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Prevalence of Respiratory Tract Infection among Children's Admitted in NICU and PICU of Sir Ganga Ram Hospital, Delhi: A Descriptive Study

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ABSTRACT

Background: Respiratory disorders are diseases of lungs and human airways that affect human respiration. In 2017, according to the Global Burden of Disease Study, approximately 544.9 million people worldwide lived with chronic respiratory diseases a 39.8 % increase since 1990, representing about 7 % of all deaths and making CRDs the third leading cause of mortality globally. The study aimed to assess the prevalence of respiratory tract diseases and its associated factors.

Material and Methods: A Quantitative Research approach with a descriptive research design to assess the prevalence of respiratory diseases among children admitted to the NICU and PICU of Sir Ganga Ram Hospital, New Delhi, from December 1 to December 31, 2024. Using a non-probability consecutive sampling technique, the study included all paediatric patients admitted with respiratory conditions during the study period. Data were collected using a validated, expert-reviewed tool comprising three sections: demographic details, a structured questionnaire (covering medical history, environmental factors, admission details, clinical signs, diagnostics, and outcomes), and treatment data. Ethical clearance and institutional permissions were obtained, and informed consent and confidentiality were maintained throughout data collection.

Result: The study reveals that among total patients admitted 38 % were due to the respiratory diseases The data also highlights that respiratory distress as the primary reason for admission in 83% of cases, emphasizing its critical role in paediatric morbidity. Prematurity was the most common underlying condition (30%), known to compromise lung development. A high rate of caesarean deliveries (86%) may contribute to delayed lung fluid clearance, increasing respiratory risks.

Conclusion: Respiratory distress remains a major cause of PICU & NICU admissions, particularly among newborn males and preterm infants. Despite a high proportion of term births and normal birth weights, prematurity and caesarean delivery were common contributing factors. Vaccination gaps and respiratory symptoms requiring advanced ventilation support emphasize the need for better perinatal care, immunization coverage, and early screening for respiratory conditions.

Keywords: descriptive design, respiratory disease, prevalence

I. INTRODUCTION

The respiratory system forms the path through which the air passes from nose to lungs.[1] The main function of respiratory system is to supply the lungs with oxygen (O2) and to eliminate carbon dioxide (CO2) from the body that is constantly being generated by the tissues[2]. **Respiratory disorders are diseases of lungs and human airways that affect human respiration.**[3]

In 2017, according to the Global Burden of Disease Study, approximately 544.9 million people worldwide lived with chronic respiratory diseases—a 39.8 % increase since 1990, representing about 7 % of all deaths and making CRDs the third leading cause of mortality globally.[4] Lower respiratory infections remained responsible for about 2.5 million deaths in 2021, ranking as the fifth leading cause of death worldwide and the deadliest infectious disease after COVID-19.[5]

Respiratory diseases in children are linked to air pollution (indoor and ambient), tobacco smoke, particulate matter, toxic gases such as SO_2, NO_2, O_3, and CO, formaldehyde, dampness, lead, poverty, low education, ethnicity, overcrowding, and poor healthcare access.[6]

II. MATERIALS AND METHODS

The present study adopted a quantitative research approach to assess the prevalence of respiratory diseases among children admitted to the NICU and PICU of Sir Ganga Ram Hospital, New Delhi. A descriptive research design was used to observe and measure the research variable prevalence of respiratory disease in a natural setting without manipulation. The study was conducted in the NICU and PICU units of Sir Ganga Ram Hospital between 01/12/2024 and 31/12/2024. The target and accessible population included all children admitted with respiratory diseases during this period. A non-probability consecutive sampling technique was employed, including children admitted with respiratory conditions while excluding those admitted for unrelated causes. The data collection tool, developed with expert guidance, included three sections: demographic details, a structured knowledge questionnaire divided into six parts (covering medical history, environmental factors, admission details, clinical signs, diagnostics, and outcomes), and treatment data. Validity of the tool was ensured through expert review and necessary modifications. Ethical clearance and permissions were obtained from the Principal of Govt. Nursing College, SLBSGMCH, and the Chief Nursing Officer and Head of Department at Sir Ganga Ram Hospital. The data collection was conducted over one month, ensuring informed consent, confidentiality, and institutional approval throughout the process.

