A Descriptive Study to Assess Demographic Characteristics and their Association with Physiological Parameters among Preterm Infants at Sharda Hospital, Greater Noida.

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Abstract: Prematurity is the primary cause of mortality for children under five worldwide. There are significant disparities in survival rates between countries. In the year 2020, an estimated 13.4 million babies were born prematurely whereas, in 2019 around 9 lakh children have lost their lives due to complications associated with prematurity. In later age, many disabilities are noticed like vision defects, hearing impairments and learning disorders. The present study was to explore the demographic characteristics and their association with physiological parameters among preterm infants admitted in NICU of Sharda Hospital, Greater Noida. In quantitative study with 130 preterm infants admitted in NICU were enrolled in the study. The results found out that no significant association was present (p>0.05) between selected demographic variables (gender, gestational age, type of delivery, APGAR scoring at 1 and 5 minute) with physiological stability scores (weight gain, temperature, heart rate, respiratory rate and SPO₂ rate). The study concluded that While progress has been made in improving neonatal care and reducing mortality rates, disparities in healthcare access and maternal health services continue to contribute to the high prevalence of preterm births.

Keywords: Preterm Infants, Physiological Parameters, NICU, Demographic Profile.

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I. INTRODUCTION

The infant taking birth before 37 weeks of gestation is referred to as "preterm Birth", it is a global public health challenge. This is considered as leading cause of neonatal morbidity and mortality contributing to nearly 35% of neonatal death worldwide. Lack of quality care in neonatal care as well as complication associated with preterm birth continues to possess a serious threat for infant survival and long term effect on health outcomes. The long term impact of preterm birth extends beyond medical concerns, affecting neurodevelopment, respiratory function and metabolic health with potential life long consequences. ¹

Low income countries mostly bear the burden of prematurity in terms of mortality rate. India has highest incidence of preterm births including nearly a quarter of global cases. Factors associated with preterm birth are multifaceted like maternal health, hypertension, diabetes, infections and environmental conditions.²

As per WHO, estimated 15 million babies are born prematurely with approximately 10% of all live births. Their prevalence varies across regions with highest incidence is seen in low and middle income countries. African and South Asian countries have around 12% of babies born prematurely where as in developed countries the cases are only 5-9%.³

As per reports, The preterm birth rate is highest in India with 25% of total preterm births. Approximately, 3.5 million babies are born prematurely in India which accounts for 13% of total death rate. India's Newborn Action plan (INAP) provides high technology, high quality, evidence based care in accordance with Sustainable Development Goals (3.2). To successfully achieve this target several medical interventions and polices are developed for strengthening healthcare systems and improving sustainability.⁴

Due to advances in medicine and technology, the mortality rate has significantly reduced over a period of time for preterm babies. But in the absence of suitable care, the Preterm infants who survive are more vulnerable to the Volume 10, Issue 3, March – 2025

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elevated risk of lifelong impairment and diminished quality of life. In a moderate prematurity, newborns who did not appear to have any impairments and were considered low-risk delays in development were discovered.⁵

It is believed that a relaxed state can help preterm babies adjust to the negative stimuli of the NICU environment and regain their normal behavioral state. Surrounded by noxious environmental stimuli in NICU, a state of relaxation facilitates the preterm neonate's ability to control their behavioral state organization.⁶

Thus, sensory enrichment programmes such as gentle touch, music, oral massage provide calming effect. The fundamental theory behind these programmes is that premature babies experience sensory deprivation, which stunts their development.⁷

The investigator wanted to explore the demographic characteristics association in terms of physiological stability scores of preterm infants admitted in neonatal intensive care unit.

> *Objective of the Study*

The study was conducted to find out the association between selected demographic characteristics and physiological outcomes among preterm infants.

II. METHODOLOGY

Total 130 preterm infants (65 in experimental and 65 in control group) who were admitted in Neonatal Intensive Care Unit, Sharda University, Greater Noida were enrolled in the study. Quasi experimental study with Total enumeration sampling technique was used to collect data from study samples. There are two tools, 1) Socio demographic proforma (gender, gestational age, type of delivery, APGAR scoring at 1 and 5 minute) and 2) Physiological stability assessment proforma (weight gain, temperature, heart rate, respiratory rate and SPO₂ rate).

