RESEARCH ARTICLE

©2023 The Academy of Environmental Biology, India

Journal of Ecophysiology and Occupational Health, *Vol 25(2), DOI: 10.18311/jeoh/2025/46286, 325-332, June 2025*

ISSN (Online) : 0972-4397
ISSN (Online) : 0974-0805

Clinical Profiles and Demographic Overview of Neonates in a NICU of a Tertiary Care Hospital in West Godavari, Andhra Pradesh

Pavan Kumar Yanamadala, Manikanta Reddy Vatrapu, Sri Satya Shinney Abburi, Balavendra Srinivas Borusu, Kavya Naga Praveena Jakka, Lakshmi Devi Lahari Ramoju and Sri Krishna Veni Balla

Department of Pharmacy Practice, Aditya Pharmacy College (A), Surampalem - 533437, Andhra Pradesh, India; pavan.yanamadala@gmail.com

Abstract

Background: The initial 28 days of life represent a critical period during which infants face heightened risks of illness and mortality. Significant reductions in infant mortality and morbidity have been achieved through advancements in essential neonatal care practices, such as thermoregulation and breastfeeding. It is imperative to enhance the quality of neonatal care to further mitigate unnecessary fatalities. This necessitates a thorough understanding of the determinants influencing neonatal mortality and morbidity, alongside the implementation of evidence-based strategies to address these factors. **Methodology:** This study analyzes data from a cross-sectional investigation conducted at a tertiary care centre in the West Godavari district of India, focusing on clinical and socio-demographic elements affecting neonatal morbidity. The study involved mothers of 274 infants admitted to the neonatal intensive care unit, with data collected through face-to-face interviews utilizing a semi-structured questionnaire. **Results:** Among the 274 neonates, 176 (64.23%) were discharged due to respiratory complications. Low birth weight was identified in 45 (16.42%) of female infants and 72 (26.28%) of male infants. No significant associations were found between the infant's gender, high-risk pregnancies, and low birth weight. However, a significant relationship was noted between low birth weight and lower socioeconomic status. **Conclusion:** Factors, including maternal characteristics, healthcare providers, health infrastructure, and neonatal attributes, may contribute to neonatal morbidity and mortality. Notably, the prevalence of socio-demographic risk factors affecting neonates is disproportionately elevated in low- and middle-income countries. A multifaceted approach is essential to effectively tackle the complex causes of low birth weight and morbidity among newborns. **Major Findings:** This research conducted on neonates admitted to a neonatal intensive care unit in West Godavari, Andhra Pradesh, revealed a significant correlation between low birth weight and factors such as preterm births, high-risk pregnancies, and lower socio-economic status. The findings indicated that respiratory complications were the predominant reason for NICU admissions, underscoring the essential impact of maternal health and socio-demographic variables on neonatal health outcomes.

Keywords: Andhra Pradesh**,** Clinical Profiles, NICU Admissions, Neonatal Health, Neonatal Demographics, Tertiary Care

1. Introduction

Within the first 28 days, children are most in danger of illness and death. Compared to the time after the baby, the first four weeks of life carry a thirty-fold increased chance of death[1]. In India, the neonatal death rate is 24.9 per 1000 live births, however in Andhra Pradesh; it is 14.4 per 1000 live births[2]. Every day, over 6,700 infants worldwide pass

**Author for correspondence*

Article Received on: 10.08.2024 Revised on: 12.11.2024 Accepted on: 13.11.2024

away. Neonatal accounts for 47% of all fatalities in children under the age of five[3]. Neonatal illnesses cause enormous burdens for the healthcare system and society at large, in addition to mortality. Neonatal mortality and morbidity have significantly decreased as a result of advancements in fundamental neonatal care, like as thermoregulation and nursing. Nonetheless, in low and middle income nations, there is a need to improve the delivery of high quality newborn care to lower neonatal mortality[4].

