

## Disease Burden of NICU, at a Tertiary Care Hospital, Karachi

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### ABSTRACT

**Objective:** To determine the number, disease pattern and outcome of the patients admitted at the Neonatal Intensive Care Unit (NICU) of a tertiary care hospital in Karachi.

**Design:** Descriptive study

**Place & Duration of the Study:** NICU, Kharadar General Hospital, KHI; Jan.2006 till Dec. 2007.

**Methods:** The data of all the admitted neonates was analyzed retrospectively for the cause of admission and their outcome.

**Results:** During this study period, the total number of patients admitted were 1069. The highest number comprised of preterm, low birth weight (LBW) babies (24.6%) followed by sepsis (19.9%), Respiratory distress Syndrome (RDS) (18.9%), birth asphyxia (17.02), meconium aspiration syndrome (15.2%), neonatal jaundice (9.44%), pneumonias (3.46), hyaline membrane disease (3.4%), congenital malformations (2.8%) and (4.3%). Out of 1069 patients, 148 expired (13.8%). Most of the expiries were due to sepsis (31.75%).

### INTRODUCTION

Neonatal period (0 to 28 days of life) is the most hazardous period of life.<sup>1</sup> Almost half of the infant deaths in our country occur within first 28 days of life.<sup>2</sup> Majority of the causes of neonatal morbidity in our country are preventable.<sup>3</sup>

Pre-maturity accounts for majority of high risk newborns as they face a large number of problems.<sup>4</sup> Caring of critically ill children remains one of the most demanding and challenging aspects of the field of paediatrics.<sup>5</sup>

Infections remain one of the major problems in pediatric intensive care unit and are the leading cause not only of admissions but also mortality in developing countries.<sup>6</sup> Mortality rate was found to be high in pediatric intensive care units of South America as well.<sup>7</sup> The major causes of neonatal deaths globally were estimated to be infections (35%), pre-term births (28%) and asphyxia (23%). Sepsis is the commonest cause of neonatal mortality and is probably responsible

for 30-50% of the total neonatal deaths each year in developing countries.<sup>8-9</sup>

It is estimated that 20% of all neonates develop sepsis and approximately 1% die of sepsis related causes.<sup>9</sup>

Neonatal septicemia is one of the commonest cause of neonatal mortality and morbidity throughout the world, it is estimated that 20% of all neonates develop sepsis and is responsible for 30-50% of total neonatal death in developing countries.<sup>10-12</sup> With an estimated 298000 neonatal deaths annually and a reported neonatal mortality rate of 49 per 1000 live births, Pakistan accounts for 7% of global neonatal deaths.<sup>13-16</sup>

Since causes of neonatal death vary by country and with the availability and quality of health care, understanding neonatal mortality in relation to these factors is crucial.<sup>16-19</sup>

Data available on neonatal deaths in Pakistan come primarily from hospital studies, which have a selective referral bias, or from communities in which the cause of death is rarely recorded.<sup>13</sup>

Information on pregnancy complications and other events before delivery is limited.<sup>20</sup> Neonatal morbidity & mortality is on increase day by day due to the lack of the available resources in developing countries. This can be reduced by proper & timely intervention.<sup>21</sup>

For better neonatal care and prevention of the preventable causes of neonatal morbidity and mortality, we should be continuously reporting the audit of neonatal admission to our neonatal units all over the

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country. The purpose behind such types of audits in neonatal units should be for the identification of various deficiencies in the management of these neonates and also to assist the health workers specially those at the community level for the better understanding and effective management of various neonatal problems in Pakistan. Kharadar General Hospital is a non-profit, tertiary care trust hospital, located in the thickly populated area of the metropolitan city Karachi. It has a well equipped 172 bedded paediatric ward with a 14 bedded nursery and an NICU with 9 incubators with ventilator facility. It also has a fully equipped gynaecology/obstetrics department with fully trained medical and paramedical staff. The NICU caters not only for its busy in-patient deliveries but also for neonates from its nearby heavily thick population.

Maintenance and improvement of a neonatal intensive care unit is a continuous task. The complexity of the process requires the use of many different problems and a good liaison with the laboratories and the obstetric departments.<sup>22</sup>

The major goals of quality control program in an intensive care unit are:

- 1 to assess the disease burden of the department
- 2 to assess the mortality rate, and
- 3 to see and take measures in order to avoid nosocomial infections.

