CLINICAL SPECTRUM OF THE DISEASES AND THEIR OUTCOME IN ADMITTED CASES OF NEONATAL INTENSIVE CARE UNIT IN A PERIPHERAL MILITARY HOSPITAL IN ABBOTTABAD

Umar Nawaz Khan, Faran Nasrullah*, Mehwish, Abdul Wahid Hussain, Affrah Qaiser**

Combined Military Hospital, Abbotabad Pakistan, *PAF Hospital, Shorkot Pakistan, **Combined Military Hospital Sargodha Pakistan

ABSTRACT

Objective: To overview the clinical spectrum of diseases and their outcome in admitted cases of Neonatal Intensive Care Unit (NICU) in a peripheral military hospital in Abbottabad.

Study Design: Observational study.

Place and Duration of Study: Pediatrics Department, Combined Military Hospital Abbottabad, from Sep 2017 to Mar 2018.

Methodology: All the relevant data of 284 patients admitted in the neonatal intensive care unit, were studied retrospectively. The history, birth place, gestational age, mode of delivery, clinical presentation, treatment, clinical course and the outcome of the admission of 284 babies was recorded. All relevant investigations and radiographs were also recorded.

Results: Out of the 284 patients included in the study, 65.1% were male while 34.8% were females. Total 44.7% patients were admitted as outdoor cases while rest of the patients (55.3%) were born in our hospital. Majority (59.5%) of the patients were less than 24 hours of age. Out of the 11.97% patients were very low birth weight, while 42.96% patients were low birth weight and 45.07% patients had normal birth weight. The most common cause of admission was infection, followed by preterm births and then was the patients with transient tachypnea of the newborn. Twenty point one percent patients expired while 79.9% patients recovered and were discharged from our unit successfully.

Conclusion: Neonatal sepsis and prematurity are two leading causes of neonatal mortality in developing countries. There is a need to increase the number of neonatal health care facilities at national level in this part of country so that a large number of preventable neonatal deaths can be avoided.

Keywords: Clinical spectrum, Neonatal intensive care unit, Outcome.

INTRODUCTION

Neonatal mortality is one of leading problems that we come across in our pediatrics practice[1]. With the perspective of a gradual decline in the overall neonatal mortality rate of Pakistan, this study was done in order to determine and evaluate the efficacy of the health care services provided in a peripheral care setup in Pak Army by comparing the neonatal mortality rates with the rest of Pakistan. Just like rest of Pakistan and other developing countries we are facing utmost challenges in this particular problem. In spite of all the hard work being done in our Neonatal Intensive Care Units, the neonatal mortality, though much improved is still quite large as compared to developed countries i.e., 35 in North America and 46 in Pakistan[2], chiefly due to lack of neonatal health care facilities and insufficient education of the masses.

According to the World Health Organization (WHO) under 5 death rate is 81 per 1000 live births in Pakistan, whereas a significant proportion (57%) of all under-5 deaths occurs in the neonatal period which is 46 per 1000 live births and most of these deaths are preventable in developing countries like Pakistan owing to prevailing poor health care services and education of masses[3]. Over past 2 decades with improving health care facilities in Pakistan the neonatal mortality rate has declined from 65 to 46 per 1000 live

Correspondence: Dr Umar Nawaz Khan, Graded Child Specialist, Combined Military Hospital, Abbottabad Pakistan
Email: dr.umarnawazkhan@yahoo.com
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births in 2018[2]. The neonatal mortality rate is one of the many indirect indicators of the development of a country. A lot of factors determine the overall mortality rate and one of them is the neonatal intensive care facilities. Other important factors include the demography, education level of the masses, social acceptability of the health care services, prevailing disease patterns and availability of the health care facilities. Basic neonatal care (level-I) is not available at the majority of centers in Pakistan where neonates are delivered or admitted[4], resultantly a lot of such babies are referred to tertiary care setups and therefore cause an increase in mortality of the prevailing setups.