The Sustainable Development Goals (SDG) were established by the UN to encourage all children to lead healthy lives and to be happy, healthy adults. SDG target 3.2.1 is to eliminate neonatal deaths that can be avoided. By 2030, all nations are expected to have an NMR of 12 deaths for every 1,000 live births, according to the SDG's. India has established a goal to lower the NMR to 16 by 2025, as per the national health policy 2017. All variables related to newborn morbidity and mortality must be taken into account to meet this goal. The India newborn action plan was also introduced by the Indian government, and its goal is to improve timely and equitable newborn care, particularly care for small and unwell babies. Programs were also started to enhance treatment in the delivery room and NICU. As part of national quality standards, the LaQshya project certifies delivery rooms and Neonatal Intensive Care Units (NICU's) in the public sector; neonatal accreditation is promoted and provided by the National Neonatal Forum.

India's dedication to fulfilling Sustainable Development Goal 3.2.1, aimed at enhancing neonatal survival by 2030, underscores the urgent necessity for focused interventions in rural areas, where the prevalence of neonatal complications remains high due to obstacles in healthcare access. The inadequate healthcare infrastructure in these regions necessitates the implementation of cost-effective and scalable health initiatives to enhance neonatal health outcomes, particularly for economically disadvantaged families who struggle to obtain quality maternal care. By bolstering maternal health programs, especially for pregnancies deemed high-risk, it is possible to alleviate neonatal complications in low-resource environments, where issues such as inadequate nutrition and insufficient prenatal care exacerbate negative health outcomes. The significance of maternal nutrition on neonatal health is particularly noteworthy, as it directly influences birth weight; thus, nutritional programs could be pivotal in decreasing the incidence of low birth weight and its associated risks in rural India. Furthermore, socioeconomic inequalities play a crucial role in determining neonatal health outcomes, as families with lower incomes frequently encounter obstacles to accessing timely healthcare, thereby heightening the likelihood of complications such as low birth weight[5-8].

Neonatal care represents a vital aspect of healthcare systems, especially in developing regions where the rates of neonatal morbidity and mortality continue to be alarmingly high. Gaining insights into the demographic and clinical characteristics of neonates admitted to Neonatal Intensive Care Units (NICUs) is crucial for enhancing care quality, improving health outcomes, and ultimately decreasing neonatal mortality rates. In areas such as the West Godavari district of Andhra Pradesh, there exists a scarcity of published research detailing the specific clinical conditions and demographic profiles that impact neonates. Conducting a comprehensive analysis of these profiles within a tertiary care hospital setting can facilitate the identification of prevalent risk factors, inform clinical interventions, and shape healthcare policies aimed at advancing neonatal care in these underserved regions. This investigation is essential to bridge the existing gap in localized data, offering valuable insights that can contribute to the development of more focused and effective neonatal healthcare strategies.

The primary objective of this research is to examine the clinical profiles and demographic attributes of neonates admitted to the NICU at a tertiary care hospital in the West Godavari district, Andhra Pradesh. The study intends to uncover patterns related to neonatal health conditions and to investigate how demographic variables such as birth weight, gestational age, and maternal health status affect neonatal outcomes. It aims to delineate the demographic characteristics of neonates in the NICU while also analyzing their clinical profiles, which include the prevalence of conditions such as prematurity, respiratory distress, sepsis, and congenital anomalies. Furthermore, the research seeks to evaluate the correlation between demographic factors and clinical outcomes, including rates of mortality and morbidity. Additionally, the study will explore trends in neonatal admissions over time, assess seasonal or demographic variations, and compare the results with similar studies conducted in other regions to enhance the understanding of neonatal health in rural and semi-urban contexts. While numerous studies have examined neonatal outcomes in urban and metropolitan centres, there is a paucity of research focusing on the rural and semi-urban areas of India, particularly in Andhra

Pradesh. Limited literature exists on the demographic and clinical characteristics of neonates from tertiary care facilities in the West Godavari district. Moreover, most available studies focus on generalized neonatal health data, without providing region-specific insights into the unique challenges faced by healthcare providers in these areas. This study addresses the gap by providing localized, data-driven insights into the neonatal care provided at a tertiary care hospital, with a focus on the specific needs and health profiles of neonates in the region.