These goals can be achieved by prospective measures of intra and interdepartmental consultations and meetings or retrospectively by audit/review of the admitted cases.<sup>22</sup>

The basic idea behind conducting this study was to assess the major disease burden of the neonatal intensive care unit at Kharadar General Hospital so as to be able to take steps to cope with these patients and hence try to decrease the mortality rate of the unit. Having an idea of the type of disease burden commonly encountered in a particular unit is the foremost step of quality control program in any intensive care setting.

## MATERIALS & METHODS

This retrospective study included patients who were admitted in the NICU of Kharadar General Hospital from January 1, 2006 till December 30, 2007. The NICU admission register was consulted and a questionnaire was formed. Data were collected for age, sex, duration of stay, significant maternal illness in the last trimester, mode of delivery, history of birth asphyxia and apgar, diagnosis, number of babies requiring ventilator support and Outcome.

All in-born and out-born babies of 6 hrs of age with all diseases with or without congenital anomalies were in children in the survey. The babies with severe birth asphyxia with APGAR < 3 were excluded. Since it was a descriptive frequencies were determined.

## RESULTS

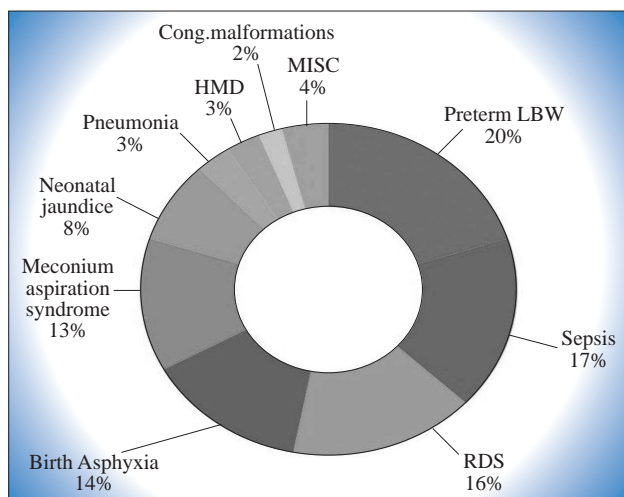
The average age of the time of the babies admission was 3.5 days (8 hours of life - 26 days of life). Most of the babies stayed in the NICU for an average of 6.5 days (12 hours - 25 days). Female babies outnumbered their male counterpart with a ratio of 2:1.3. Only 325 mothers were significantly ill during the last trimester with problems like high grade fever, hypertension, leaking, uncontrolled diabetes, pneumonia, urinary tract infections and pustular skin rash. 17.02% of the babies had an apgar score between 6-3 ( apgar scores under 3 were excluded from the study). The mode of delivery was mostly normal vaginal delivery (NVD) i.e 68% NVD, 22% Lower Section Ceasarian Section (LSCS) and 10% Forceps deliveries. The total number of patients admitted were 1069. The highest number of admissions comprised of preterm, low birth weight (LBW) babies (24.6%). The baby with the lowest weight was 800gms. The most common disease was sepsis (19.9%), followed by Respiratory distress Syndrome (RDS) (18.9%), birth asphyxia (17.02%), meconium aspiration syndrome (15.2%), neonatal jaundice (9.44%), pneumonias (3.46), hyaline membrane disease (3.4%), congenital malformations (2.8%) and miscellaneous (4.3%). Out of 1069 patients, 148 expired (13.8%). Most of the expiries were due to sepsis (31.75%). 210 babies required ventilator support out of which 100 babies could not be weaned off and expired.