III.RESULTS

Table 1 Frequency and percentage of distribution of demographic characteristics of sample.
N=126

Variables	Options	f (%)
Age	Newborn	69 (55%)
	Infant	10 (8%)
	Toddler	13 (10%)
	Preschooler & schooler	29 (23%)
	Adolescents	5 (4%)
Gender	Male	78 (62%)
	Female	48 (38%)
Weight at birth	< 1500 grams	10 (8%)
	1500-2499grams	36(29%)
	2500-3500grams	63(50%)
	>3500 grams	17(13%)
Gestational age	Term	86 (68%)
	Preterm	40 (32%)
Areas of administration	NICU	68 (54%)
	PICU	58 (46%)
Diagnosis	Respiratory diseases	46 (37%)
	Others	80 (63%%)

Table 1 depicts that the majority of participants were newborns (55%), followed by preschoolers and school-aged children (23%), toddlers (10%), infants (8%), and adolescents (4%). Most participants were male (62%), and 38% were female. Regarding birth weight, half of the children (50%) weighed between 2500–3500 grams, 29% had low birth weight (1500–2499 grams), 13% weighed over 3500 grams, and 8% were very low birth weight (<1500 grams). In terms of gestational age, 68% were born at term, while 32% were preterm. Area-wise distribution showed that 54% of cases were managed in the Neonatal Intensive Care Unit (NICU) and 46% in the Paediatric Intensive Care Unit (PICU). Respiratory diseases accounted for 37% of diagnoses, whereas 63% had other medical conditions.

Table 2 Associated factors related to respiratory tract diseases among patients admitted in NICU and PICU
N=46

ASSOCIATED FACTORS	OPTIONS	f (%)
Underlying Condition	Prematurity	14 (30%)
	Congenital Heart Diseases	2 (4%)
	Neuromuscular Disorder	1 (2%)
	Others	7 (15%)

ASSOCIATED FACTORS	OPTIONS	f (%)
	Absent	22 (48%)
Birth History	Normal Vaginal Delivery	4 (14%)
	Caesarean Section	24 (86%)
Previous Hospitalization	Yes	12 (26%)
Vaccination	Up To Date	25 (54%)
	Incomplete	14 (30%)
	Not Done	7 (15%)
Exposure To Known Infection	Yes	13 (28%)
Presence Of Respiratory Tract Infection Cases in Family or Community	Yes	2 (4%)
Primary Reason Of Admission	Respiratory Distress	38 (83%)
	Neurological Issues	3 (7%)
	Others	5 (11%)
Duration Of Hospital Stay	≤ 5 Days	19 (41%)
	6-15 Days	17 (37%)
	16-25 Days	5 (11%)
	>25 Days	5 (11%)
Ventilation Support Required	O2 Therapy	16 (35%)
	Mechanical Ventilation	16 (35%)
	Room Air	14 (30%)
	Fever	12 (2%)
	Difficulty Breathing	30 (65%)
	Cyanosis	6 (13%)
	Apnoea	4 (9%)
	Wheezing	2 (4%)

Table 2 depicts that 48% of children had no underlying conditions, though 30% were premature. Most were delivered via Caesarean section (86%) and had no prior hospitalizations (74%). Vaccination was up to date in 54%, while 45% had incomplete or no vaccination. Exposure to infection was low (28%), and 96% had no known respiratory cases in their surroundings. Respiratory distress was the main reason for admission (83%). Hospital stays were mostly under 15 days (78%). Ventilation support was required in 70% (35% each on oxygen and mechanical ventilation). Common symptoms included difficulty breathing (65%), cyanosis (13%), apnea (9%), and wheezing (4%).

IV. DISCUSSION

The study reveals that among total patients (126) admitted 46 (37 %) were due to the respiratory tract diseases.

The data highlights that among 46 patients, (83%) were having respiratory distress as the primary reason for admission, emphasizing its critical role in paediatric morbidity. Prematurity was the most common underlying condition (30%), known to compromise lung development. A high rate of caesarean deliveries (86%) may contribute to delayed lung fluid clearance, increasing respiratory risks. Despite most children having no prior hospitalizations (74%), incomplete or absent vaccination in 45% raises

concerns about preventable infections. Although exposure to known infections was reported in only 28%, the high need for respiratory support oxygen therapy and mechanical ventilation in 70% reflects the severity of respiratory conditions. Symptoms like difficulty breathing (65%), cyanosis (13%), and apnea (9%) further support the predominance of respiratory complications in this paediatric group.

V. CONCLUSION

The study concludes that respiratory distress remains a major cause of PICU & NICU admissions, particularly among newborn males and preterm infants. Despite a high proportion of term births and normal birth weights, prematurity and caesarean delivery were common contributing factors. Vaccination gaps and respiratory symptoms requiring advanced ventilation support emphasize the need for better perinatal care, immunization coverage, and early screening for respiratory conditions. Strengthening neonatal care, improving prenatal counselling, and promoting full-term vaginal deliveries where possible could significantly reduce respiratory morbidity and improve paediatric outcomes.

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