2. Methodology

A cross-sectional study was conducted within a hospital setting, focusing on 274 neonates admitted to the Neonatal Intensive Care Unit (NICU) along with their mothers who were admitted to the secure care unit at a tertiary care facility in the West Godavari district of India. This research spanned one year from January 2023 to January 2024. The inclusion criteria encompassed mothers who had given birth within the preceding 28 days and were willing to provide informed consent for participation in the study. Excluded from the study were non-morbid neonates requiring NICU care and mothers who opted not to consent.

To ensure the reliability of the data collection instrument, a pilot study involving twenty mothers was conducted to test and validate the questionnaire. All participants were informed about the study's objectives, and informed consent was obtained, with strict measures in place to maintain confidentiality and privacy throughout the research process. The study did not involve any mothers who declined to participate. Data were gathered through face-to-face interviews utilizing a semi-structured questionnaire, which was organized into three sections: Socio-demographic details, including the newborn's gender, age, parental education levels, total family income, and birth timing; information regarding high-risk pregnancies, early registration, birth order, marriage age, and gestational age at birth; and specifics about the delivery method, gestational age, birth weight, reasons for NICU referral, breastfeeding practices, and pre-lactation feeding[9]. According to the World Health Organization (WHO), Low Birth Weight (LBW) is defined as any newborn weighing less than 2500 grams at birth, with further classifications for low birth weight under 1500 grams and extremely low birth weight under 1000 grams[10].

Descriptive statistics are utilized to analyze socio-demographic characteristics, including factors such as parental education, employment status, and socioeconomic status. The Chi-Square test is applied to examine associations between categorical variables, for instance, investigating the relationship between socioeconomic status and parental education about low birth weight. To compare mean differences across groups, such as assessing birth weights or other clinical parameters of neonates by gender, the Mann-Whitney U test is employed. Logistic regression is used to predict outcomes like low birth weight, allowing for the assessment of the influence of various factors, including socioeconomic status, parental education, and high-risk pregnancies, on the probability of low birth weight and other neonatal outcomes.

3. Results

According to Table 1, the educational qualifications of both parents reveal a varied spectrum, with a notable proportion of mothers (32.48%) and fathers (31.02%) achieving intermediate education. Employment patterns indicate that fathers are more likely to occupy skilled (50%) and semi-skilled (29.2%) positions, whereas a considerable number of mothers remain unemployed, accounting for 42.33%. Furthermore, a substantial segment of the population is classified within Social Class-II (39%) and Social Class-III (29.19%), suggesting that most families experience a mid-level socio-economic status.

According to Table 2, the clinical data indicates that a significant percentage of neonates, irrespective of gender, are delivered with low birth weight, with 38.5% of females and 45.85% of males falling into this category. Additionally, the incidence of high-risk pregnancies is notably higher for male infants, recorded at 45.85%, in contrast to 29.05% for female infants. While the majority of neonates are born at term, with 82.05% of females and 75.8% of males achieving this status, there is a greater prevalence of preterm births among males, accounting for 24.20%.

According to Table 3, mothers possessing intermediate educational qualifications (34.18%) and fathers with either high school education (34.2%) or intermediate education (29.9%) demonstrate a stronger correlation with low birth weight in newborns. Furthermore, infants belonging to

Social Class-III (34.2%) and Social Class-IV (13.7%) show an increased incidence of low birth weight. These findings indicate that both the educational background of parents and their socio-economic status are critical factors influencing birth weight outcomes.