Aim of this study is to study the variables of the health care facilities, disease patterns and their outcomes in a military setup which is not a very large but an important part of the country's health care system. This study gives the accurate picture of the clinical disease spectrum and the effect of the available health care facilities in a military setup on the disease outcome and whether this system parallels the improving health care services of the country or not.

METHODOLOGY

The study was conducted in Pediatrics department, Combined Military Hospital, Abbottabad from September 2017 to March 2018. A total of 284 patients admitted in neonatal intensive care unit, during this period, were evaluated retrospectively. Non-probability, purposive sampling was done. The study was approved by institute's ethical committee for research. The data were entered in SPSS and results were calculated.

All the patients admitted in neonatal intensive care unit during the study period were included in the study. No patient was excluded. The patient's history, duration of hospital stay, gender, age at admission, weight, gestational age, mode of delivery, diagnosis, treatment given and the treatment outcome (discharged/expired) were recorded. Complete hospital stay and course of the individual cases were recorded and follow-up up till one month was done. During the hospital admission, from all of the investigations done, the integral recorded investigations for study included Complete Blood Count, C Reactive Protein, Renal Function tests, Blood Cultures, serum Bilirubin levels and chest X-Rays of all the patients.

For diagnosis of Meconium Aspiration Syndrome relevant history of fetal distress, meconium staining of amniotic fluid and development of respiratory distress in first 24 to 72 hours along with x-ray evidence of meconium aspiration were kept in consideration. Transient Tachypnea of New born and Respiratory Distress Syndrome were diagnosed on the basis of relevant history of gestational age, APGAR score, time of initiation of respiratory distress, moaning, grunting, cyanosis and supporting X-rays with characteristic findings of Respiratory Distress Syndrome and Transient Tachypnea of the Newborn. Prematurity was chiefly labelled on the basis of the internationally accepted World Health Organization definitions which state prematurity as any birth before the completion of 37 weeks of gestational age, whereas low birth weights described as the patient having a birth weight of <2.5Kg; very low birth weight (VLBW) is a birth weight of <1.5kg, extremely low birth weight (ELBW) is a birth weight of <1kg and incredibly low birth weight is a birth weight below 7500 grams (0.75 kg)[6]. Hypoxic Ischemic Encephalopathy was diagnosed with a history of delayed cry at birth, poor respiratory efforts, low APGAR score at 0 and 5 minutes and succeeding clinical outcome including seizures, absent neonatal reflexes and unresponsiveness. Neonatal Sepsis was diagnosed with the help of raised Total Leucocyte Count >30,000/mm^3, C-Reactive Protein >6 mg/L and isolating pathogensfrom Blood Cultures along with the clinical examination. All the variables studied were stratified according to the table. The data was interpreted using SPSS.

RESULTS

A total of 284 patients were admitted in our neonatal intensive care unit, in the duration of the

study. Out of these patients, 185 were males (65.1%) and 99 were females (34.8%). One hundred and twenty seven patients (44.7%) were outdoor (referred from outside our hospital), whereas 157 patients (55.3%) were indoor cases (born in our hospital). Majority of the patients were less than 24 hours of age i.e. 169 (59.50%) while 115 (40.50%) were 1 day or more of age. Thirty four patients (11.97%) were very low birth weight i.e. less than 1.5kg, while 122 patients (42.96%) were low birth weight i.e. 1.5-2.4kg and 128 patients (45.07%) had normal birth weight i.e. >2.5kg. The most common cause of admission was infection, seen in 96 patients (33.8%), followed by preterm babies, who were 61 (21.4%) and patients with transient tachypnea of the newborn, seen in 29 patients (10.2%). Sixty five patients (22.89%) required ventilator during the course of their treatment. Fifty seven patients (20%) expired while 227 patients (79.9%) recovered and were discharged from NICU.

Table: Disease pattern of NICU admissions.