A socio-demographic proforma The preterm infant were included in the study (a) born between 29- 34 weeks of gestation (b) Medically stable with no underlying chromosomal abnormalities, injuries or serious conditions, (c) Receiving oxygen support under 30%, (d) able to tolerate enteral feeding. Preterm infants who (a) are dependent on ventilator (b) having congenital abnormalities (c) having significant medical or surgical complications were excluded from the study. Data was analyzed using descriptive and inferential statistics.

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III. RESULTS

In the present study, Maximum 25(38.5%) of preterm infants belonged to the gestational age of 32-34 weeks followed by 21(32.3%) and 19(29.2%) of preterm infants belonged to gestational age of 30-32 weeks and 28-30weeks respectively. Whereas, in control group most of 26(40%) preterm infants belonged to gestational age of 32-34 weeks followed by 21(32.3%) and 18 (27.7%) of preterm infants belonged to gestational age of 30-32 weeks and 28-30 weeks respectively.

Majority 39(60%) of preterm infants were male followed by 26 (40%) were female in intervention group. Whereas, majority 34(52.3%) of preterm infants were female followed by 31(47.7%) of preterm infants were male in control group. Majority 34(52.3%) of preterm infants were born through caesarean birth followed by 31(47.4%) of preterm infants who were born through normal vaginal delivery in intervention group. Whereas, in control group majority 43(66.2%) of preterm infants were born through caesarean birth followed by 22(33.8%) were born through normal vaginal delivery.

Maximum 31(47.7%) preterm were not having any distress after birth followed by 23(35.4%) and 11(16.9%)preterm infants who had moderate to severe distress after birth in intervention group respectively. In control group majority 37 (56.9%) of preterm infants had no distress followed by 15 (23.1%) and 13 (20%) of preterm infants who had moderate to severe distress after birth. Almost all 60 (92.3%) of preterm were not having any distress after birth followed by only 5(7.7%) preterm infants who had moderate distress after birth in intervention group. Whereas, in control group majority 57 (87.7%) of preterm infants had no distress followed by only 8 (12.3%) of preterm infants had moderate distress after birth. The mean birth weight of preterm infants was 1.84±0. 39, 1.79±0.30 in intervention and control group respectively.

Data presented in Table no. 1 shows that there was no statistically significant association found between selected demographic characteristics and Physiological stability scores among preterm infants (p>0.05) in both the groups.

Table 1: F Value and p Value Related to the Association of Selected Background Characteristics with Pretest and Posttest	III
Physiological Stability Scores among Preterm Infants in Intervention Group and Control Group. N=130	

Background	Physiological stability	Interventional group	Control group
Characteristics	scores	F & p values	F & p values
Gestational age	Weight gain	F=0.18, p=0.82 (NS)	F=6.54, p=0.78 (NS)
	Temperature	F=0.20, p=0.81 (NS)	F=0.40, p=0.66 (NS)
	Heart rate	F=0.54, p=0.58 (NS)	F=2.15, p=0.12 (NS)
	Respiratory rate	F=0.33, p=0.71 (NS)	F=0.36, p=0.69 (NS)
	SPO ₂ rate	F=0.78, p=0.46 (NS)	F=0.76, p=0.46 (NS)
Gender	Weight gain	F=0.31, p=0.57 (NS)	F=0.27, p=0.59 (NS)
	Temperature	F=0.03, p=0.84 (NS)	F=0.83, p=0.36 (NS)

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	Heart rate	F=2.38, p=0.12 (NS)	F=0.20, p=0.65 (NS)
	Respiratory rate	F=0.23, p=0.62 (NS)	F=0.30 p=0.58 (NS)
	SPO ₂ rate	F=0.22, p=0.63 (NS)	F=1.19, p=0.27 (NS)
Type of delivery	Weight gain	F=0.41, p=0.52 (NS)	F=0.71, p=0.40 (NS)
	Temperature	F=0.53, p=0.46 (NS)	<i>F</i> =1.99, <i>p</i> =0.16 (NS)
	Heart rate	F=0.02, p=0.87 (NS)	F=3.71, p=0.52 (NS)
	Respiratory rate	F=0.14, p=0.70 (NS)	F=0.22 p=0.63 (NS)
	SPO ₂ rate	F=0.71, p=0.40 (NS)	F=0.54, p=0.46 (NS)
APGAR scoring at 1	Weight gain	F=0.19, p=0.82 (NS)	F=0.16, p=0.84 (NS)
minute	Temperature	F=1.16, p=0.31 (NS)	F=0.41, p=0.66 (NS)
	Heart rate	F=0.79, p=0.45 (NS)	F=1.38, p=0.25 (NS)
	Respiratory rate	F=2.32, p=0.10 (NS)	F=2.22 p=0.11 (NS)
	SPO ₂ rate	F=0.48, p=0.62 (NS)	F=0.50, p=0.60 (NS)
APGAR scoring at 5	Weight gain	F=0.19, p=0.65 (NS)	F=0.75, p=0.38 (NS)
minute	Temperature	F=3.25, p=0.72 (NS)	F=0.15, p=0.69 (NS)
	Heart rate	F=2.09, p=0.15 (NS)	F=1.18, p=0.28 (NS)
	Respiratory rate	F=0.11, p=0.73 (NS)	F=0.06 p=0.79 (NS)
	SPO ₂ rate	F=0.48, p=0.48 (NS)	<i>F</i> =0.004, <i>p</i> =0.95 (NS)

