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The Prevalence and Risk Factors of Late Onset Neonatal Sepsis in SCANU (Special Care Newborn Unit)

Dr. Md. Obaidul Islam[1*], Dr. Md. Firoz Ahmed[2], Dr. Md. Sirajul Islam Bhuiyan[1], Dr. Md. Abul Khayer[1], Dr. Farhana Rahman[2]

[1]Assistant Professor of Pediatrics, Mugda Medical College, Dhaka, Bangladesh
[2]Assistant Professor of Pediatrics, Kushtia Medical College, Dhaka, Bangladesh

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***Corresponding author:** Dr. Md. Obaidul Islam
Assistant Professor of Pediatrics, Mugda Medical College, Dhaka, Bangladesh

Abstract **Original Research Article**

Background: Despite significant attempts to mitigate its effects, neonatal sepsis including late onset neonatal sepsis is regarded as a major cause of morbidity and death in newborns. ***Objective:*** In this study our main goal is to evaluate the prevalence and risk factors of late onset neonatal sepsis in SCANU (Special Care Newborn Unit). ***Method:*** This cross sectional study was carried out at tertiary medical college and hospital where 100 neonates suspected of having neonatal sepsis and admitted in the neonatal unit were included. Clinical sepsis was diagnosed based on presence of one or more of clinical features. Clinical features considered were fever (≥38.0°C), hypothermia (≤36.5°C), convulsions, lethargy, poor feeding, respiratory distress, vomiting, bulging fontanels, jaundice, and umbilical pus infections. ***Results****:* The research found that 46% of the instances occurred in the 15-22 day age range, and that 88% of the participants were female. Seventy-five percent of the babies were fed formula, 20 percent of the babies used a bottle, and 80 percent of the patients had poor hygiene status. There were 6% instances of very low birth weight and 35% occurrences of low birth weight. In addition, a cough was seen in 51.7% of cases, a cough accompanied by respiratory distress in 66.0% of cases, a fever in 76.0% of cases, a reduction in urine output in 50% of cases, convulsions in 20% of cases, a skin rash in 92.0% of cases, and jaundice in 18.0% of cases. Sixty percent were given antibiotics for 1-5 days, and 58 percent of those admitted remained in the hospital for 6-10 days. The prevalence of Klebsiella pneumoniae was highest (38%), followed by staphylococcus aureus (27%), Pseudomonas aeruginosa (15%), Citrobacter species (10%), and Klebsiella oxytoca (8%). As part of the therapy, many antibiotics were administered all at once. These included Tazid, meropenem, kacin, Gentamicin, and others. 62% of patients were advised to follow up once therapy was completed (DA). ***Conclusion:*** Our research shows that a high temperature and a rash on the baby's skin are classic symptoms of neonatal late-onset sepsis. Also, the major causes of sepsis in infants are shown to be improper hygiene practices.

Keywords: Late-onset sepsis (LOS), poor hygiene, mode of discharge.

INTRODUCTION

Neonatal sepsis is a common illness that occurs in neonates at 28 days of age and is a major cause of morbidity and death in newborns. It is a huge global public health concern. According to the age of onset, neonatal sepsis is classified as early-onset sepsis (EOS) or late-onset sepsis (LOS) [1-4].

Early-onset sepsis (EOS) occurs within the first 72 hours of life, while late-onset sepsis (LOS) occurs beyond the first 72 hours [5-10].

EOS is caused by transplacental or, more commonly, ascending infections from the maternal vaginal canal, whereas LOS is caused by the postnatal nosocomial or community environment, with a peak incidence recorded between the 10th and 22nd day of life. Epidemiological studies have shown a steady decline in EOS during the 1980s, perhaps as a result of improvements in obstetric care and the use of prophylactic intrapartum antibiotics to prevent Group B Streptococcus infections. There is evidence that hospitalization and life-sustaining medical equipment have a role in the pathophysiology of neonatal LOS since the prevalence of LOS has grown in tandem with the better survival of preterm children, particularly in

those with very low birth weight (VLBW) [12-15]. Strategies to prevent and cure newborn LOS may, in turn, affect the pattern of LOS pathogens, making the microbiological properties of LOS of fundamental relevance in directing clinical antisepsis management. The prevalence of newborn LOS might be mitigated with a better knowledge of its epidemiology and how to treat it [6, 7].