Diagnosis	Age		Birth Weight (Kgs)			Ventilator Required		Outcome	
	>24 hours	>1 Days	> 1.5	1.5-2.4	≥ 2.5	Yes	No	Expired	Dis-charged
MAS	22	1	-	4	19	2	21	3	20
RDS	18	1	6	9	4	7	12	6	13
PT	53	8	17	44	-	13	48	12	49
HIE	15	2	1	6	10	7	10	5	12
TTN	29	-	-	10	19	-	29	-	29
NNJ	2	22	3	9	12	1	23	1	23
NNS	20	76	7	34	55	32	64	27	69
Dysmorphic	2	-	-	2	-	2	-	2	-
OBS	5	1	-	2	4	-	6	-	6
FITS	0	1	-	-	1	-	1	-	1
Meningoceole	3	2	-	1	4	-	5	-	5
HDN	-	1	-	1	-	1	-	1	-

(MAS=Meconium aspiration syndrome, RDS=Respiratory distress syndrome, PT/LBW=Preterm/Low birth weight, HIE=hypoxic ischemic encephalopathy, TTN=Transient tachypnea of the newborn, NNJ=neonatal jaundice, NNS=neonatal sepsis, OBS= observation, HDN=Hemorrhagic disease of the newborn).

DISCUSSION

The neonatal mortality is a key outcome indicator for newborn care and directly reflects prenatal, intrapartum, and neonatal care. The calculated neonatal mortality rate at CMH Abbottabad was 47 per 1000 live births which is comparable to neonatal mortality rate of the whole country i.e. 46 per 1000 live births[5]. Total cases included in the study were 284, out of which majority were male babies i.e. 185 (65.1%) whereas female babies were 99 (34.9%) with male to female ratio of 2 : 1.06. which was contrary to a study done in Karachi which showed a male to female ratio of 1.3:2, however this male predominance is consistent with the studies done in other developing countries: 57.8% in South

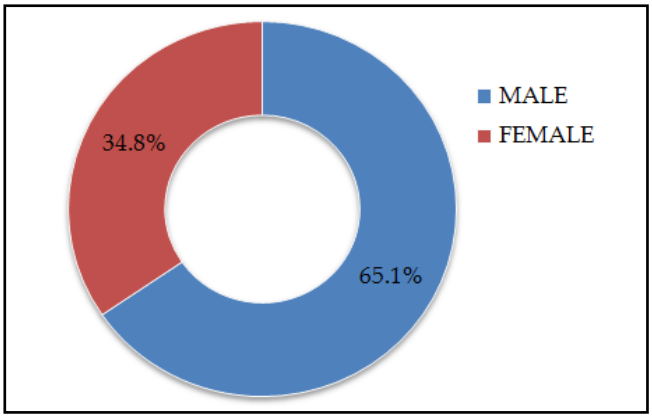

Figure-1: Graphical representation of gender distribution.

(MAS=Meconium aspiration syndrome, RDS=Respiratory distress syndrome, PT/LBW=Preterm/Low birth weight, HIE= hypoxic ischemic encephalopathy, TTN=Transient tachypnea of the newborn, NNJ=neonatal jaundice, OBS=observation, HDN=Hemorrhagic disease of the newborn).

Africa, 63.3% in India, and 61.1% in Ethiopia[8-10].

This big difference of gender in admitted cases may indicate that male gender is preferred over females in terms of seeking health care in developing countries[10]. It can be just a coincidence that majority of the patients were males but further studies are required to establish the factors involved behind this gender inequality of admitted cases. Majority of the patients were admitted within 24 hours of their birth, its reason is the fact that a large number of studied patients were born indoor. Out of total 284 admissions, 169 (59.50%) were less than 24 hours old. This is higher than some of the studies done elsewhere