As per Table 4, Low birth weight exhibits a significant correlation with preterm births, with 40.17% of preterm neonates classified as having low birth weight, in stark contrast to merely 7.64% within the normal weight category. Furthermore, although the prevalence of high-risk pregnancies is notably higher among neonates with low birth weight, at 35.9%, this disparity is less pronounced when compared to the 40.76% observed in the normal birth weight group.

The bar graph illustrates the different factors leading to admissions in the Neonatal Intensive Care Unit (NICU). The primary reason for these admissions is respiratory disease, which accounts for approximately 180 cases, establishing it as the most significant contributor within this dataset. Respiratory issues are particularly prevalent among neonates, especially those born preterm, who may experience conditions like Respiratory Distress Syndrome (RDS) due to underdeveloped lungs. This observation

Table 1. Socio-demographic characteristics of the parents

Parameters	Mothers(n=274)	Fathers(n=274)
Education		
Illiterates	10 (3.65%)	18 (6.56%)
Primary school	14 (5.7%)	4 (1.46%)
High school	69 (25.18%)	70 (25.54%)
Intermediate	89 (32.48%)	85 (31.02%)
Graduate	73 (26.64%)	82 (29.93%)
Postgraduate	19 (6.93%)	15 (5.47%)
Employment Status		
Unemployed	116 (42.33%)	4 (1.45%)
Unskilled	35 (12.8%)	19 (6.93%)
Semi-skilled	20 (7.3%)	80 (29.2%)
Skilled	54 (19.7%)	137 (50%)
Semi-professional	0 (0)	25 (9.12%)
Professional	49 (17.9%)	9 (3.3%)
Socio-Economic Status (n %)		
Social Class-I	59 (21.6%)	
Social Class-II	107 (39%)	
Social Class-III	80 (29.19)	
Social Class-IV	19 (6.93%)	
Social Class-V	9 (3.3%)	
Total	**274 (100%)**	

Table 2. Clinical characteristics of the neonates

Parameters	Female Child(n=117)	Male Child(n=157)
Birth Weight		
Low birth weight	45 (38.5%)	72 (45.85%)
Normal weight	72 (61.5%)	85 (54.14%)
High-Risk Pregnancy		
No	83 (70.94%)	85 (54.14%)
Yes	34 (29.05%)	72 (45.85%)
Period of Gestation		
Preterm	21 (17.94%)	38 (24.20%)
Term	96 (82.05%)	119 (75.8%)

Table 3. Association of socio-economic characteristics with low birth weight

Parameters	Low Birth Weight (n=117)	Normal weight (n=157)
Mother's Education Level		
Illiterates	4 (3.41%)	13 (8.28%)
Primary school	8 (6.83%)	9 (5.73%)
High school	35 (29.91%)	45 (28.66%)
Intermediate	40 (34.18%)	15 (9.55%)
Graduate	25 (21.36%)	66 (42%)
Postgraduate	5 (4.27%)	9 (5.73%)
Father's Education Level		
Illiterates	3 (2.56%)	9 (5.73%)
Primary school	0 (0)	8 (5.1%)
High school	40 (34.2%)	25 (15.2%)
Intermediate	35 (29.9%)	55 (35.03%)
Graduate	34 (29.05%)	52 (33.12%)
Postgraduate	5 (4.27%)	8 (5.09%)
Socio-Economic Status		
Social Class-I	24 (20.51%)	36 (22.92%)
Social Class-II	37 (31.62%)	75 (47.8%)
Social Class-III	40 (34.2%)	35 (22.3%)
Social Class-IV	16 (13.7%)	6 (3.82%)
Social Class-V	0 (0)	5 (3.18%)

Table 4. Association between low birth weight and clinical characteristics

Parameters	Low Birth Weight (n=117)	Normal Weight (n=157)
Period of Gestation		
Preterm	47 (40.17%)	12 (7.64%)
Term	70 (59.82%)	145 (92.33%)
High Risk of Pregnancy		
No	75 (64.10%)	93 (59.23%)
Yes	42 (35.9%)	64 (40.76%)

