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CLINICAL PROFILE AND OUTCOME OF NEONATAL SEPSIS IN A TERTIARY CARE CENTRE, TRICHY, TAMIL NADU

Dissertation submitted to

ANNAL GANDHI MEMORIAL GOVERNMENT HOSPITAL

in partial fulfillment of the regulations

for the award of the degree of

MD Degree Examination Branch VII

PAEDIATRIC MEDICINE

K.A.P. Viswanathan Government Medical College

Tiruchirappalli

ANNAL GANDHI MEMORIAL GOVERNMENT HOSPITAL

APRIL 2012

CERTIFICATE

Certified that this dissertation entitled **"CLINICAL PROFILE AND OUTCOME OF NEONATAL SEPSIS IN A TERTIARY CARE CENTRE, TRICHY, TAMIL NADU"** is a bonafide work done by **Dr. D.S. JOTHI,** Post Graduate Student of Pediatric Medicine, KAPV GOVERNMENT MEDICAL COLLEGE-TRICHY, during the academic years 2010 - 2011.

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DECLARATION

I declare that this dissertation entitled **"CLINICAL PROFILE AND OUTCOME OF NEONATAL SEPSIS IN A TERTIARY CARE CENTRE, TRICHY, TAMIL NADU"** has been conducted by me at ANNAL GANDHI MEMORIAL GOVERNMENT HOSPITAL - TRICHY. It is submitted in part of fulfillment of the award of the degree of M.D (Paediatrics) for the APRIL 2012 examination to be held under the Tamil Nadu Dr. M.G.R Medical University, Chennai. This has not been submitted previously by me for the award of any degree or diploma from any other university.

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Dr. D.S. Jothi

CONTENTS

INTRODUCTION

Neonatal septicemia refers to a clinical syndrome characterized by systemic signs and symptoms due to generalized bacterial infection with a positive blood culture in the first four weeks of life.

Bacterial infections are the commonest cause of morbidity and mortality during the neonatal period. Fulminant and fatal course of infection may result from complications such as shock, disseminated intravascular coagulation and multi-system organ failure, mandating early diagnosis of this life-threatening condition for a timely treatment and a favourabIe outcome. Sepsis is the commonest cause of mortality responsible for 30-50% of the 5 million total neonatal deaths each year. The reported incidence of neonatal sepsis varies from 7.1 to 38 per 1000 live births in Asia. National Neonatal Perinatal Database (NNPD, 2002-2003) from India has reported an incidence varying from 0.1% to 4.5%[1]. Sepsis to be one of the commonest causes of neonatal mortality contributing to19% of all neonatal deaths.

Gram negative organisms are found to be more frequently than Gram positive organisms as evidenced by many Indian studies[2,3]. The clinical presentation is often subtle or nonspecific and usually mimicked by several other disorder.

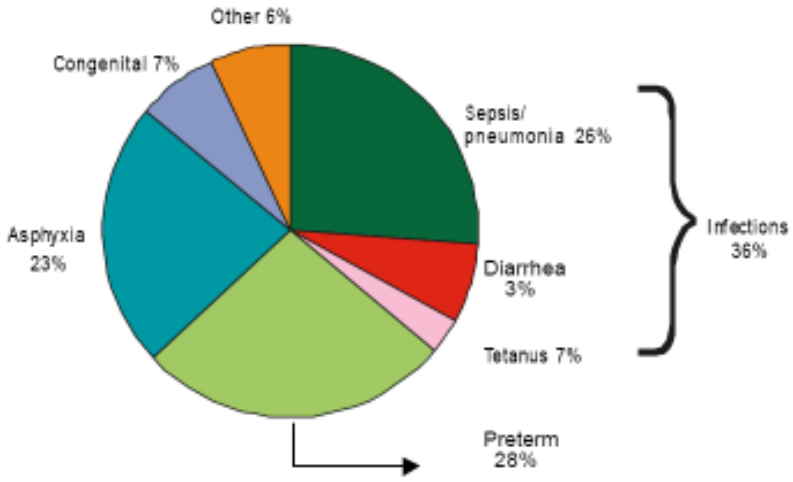


Fig. 1

The Three major causes of neonatal deaths worldwide are infections, including sepsis, pneumonia, tetanus, diarrhoea (36%), prematurity (28%) and Birth Asphyxia or problems related to child birth complications (Fig.1).