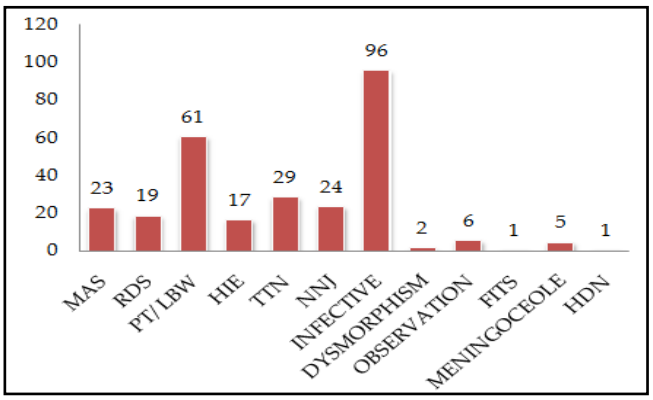

Figure-2: Bar-Graph representation of causes of admission to NICU.

in Pakistan; for example in a study in Peshawar[11] the figure was 35%, 33.6% in a Karachi study[12], and is lower than a study conducted in Lahore, which reported 75% of neonates admitted during the first 24 hours of life[14]. The babies brought in NICU and detained for few hours for observation were not included in the study.

Neonatal sepsis was the leading cause of admission in our study and comprised of 96 patients which makes a total of 33.8% patients. The number is higher than the study done in Karachi, which was 20.3% and 21% in South African studies[8,9]. The neonatal sepsis included patients of congenital pneumonia, cellulitis, meningitis and septicemia. The increasing tendency of infection in neonates may because of the increased turnover of the patients in a relatively smaller setup and influx of outdoor patients which was on a rise in our study due to limited local government NICU facilities and a large dependent drainage area. Out of these 96 babies, 41 (42.7%) were low birth weight babies. 32 (33.33%) required ventilator support and 15 (15.62%) expired out of 96 babies. Out of the 32 babies who required ventilator support 22 babies were complicated with low birth weight and 7 had RDS as well.

Second leading cause of NICU admissions in our study was prematurity and there were total 61 (21.47%). Seventeen (27.87%) of total 61 were having birth weight less than 1.5kg and 44 (72.13%) had birth weight between 1.5 and 2.5 kg. Thirteen (21.31%) preterm babies required mechanical ventilation and only 12 (19.64%) out of 61 expired. The pre-term babies who expired were majority 8 (13.11%) having birth weight less than 1.5kg. The pathology that affects the fetusin utero causing low birth weight deliveries is related to maternal physiology including maternal illness and infection during pregnancy. The antenatal causes of prematurity in most cases are maternal in origin[16]. Thirty five percent of neonates in this study had LBW which is comparable with studies from Pakistan (37.7%) and Tanzania (29%), but lower than South Africa (52.5%) and India (60%)[8,9,11]. This comparison between different developing countries may be due to poor maternal health care facilities[15]. However more comparative studies/literature reviews are required to establish the exact causes of high incidence as this was out of scope of this study.

On number three of the leading causes, Transient Tachypnea of Newborn was placed resulting in total 29 (10.21%) admissions, followed by Neonatal Jaundice which resulted in 24 (8.45%) admissions. In babies having TTN, 3 (10.34%) were below 1.5kg, 10 (34.48%) had birth weight from 1.5 to 2.5kg, whereas 16 (55.17%) were having normal birth weight. None of them required ventilator and out of these 29, 7 (24.13%) were complicated by neonatal sepsis, but all of them got better with treatment and were discharged with zero percent mortality.

Another aspect of the data analysis is the disease spectrum in subnormal birth weight babies. Out of total 159 babies coming in this category which makes 55.98% of the total admissions, 41 (25.77%) were complicated with neonatal sepsis, 15 (9.43%) had RDS and 7 (4.40%) had HIE. Mortality rate in this category was 24.52% over all. This is comparable to a study done in Kharian[17], which shows 23.1% mortality rate in low birth weight babies in neonatal period however it is higher than studies done in India and Germany which show a mortality of 12.5% and 10.9% respectively during hospital stay in low birth weight babies[18,19].

CONCLUSION

Neonatal sepsis and prematurity are two leading causes of neonatal mortality in developing countries. There is a need to increase the number of neonatal health care facilities at national level in this part of country so that a large number of preventable neonatal deaths can be avoided.

CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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