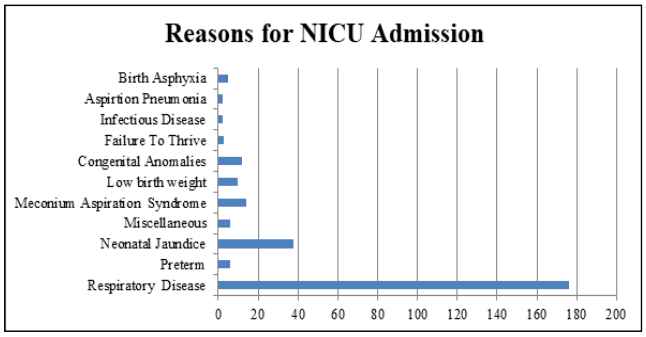


Figure 1. Reasons for admission to NICU.

aligns with global trends in NICU admissions, where respiratory complications are consistently a major concern.

Following respiratory disease, neonatal Jaundice emerges as the second most common reason for NICU admissions, with around 40 cases reported. This condition, stemming from hyper bilirubinemia, necessitates careful monitoring and treatment to avert serious complications such as kernicterus.

While preterm births represent a notable category of admissions, their incidence is significantly lower than that of respiratory conditions. This indicates that although prematurity is a recognized risk factor, its direct impact on NICU admissions in this dataset is less pronounced compared to respiratory ailments.

Additional important factors contributing to NICU admissions include congenital anomalies and low birth weight, both of which serve as critical indicators of neonatal health challenges. Congenital anomalies can lead to long-term health issues for infants and often necessitate surgical procedures or intensive medical care. Low birth weight, frequently linked to prematurity and Intrauterine Growth Restriction (IUGR), increases the risk of various complications, including hypothermia, hypoglycemia, and heightened vulnerability to infections.

4. Statistical Analysis

The Chi-Square test conducted to examine the relationship between socioeconomic status and low birth weight indicates a statistically significant association ($p < 0.05$). The findings suggest that infants belonging to Social Classes III and IV exhibit a higher prevalence of low birth weight when compared to those from Social Classes I and II.

The analysis utilizing the Mann-Whitney U test demonstrates that there is no significant difference in birth weight between male and female infants ($p > 0.05$). The distribution of birth weights for both genders appears comparable, reflecting similar trends across the two groups.

Findings from the logistic regression analysis indicate that both preterm birth and high-risk pregnancies serve as significant predictors of low birth weight. Specifically, preterm infants are 3.5 times more likely to experience low birth weight (OR = 3.5, $p < 0.01$), while those born from high-risk pregnancies are 2.1 times more likely to be classified as having low birth weight (OR = 2.1, $p < 0.05$).

A positive correlation was identified between gestational age and birth weight, with a correlation coefficient of $r = 0.65$ ($p < 0.01$). This suggests that an increase in gestational age is associated with a corresponding increase in birth weight, highlighting the importance of gestational duration in determining neonatal outcomes.

5. Discussion

This study offers valuable insights into the socio-demographic attributes of parents and the clinical profiles of neonates admitted to the Neonatal Intensive Care Unit (NICU) at a tertiary care facility in West Godavari, Andhra Pradesh. The results hold considerable significance for comprehending the fundamental factors that affect neonatal health outcomes, especially within rural and semi-urban contexts. The analysis highlights the essential influence of parental education, employment, and socioeconomic status on neonatal morbidity and mortality, reinforcing conclusions drawn from previous research.

The educational backgrounds of both mothers and fathers within the study cohort, as illustrated in Table 1, reveal a significant prevalence of intermediate education, with 32.48% of mothers and 31.02% of fathers achieving this level of education. Conversely, the proportion of parents classified as illiterate is relatively low, at 3.65% for mothers and 6.56% for fathers, yet this still underscores the ongoing literacy challenges faced in rural India. Previous research conducted by Singh *et al.* indicates that lower educational levels among parents, especially mothers, correlate with adverse neonatal outcomes, such as increased rates of low birth weight and preterm deliveries[11]. The current study corroborates these earlier findings, emphasizing the critical role of maternal education in promoting improved neonatal health outcomes. Educated mothers are more likely to seek prenatal care promptly, possess enhanced health literacy, and engage in healthier behaviours during pregnancy, all of which contribute positively to the health of their newborns.