IV. DISCUSSION

The present study was conducted to explore the demographic characteristics and physiological outcomes among preterm infants at Sharda Hospital, Greater Noida. Findings in the present study revealed that although there was positive correlation but no statistically significant association (p>0.05) was found between selected demographic variables (gender, gestational age, type of delivery, APGAR scoring at 1 and 5 minute) with physiological stability scores (weight gain, temperature, heart rate, respiratory rate and SPO₂ rate).

In **consistent** with present study, quasi-experimental research by Kausalya et al., 2019 conducted to assess the effectiveness of multisensory stimulation also reported no statistically significant association (p>0.05) between selected demographic variables and post test scores. ⁸

In **accordance** with present study, quasi-experimental research by C. et al., 2016 conducted to assess the effectiveness of sensory stimulation on length of hospital stay also revealed no statistically significant association (p value 0.19; p>0.05) between selected demographic variables and length of hospital stay.⁹

However, in **contrast** with present study, true experimental research by Livingston and Mathiarasu, 2024 conducted to evaluate the effectiveness of stimulation on physiological parameters reported that demographic variable in terms of gestational age (p value 0.001; p>0.05) was found to be statistically significant with physiological parameters. ¹⁰

V. NURSING IMPLICATION

Nurses play a vital role in monitoring and managing the physiological parameters of preterm infants to ensure optimal health outcomes. Preterm infants are particularly vulnerable due to their underdeveloped organ systems, requiring specialized nursing care in neonatal intensive care units (NICUs).

Preterm birth remains a significant public health challenge both in India and globally. While progress has been made in improving neonatal care and reducing mortality rates, disparities in healthcare access and maternal health services continue to contribute to the high prevalence of preterm births. Addressing this issue requires a multifaceted approach, including enhanced prenatal care, better healthcare and targeted infrastructure. policy interventions. Furthermore, nursing care plays a critical role in optimizing the physiological stability of preterm infants through careful monitoring and evidence-based interventions. By investing in maternal and neonatal health, countries can improve survival outcomes and reduce the long-term impact of preterm births on individuals and society.

VI. CONCLUSION

Preterm infants suffer from numerous health challenges like breathing issues, physiological immaturity, feeding issues, vision problems etc. Environment in neonatal intensive care unit leads to sleep disturbance, fluctuation in vital parameters which leads to impaired health and development delays.

Nurse led interventions such as auditory, visual, tactile, kinesthetic and oral stimulation should be encouraged to improve the physiological parameters among preterm infants. Preterm birth remains a significant public health challenge both in India and globally. While progress has been made in improving neonatal care and reducing mortality rates, disparities in healthcare access and maternal health services continue to contribute to the high prevalence of preterm births.

RECOMMENDATIONS

• Healthcare facilities should adopt evidence-based neonatal care protocols to ensure consistent and highquality care for preterm infants. Regular training and capacity-building programs for nurses and neonatal care

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providers can enhance their ability to monitor and manage physiological parameters effectively.

- Parents should be educated on essential neonatal care practices, including Kangaroo Mother Care, feeding techniques, and early warning signs of complications. NICUs should be equipped with advanced monitoring systems to continuously track vital signs and detect early signs of instability.
- Expanding NICU facilities, especially in rural and underserved areas, can help provide timely and specialized care to preterm infants. Ongoing research on neonatal care advancements, including artificial womb technology and improved respiratory support, should be encouraged to enhance survival outcomes. Governments and healthcare organizations should implement policies that prioritize maternal and neonatal health, ensuring adequate funding and resources for preterm infant care.

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