OBJECTIVE

General Objective

To find out the prevalence and risk factors of late onset neonatal sepsis in SCANU (Special Care Newborn Unit).

Specific Objectives

- To find out the clinical profile of neonatal sepsis.
- To evaluate the laboratory profile of the neonatal sepsis.

METHODOLOGY

Study Procedure

This study was Cross sectional study which was done at Department of neonatology of tertiary care Hospital, Dhaka, for one year from January 2019 to January 2020 where 100 neonates with sepsis were included as sample population during the study period

All infants who were hospitalized in the neonatal intensive care unit and were thought to have neonatal sepsis were considered. The diagnosis of clinical sepsis was established by the presence of at least one of the clinical symptoms. There were several symptoms to look out for, including a temperature of 38.0 degrees Celsius, hypothermia of 36.5 degrees Celsius, convulsions, lethargy, poor feeding, respiratory distress, vomiting, bulging fontanels, jaundice, and umbilical pus infections. Babies were ruled out of the study if their parents refused to sign an informed consent form.

Each parent or legal guardian provided a signed permission form indicating that they gave their consent voluntarily and after receiving all relevant information. Parent/guardian information leaflets included all relevant details regarding the research and its aims. The criteria for discontinuation were evaluated upon discharge or the baby's death while in the hospital. No special interventions were recommended as part of the research, and all tests and procedures were conducted as per the ward's usual routine.

All the records of the study population were carefully reviewed and data including socio-demographic and clinical features consistent with sepsis, result of cultures, antibiotic sensitivity will have entered into a data collection sheet and all the data were analyzed using SPSS version 22.

RESULTS

In table-1 shows age distribution of the patients where majority were belonging to 15-22days only, 46%. The following table is given below in detail:

Table-1: Age distribution of the patients

Age Group	Percent
7-14 days	30
15-22 days	44
23-30 days	26

In figure-1 shows gender distribution where most of the patients where female, 88%. The following figure is given below in detail:

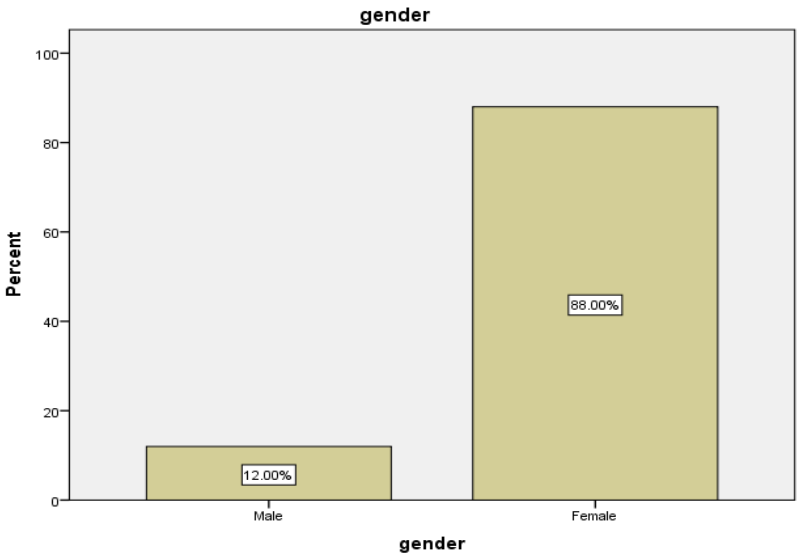

Figure-1: Gender distribution

In table-2 shows distribution of the neonates on the basis of birth weight where 7% cases were very low birth weight and 34% cases had low birth weight. The following table is given below in detail:

Table-2: Distribution of the neonates on the basis of birth weight

Birth weight status	Percentage (%)
Very low birth weight	6%
Low birth weight	35%
Normal birth weight	59%