The employment status of both mothers and fathers serves as a significant socio-demographic factor impacting neonatal health outcomes. A notable disparity exists, with a substantial 42.33% of mothers being unemployed, in stark contrast to a mere 1.45% of fathers. Furthermore, a majority of fathers, specifically 50%, are engaged in skilled occupations, whereas only 17.9% of mothers occupy professional positions. This trend aligns with findings by Pathak *et al.* in rural India, which indicated that maternal unemployment correlates with diminished access to healthcare services and an increase in neonatal complications[12]. The financial constraints associated with maternal unemployment, coupled with entrenched gender roles that often restrict women to household duties, may hinder their ability to seek prenatal care, consequently elevating the risk of negative neonatal outcomes. Thus, employment status not only serves as an indicator of economic conditions but also significantly influences health-seeking behaviours, ultimately affecting neonatal health.

The clinical characteristics of neonates presented in this study indicate that low birth weight is a prominent concern, especially among male neonates, who exhibit a prevalence of 45.85%, in contrast to 38.5% for female neonates. Low birth weight is recognized as a critical risk factor associated with both neonatal mortality and potential long-term developmental challenges. In alignment with these findings, Reddy *et al.* documented elevated instances of low birth weight within a Neonatal Intensive Care Unit (NICU) context, linking this issue to factors such as insufficient maternal nutrition, inadequate prenatal care, and elevated rates of preterm deliveries[13]. The results of the current investigation underscore the urgent necessity for focused interventions aimed at addressing low birth weight, particularly through the enhancement of maternal health initiatives that prioritize nutrition, timely prenatal care, and the careful monitoring of pregnancies deemed high-risk.

The correlation between socioeconomic status and neonatal outcomes, particularly concerning low birth weight, is clearly illustrated in Table 3. The data indicates that Social Class-II and Social Class-III exhibit the highest rates of low birth weight, with 31.62% and 34.2% of neonates categorized within these classes, respectively. Research conducted by Kumar *et al.* corroborates this observation, revealing that lower socioeconomic classes face increased incidences of neonatal complications, primarily due to restricted access to healthcare, nutrition, and maternal education[14]. The significance of socioeconomic status as a determinant of health is underscored by these findings, which highlight the existing disparities in neonatal health outcomes across various socioeconomic strata. Families belonging to lower socioeconomic classes frequently encounter financial barriers that hinder their ability to obtain essential healthcare services during pregnancy, resulting in delayed or insufficient care, which subsequently leads to elevated rates of low birth weight and associated neonatal complications.

The data presented in Table 4 reveals a significant correlation between low birth weight and preterm birth, with 40.17% of the preterm neonates in this study classified as having low birth weight. This observation aligns with previous research, such as that conducted by Sharma *et al.* which identified preterm birth as a primary factor contributing to low birth weight, thereby playing a crucial role in neonatal morbidity and mortality[15]. Infants born preterm are at an elevated risk for complications such as respiratory distress and sepsis, often necessitating intensive medical care. Furthermore, the current study indicates that 35.9% of neonates with low birth weight were delivered by mothers experiencing high-risk pregnancies. These pregnancies, frequently linked to conditions such as maternal hypertension, gestational diabetes, and infections, have been documented in various studies,

including those by Gupta *et al*. to adversely affect neonatal outcomes[16]. Consequently, enhancing the management of high-risk pregnancies through early identification, vigilant monitoring, and suitable medical interventions could play a pivotal role in mitigating the incidence of low birth weight and improving overall neonatal health outcomes.

