.*^[8] (8.15%) as these are studies in various parts of developing country India. Our SNCU survival rate is 98.49% (excluding the referrals and LAMA cases).

The data of NFHS 4 and NFHS 5 show that major causes of morbidity and mortality has been reduced which can be attributed due to allotting SNCUs, NBSUs and NBCCs at rural and tribal parts of Telangana State playing a major role in reduction of morbidity and mortality due to prematurity, RDS, MAS, HIE, and neonatal sepsis.^[17]

CONCLUSIONS

ELBW, Prematurity, RDS, MAS and Perinatal asphyxia and its complications are the leading causes of mortality

in our SNCU. LBW and prematurity were preventable causes of mortality, which are been well addressed through improvement of obstetric care and scaling up of neonatal care skill through NSSK, integrated management of neonatal and childhood illnesses (IMNCI), FIMNCI, and FBNC programs.

Establishing FBNC centers in various parts of Telangana state and entire country and government schemes such as NRHM and KCR KIT have great impact in reducing the morbidity and mortality of Neonates by increasing institutional deliveries.

ETHICAL APPROVAL

The study was approved by the Institutional Review Board.

REFERENCES

1. Kumar P, Singhal N. Mapping neonatal and under-5 mortality in India. *Lancet* 2020;395:1591-3.
2. United Nations Inter-agency Group for Child Mortality Estimation (UN IGME). Levels and Trends in Child Mortality: Report; 2019. p. 4. Available from: <http://www.unicef.org/reports/levels-and-trends-child-mortality-report-2019>. [Last accessed on 2021 Aug].
3. Chen WH, Su CH, Lin LC, Lin HC, Lin YJ, Hsieh HY, Sheen JM, *et al.* Neonatal mortality among outborn versus inborn babies. *J Pediatr Neonatol* 2021;62:412-8.
4. Care of Small and Sick Newborn in SNCU of India a Two Year April 2013 to March 2015 Report by MOH&FW, GOI; 2015. p. 1-2. Available from: <http://www.healthynetwork.org/hnn-content/uploads/care-of-small-sick-newborns-in-sncu-of-india-two-year-report.pdf>. [Last accessed on 2021 Aug].
5. Ministry of Health and Family Welfare, Government of India, September 2014, India Newborn Action Plan. p. 1-84. Available from: <http://vikaspedia.in/health/nrhm/national-health-mission/india-newborn-action-plan>. [Last accessed on 2021 Aug].
6. Key Indicators 22 STATES/UTs FROM PHASE I Report by MOH&FW, GOI Dated 15-12-2020. Available from: http://rchiips.org/nfhs/nfhs-5_fcts/nfhs-5%20state%20factsheet%20compendium_phase-i.pdf. [Last accessed on 2021 Aug].
7. Spandana B, Reddy RG, Prashanthi B. A study on awareness and utilization of the Telangana state government schemes by the tribal women. *Pharm Innov J* 2019;8:229-32.
8. Kumar R, Mundhra R, Jain A, Jain S. Morbidity and mortality profile of neonates admitted in special newborn care unit of a teaching hospital in Uttarakhand, India. *Int J Res Med Sci* 2018;7:241.
9. Randad K, Choudhary D, Garg A, Jethaliya R. Pattern of neonatal morbidity and mortality: A retrospective study in a special newborn care Unit, Mumbai. *Indian J Child Health* 2020;7:299-303.
10. Mundlod S, Thakkarwad S. Mortality profile and out-come analysis in level two SNCU in tribal medical college district Adilabad Telangana. *IP Int J Med Paediatr Oncol* 2019;5:125-8.
11. Prasanna CL, Suneetha B, Prabhu GR, Prakash PS. Morbidity and mortality pattern among babies admitted in special newborn care unit, Nellore, Andhra Pradesh, India. *Int J Contemp Pediatr* 2019;6:1898-903.
12. Sharma AK, Gaur A. Profile of neonatal mortality in special newborn care unit of tertiary care hospital. *Int J Contemp Pediatr* 2019;6:4205.
13. Modi R, Modi B, Patel JK, Punitha KM. Study of the morbidity and the mortality pattern in the neonatal intensive care unit at a tertiary care teaching hospital in Gandhinagar District, Gujarat, India. *J Res Med Den Sci* 2015;3:208-12.
14. Anupama D, Bidyut BN, Anjana TN. Morbidity and mortality profile of newborns admitted to the neonatal intensive care unit of a tertiary care teaching hospital of Assam. *J Med Sci Clin Res* 2020;8:697-702.
15. Som M, Nayak C, Padhi BK, Ashwan N. Patterns of morbidity among newborns admitted in SNCUs of Odisha, India. *Int J Health Sci Res* 2018;8:10-9.
16. Available from: <https://aiims-who-cc-ptc.soft112.com>. [Last accessed on 2021 Aug].
17. Available from: <http://rchiips.org/pdf/dlhs4/report/TE.pdf>; http://rchiips.org/nfhs/factsheet_NFHS-5.shtml. [Last accessed on 2021 Aug].

How to cite this article: Mendu SB, Kota V, Neela AR, Bukkapatnam SB. Morbidity and Mortality Profile of Neonates Admitted in Special Newborn Care Unit in Tertiary Care Centre in Rural Area of Telangana State, India. *Int J Sci Stud* 2021;9(8):25-30.

Source of Support: Nil, **Conflicts of Interest:** None declared.