In table-3 shows distribution of the patients according poor hygiene and feeding status where 80% cases undergone poor hygiene status, followed by 45% had poor cord care, 75% were feed formula and 20% cases used bottle. The following table is given below in detail:

Table-3: Distribution of the patients according poor hygiene and feeding status

Poor hygiene	Percentage (%)
Yes	80
No	20
Poor cord care	%
Yes	45
No	55
Formula feeding	%
Yes	25
No	75
Bottle feeding	%
Yes	20
No	80

In table-4 shows clinical characteristics of the patients where cough was shown 52% cases followed by cough with respiratory distress was shown in 66% cases, fever shown in 76%, decreased urine output shows in 50% cases, convulsion was shown in 20% cases, skin rash shown in 92% cases and jaundice shown in 18& cases. The following table is given below in detail:

Table-4: Clinical characteristics of the neonates

Cough only	Percentage %
Yes	52
No	48
Cough with respiratory distress	%
Yes	66
No	34
Fever	%
Yes	76
No	24
Decreased urine output	%
Yes	50
No	50
Convulsion	%
Yes	20
No	80
Vomiting or abdominal distension	%
Yes	22
No	76
Jaundice	%
Yes	18
No	82
Skin rash	%
Yes	92
No	8

In table-5 shows chest status and duration of o2 requirement of the patients 60% cases were Tachypnea, prolonged CRT cases were seen in only 6% cases and 38% cases required O2 about 2-5 days. The following table is given below in detail:

Table-5: Chest status and duration of o2 requirement of the patients

Tachypnea	**%**
Yes	60
No	40
Chest indrawing	%
Yes	72
No	28
Prolonged CRT	%
Yes	6
No	94
Crepes in lung	%
Yes	34
No	66
Lethargic	%
Yes	54
No	46
Duration of O2 requirement	%
24h-1days	26
2-5 days	38
None	36

In table-6 shows laboratory status where 70% had normal HB%, 14-24mg/dl and 52% had 1.5-24mg/dl CRP level. The following table is given below in detail:

Table-6: Laboratory status

HB%	**%**
14-24mg/dl	70
<14mg/dl	30
CRP	%
1.5-20mg/dl	52
>20mg/dl	48%
TC	%
15000/mm^3 or more	66
<15000/mm^3	34

In table-7 shows isolated organism among neonates where most common organism was Klebsiella pneumoniae, 38% followed by 27% cases were staphylococcus aureus, 15% were Pseudomonas aeruginosa, 10% were Citrobacter species and 8% were Klebsiella oxytoca. The following table is given below in detail:

Table-7: Isolated organism among neonates

Isolated organism	**Percentage (%)**
Klebsiella pneumoniae	38%
Staphylococcus aureus	27%
Citrobacter species	10%
Pseudomonas aeruginosa	15%
Klebsiella oxytoca	8%
E.coli	2%

In table-8 shows antibiotic status and duration of hospital stay where 59% got their antibiotic treatment for 1-5days and 58% cases stayed in hospital for 6-10 days. During treatment combine antibiotic such as Tazid, meropenem, kacin, Gentamicin etc. were introduced. The following table is given below in detail:

Table 8: Antibiotic status and duration of hospital stay

Duration of antibiotic treatment	Percentage (%)
1-5 days	59
6-11 days	41
Duration of hospital stay	%
1-5 days	42
6-10 days	58

In figure-2 shows mode of discharge where 62% cases discharge with advice and 38% cases discharge on request. The following figure is given below in detail:

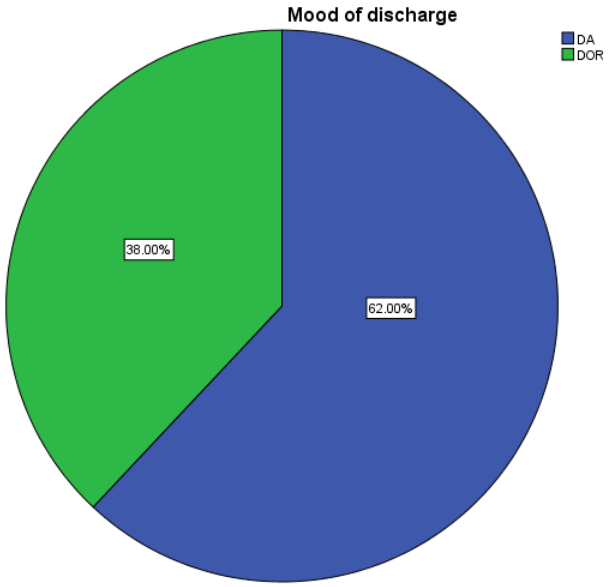

Figure-2: Mode of discharge

DISCUSSION

According to the data, 67.63% of the population is middle class, with 57.8% being male and 42.2% being female. 15 According to our research, 88% of patients were female.

Umbilical cord infection, a history of bottle feeding, and maternal illness were all shown to be substantially (p 0.05) linked to neonatal sepsis [15]. While 80% of the babies in our research had poor cleanliness, 45% had inadequate cord care, 75% were fed formula, and 20% used a bottle.

Only 10–15% of newborns have fever at birth, but when it persists (e.g., for more than an hour), it's almost always an indication of infection, according to one research. As well as these, jaundice (particularly during the first 24 hours of birth without Rh or ABO blood type incompatibility and with a higher than anticipated direct bilirubin concentration), vomiting, diarrhea, and abdominal distention are all possible symptoms and indicators [16]. Cough with respiratory distress was seen in 66% of cases, followed by fever in 76% of instances, a reduction in urine output in 50% of cases, convulsions in 20% of cases, a skin rash in 92% of cases, and jaundice in 18% of cases, all of which we also observed. In addition, Tachypnea was seen in 60% of patients, extended CRT was observed in just 6% of instances, and 38% of cases needed O2 for about 2-5 days.

Klebsiella pneumonia was found to be the most often isolated microbe in that research, making up 34.70 percent. Other frequently isolated microorganisms were acinetobacter species (9.83 percent), pseudomonas aeruginosa (9.23 percent), and E. coli 8.10 percent.

Klebsiella oxytoca, Burkholderia cepacia, and Proteus spp. were the gram-negative microbes identified less often. Staphylococcus aureus (21.8%) and coagulase-negative staphylococci (9.83%) were the most often identified gram-positive pathogens. Only a handful of different types of candida were found [6]. In contrast, our research revealed that Klebsiella pneumoniae accounted for 38% of the most frequently isolated organisms, with staphylococcus aureus coming in second at 27%, Pseudomonas aeruginosa in 15% of the cases, Citrobacter species in 10%, and Klebsiella oxytoca in 8%.

Recent UK national surveillance data reported that 95%-97% of organisms isolated from LOS blood samples were susceptible to gentamicin+ flucloxacillin and gentamicin+amoxicillin/penicillin. This suggests that the current guideline for empirical therapy is adequate, and that most LOS cases can be appropriately treated by narrow-spectrum antibiotics [18]. Antibiotics including cefotaxime, amikacin, mahacef, kain, meropenem, vancomycin, and colomycin were employed in our research. Sixty percent were given antibiotics for 1-5 days, while 58 percent of patients were hospitalized for 6-10 days. With counsel, 62% of patients were released from the hospital after therapy (DA).

CONCLUSION

Our research indicates that a rash and high body temperature are two of the most prominent symptoms of late onset neonatal sepsis in a baby. Also, the major causes of sepsis in infants are shown to be improper hygiene practices.There has been a recent uptick in the number of instances where babies are being fed exclusively by bottle. The risk of sepsis may be reduced if new parents are educated on how to maintain sanitary conditions and successfully breastfeed their infants. In addition, Klebsiella pneumoniae was often isolated from newborns and was thought to be responsible for the severity of late onset neonatal sepsis in these infants. This research highlights the need of include Gram-negative and Gram-positive organisms, including Klebsiella pneumoniae and Staphylococcus aureus, in empirical treatment for suspected newborn septicaemia. In order to improve sepsis survival, we may argue that lessons learned in the intensive care of newborns may be transferred to adult patients.

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