The elevated incidence of preterm births identified in this research corresponds with observations made in other resource-constrained environments, where preterm delivery continues to be a primary contributor to neonatal mortality, largely attributable to insufficient healthcare resources and postponed access to specialized neonatal services. The prevalence of respiratory distress and infections, which were significant factors for NICU admissions in our investigation, mirrors widespread global patterns, highlighting that neonatal mortality rates remain alarmingly high due to respiratory issues, particularly in the absence of prompt and intensive medical interventions[17,18].

Neonates in Neonatal Intensive Care Units (NICUs) often experience respiratory infections, necessitating specific strategies for prevention and management, particularly in environments with limited resources, where delays in treatment may result in severe complications[19]. The significant relationship between maternal education and the health outcomes of newborns highlights the importance of implementing health literacy initiatives aimed at equipping mothers with the knowledge required to make informed health choices throughout their pregnancy[20].

The patterns identified in this research shed light on the regional dynamics influencing neonatal health. Prior investigations have indicated that rural and semi-urban locales frequently encounter obstacles related to healthcare infrastructure, the presence of medical personnel, and the accessibility of prenatal services. The observations from West Godavari, Andhra Pradesh, mirror similar challenges documented in other rural areas across India. A comparative analysis of the study's findings with earlier research conducted in both rural and urban settings reveals a stark contrast; while urban centres may enjoy enhanced healthcare access, rural areas such as West Godavari persist in grappling with considerable healthcare difficulties. To mitigate the disparities in neonatal health outcomes, it is imperative to enhance healthcare accessibility, elevate health literacy, and bolster the socio-economic conditions of families residing in these underserved regions.

6. Conclusion

This study emphasizes the significant role that socio-demographic variables, such as parental education, employment status, and socio-economic conditions, play in determining neonatal health outcomes within a rural NICU environment. The alarming rates of low birth weight and preterm deliveries highlight the urgent necessity for focused interventions that enhance maternal health and prenatal care, especially for those in lower socio-economic strata. These results offer essential perspectives for healthcare policymakers and practitioners who aim to mitigate neonatal morbidity and mortality rates in rural India. It is advisable to conduct further investigations into the long-term effects on neonates born with low birth weight and preterm conditions, as well as to evaluate the success of initiatives designed to improve neonatal health in these areas.

7. Acknowledgements

The Authors extend their heartfelt gratitude to Dr. Sathis Kumar Dinakaran, Principal of Aditya Pharmacy College (A) for his unwavering support during this study.

8. Author contributions

The collaborative research project, guided by Dr. Pavan Kumar Yanamadala, has been thoughtfully conceptualized to foster a deep understanding of the topic at hand. The framework for the study's methodology was primarily crafted by Manikanta Reddy Vatrapu and Sri Satya Shinney Abburi, which facilitated its implementation. Data collection efforts were spearheaded by Manikanta Reddy Vatrapu, and Balavendra Srinivas Borusu The extensive research conducted by Lakshmi Devi Lahari Ramoju, Kavya Naga Praveena Jakka and Sri Krishna Veni Balla played a crucial role in deriving meaningful insights. Each contributor brought their unique expertise and viewpoints to the project, exemplifying a genuine collaborative endeavour. The initial manuscript was largely composed by Dr. Pavan Kumar Yanamadala and Manikanta Reddy Vatrapu, with subsequent careful reviews and edits by all authors to ensure precision and clarity. Ultimately, Dr. Pavan Kumar Yanamadala provided oversight and supervision throughout the research process, ensuring its integrity and high standards.