## DISCUSSION

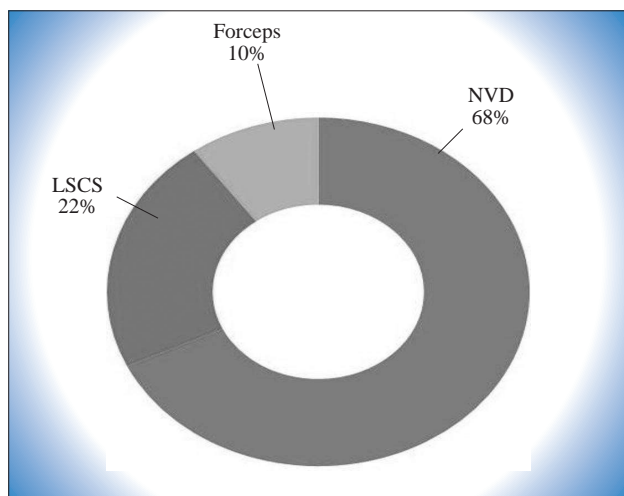
This two year, retrospective study was done in order to document the most common type of diseases with which the neonates are admitted in the neonatal intensive care unit of Kharadar General Hospital. Here preterm, low birth weight babies and septicemia account for the largest number of cases. The results of our study are comparable to a similar study done at National Institute of Child Health (NICH), Karachi in 2005 which shows low birth weight babies topping the list (55.4%), followed by septicemia (30.64%).<sup>9</sup>

Low birth weight (LBW) is one of the leading problems in almost all the developing countries. Immaturity tends to increase the severity but reduces the distinctiveness of the clinical manifestation of most neonatal diseases. Immature organ function, complications of therapy and the specific disorders

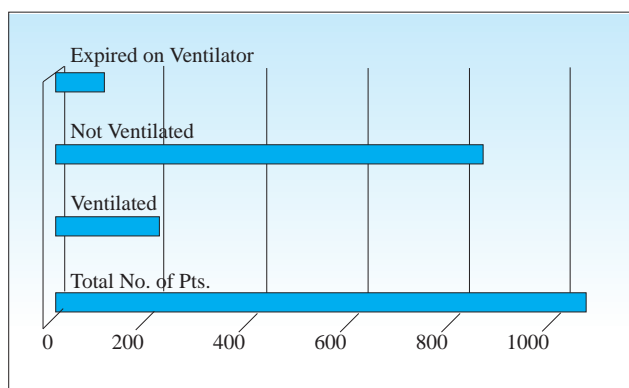
**Disease Burden n= 1069**



**Mode of Delivery**



**Outcome of Babies on Ventilator**



that caused the premature onset of labor contribute to neonatal morbidity and mortality associated with premature, LBW infants.

Neonatal sepsis is a significant cause of neonatal morbidity and mortality in the newborn, particularly in preterm, low birth weight infants.<sup>23-24</sup> The incidence of neonatal sepsis in the developed countries is 1-10/1000 live births, where as it is roughly three times more in developing countries like Pakistan.<sup>29</sup> Neonatal sepsis has a significant contribution in neonatal mortality rate (NNMR). In an evaluation of neonatal deaths from a community based study in and around Lahore, Jalil et al recorded an infectious etiology in almost 75% of all deaths and this was also recognized as an important factor in almost one third of all first week deaths.<sup>22</sup> A similar study in Northern Pakistan confirmed that vast majority of neonatal deaths was related to pneumonia or diarrhea.<sup>16</sup> Hospital based data indicate 30-38% overall mortality associated with neonatal sepsis.<sup>29-30</sup>

Its clinical manifestations vary from being specific to subtle, testing the very skills of the pediatrician. The inability to be certain of infection, coupled with non-specific signs of the life threatening illness in neonates have resulted in widespread use of antibiotics aggravating the problem of antibiotic resistance.

Reports of the epidemiology of neonatal septicemia from Pakistan are few. The epidemiological data from other developing countries, however, shows important differences in the incidence, risk factors, pattern and antimicrobial sensitivities of pathogens and mortality from that of developed countries.<sup>25-28</sup>

Neonatal septicemia is responsible for 1.5 to 2.0 million deaths per year or between 4000 to 5000 deaths per day in the less-developed countries of the world. Continued surveillance is mandatory to select the empirical therapy to reduce neonatal mortality.<sup>29-30</sup>

In our study, since the leading causes of neonatal admissions are preterm, LBW infants and septicemia, further extensive studies should be conducted in order to determine the risk factors particularly involved in these two problems. Active involvement of the obstetric department and the laboratory is also important in this context.

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