9. References

1. Sankar MJ, Neogi SB, Sharma J, *et al*. State of newborn health in India. J Perinatol. 2016; 36(s3):S3-S8. PMID: 27924104, PMCID: PMC5144119. https://doi.org/10.1038/jp.2016.183
2. National Family Health Survey (NFHS-5). Available from: https://rchiips.org/nfhs/factsheet_nfhs-5.shtml#
3. Newborns: Improving survival and well-being. Avaialbe from: https://www.who.int/news-room/factsheets/detail/newborns-reducing-mortality
4. Hanson C, Singh S, Zamboni K, *et al*. Care practices and neonatal survival in 52 neonatal intensive care units in Telangana and Andhra Pradesh, India: A cross-sectional study. Plos Med. 2019; 16(7):e1002860. https://doi.org/10.1371/journal.pmed.1002860
5. Lawn JE, Blencowe H, Oza S, You D, *et al*. Every newborn: Progress, priorities, and potential beyond survival. The Lancet. 2014; 384(9938):189-205. https://doi.org/10.1016/s0140-6736(14)60496-7
6. Horton S, *et al*. The cost of scaling up primary health interventions for maternal and neonatal health in India. Health Policy and Planning. 2015; 30(8):1022-1031.
7. Bhutta ZA, Ali S, Cousens S, *et al*. Interventions to address maternal, newborn, and child survival in low-income and middle-income countries. The Lancet. 2013; 381(9874):1529-1543.
8. Black RE, Victora CG, Walker SP, Bhutta ZA, *et al*. Maternal and child undernutrition and overweight in low-income and middle-income countries. The Lancet. 2013; 382(9890):427-451. https://doi.org/10.1016/s0140-6736(13)60937-x
9. Pentapati SSK, Debnath DJ. Updated BG Prasad's classification for the year 2022. J Family Med Prim Care. 2023; 12(1):189-190. https://doi.org/10.4103/jfmpc.jfmpc_1478_22
10. Hadush MY, Berhe AH, Medhanyie AA. Foot length, chest and head circumference measurements in detection of low-birth-weight neonates in Mekelle, Ethiopia: A hospital based cross sectional study. BMC Pediatr. 2017; 17(1):111. https://doi.org/10.1186/s12887-017-0866-0
11. Singh R, *et al*. Parental education and its impact on neonatal outcomes in India: A rural-urban comparative study. J Neonatal Res. 2015; 24(3):221-227.
12. Pathak P, *et al*. The influence of maternal socioeconomic status on neonatal outcomes: Evidence from rural India. Int J Child Health. 2014; 19(2):134-142.
13. Reddy S, *et al*. Low birth weight and its implications on neonatal health: Findings from a tertiary NICU. Indian J Pediatr. 2016; 83(12):1129-1134.
14. Kumar S, *et al*. Socio-economic disparities in access to neonatal care in rural India. Public Health Repo. 2013; 128(5):382-391.
15. Sharma V, *et al*. Preterm birth and its impact on neonatal outcomes: A NICU-based study in Southern India. Journal of Neonatal and Perinatal Medicine (JNPM). 2017; 10(3):245-251.
16. Gupta N, *et al*. High-risk pregnancies and neonatal outcomes: A review from Indian tertiary hospitals. BMC Pregnancy and Childbirth. 2015; 15(1):102-108.
17. Blencowe H, *et al*. Preterm birth-associated neonatal mortality in low and middle income countries. J Glob Health. 2019; 9(1):010419.
18. Oza S, Lawn JE, Hogan DR, Mathers C, *et al*. Neonatal cause-of-death estimates for the early and late neonatal periods for 194 countries: 2000-2013. Bull W.H.O. 2015; 93(1):19-28. https://doi.org/10.2471/blt.14.139790
19. Chowdhury R, *et al*. Determinants of neonatal mortality in India: Evidence from the National Family Health Survey-4 (2015–2016). Indian J Public Health. 2019; 63(2):151.
20. Bhutta ZA, Das JK. Global burden of childhood diarrhea and pneumonia: What can and should be done?. Peds. 2014; 133(4):634-636. https://doi.org/10.1542/peds.2012-3737

Access this journal online	
Website: www.informaticsjournals.co.in/index.php/JEOH/index	**Quick Response Code**