In the Annal Gandhi memorial Govt. Hospital which is a tertiary care centre, attached to KAPV Govt. College, Trichy, admits approximately 3478 neonates for various causes in its new bornward.

The common causes of admissions were preterm care, septicemia, jaundice, birth asphyxia etc.

AIMS AND OBJECTIVES

- Neonatal mortality remains high in our country in spite of the decline in the infant mortality rate. One third of the neonatal mortality is reported to be due to sepsis and related illness.
- Hence this study was planned to understand the clinical parameters, role of investigations and the outcome in neonatal sepsis.
- To analyze the causative organisms and their sensitivity pattern.
- To identify the perinatal risk factors in the causation and outcome of neonatal sepsis.
- To identify modifiable risk factors in order to develop appropriate strategies to address them.
- To identify laboratory investigations for early diagnosis of sepsis.

REVIEW OF LITERATURE

Literature review was done to understand the current status of the clinical profile, causative organisms and their sensitivity pattern, laboratory findings, neonatal and maternal risk factors of neonatal sepsis in similar hospitals in India and abroad.

CLINICAL PROFILE

YR. Khinchi et al[4] has shown that Babies was having sepsis in out born group 59% as compared to inborn 35% Male sex was found to have more sepsis as compared to female. Sepsis was inversely related to Birth weight.

Waliullah MS et al[5] has shown that clinical presentation includes reluctant to feed (96.7%), lethargy (73.4%), abdominal distention (70%), Hypothermia (40%), Jaundice (50%) are more common.

BLOOD CULTURE

Rekha Sriram et al[6] in her study 50.4% were blood culture positive.

Vishnu Bhat et al[2] in his study 40.6% (50 of 120) were culture-proven cases of neonatal sepsis.

Shashikala S. Tallur et al[3] shown in her study the blood culture positivity rate of 64.87%.

CAUSATIVE ORGANISMS AND SENSITIVITY PATTERN

Waliullah MS et al[5] In his study predominant organism was gram negative. Among them Klebsiella (60%), Serratia (20%), Acenetobactor

(13.3%). This isolates were most often sensitive to third generation cephalosporin.

Seyyed Mohammad Hassan Aletayeb et al[7] in his study 92.8% had sepsis with gram negative bacteria with 121 (79%) positive cultures for species belonging to enterobacteriaceae family and 11 (72.%) with gram positive bacteria. The most common isolated gram negative bacteria were klebsiella pneumoniae 46.4%, enterobacter spp. 17.6% and E.coli 14.4%. K. pneumoniae and enterobacter. K. pneumoniae resistance to cefotaxime was 95.8%. However this species showed 90% sensitivity to imipenem. All of the isolated gram positive bacteria were resistant to ampicillin and pencillin and sensitive to vancomycin.

Vishnu Bhat et al[2] in his study shown that klebsiella pneumoniae was isolated from 66% of culture positive cases followed by Coagulase-negative staphlococi in 12% of cases. Klebsiella pneumoniae was resistant to most of the antibiotics tested except amikacin and meropenem.

Jain NK et al[8] in his study the most common organism was E.coil.

Ruchika Kohli-Kochhar et al[9] in his study revealed that Gram-positive organisms were the predominant cause of both early and late onset sepsis; the common isolates were Staphylococcus epidermidis 34% and Staphylococcus aureus 27/%. There were no isolates of group B Streptococcus. Condida species was isolated only in patients with late onset sepsis 6.9%. Bacterial

isolates were relatively sensitive to the commonly used first and second line empiric antibiotics.

MORTALITY

Shashikala S. Tallur et al[3] in his study shown the overall mortality rate was 47.52% and the case fatality rate in LOS was higher than in VOS and EOS. The mortality was significantly higher in neonates with lower birth weight and lower gestational age.

Seyyed Mohammad Hassan Aletayeb et al[7] in his study the mortality rate was 53.5% this study.

Betty Chacko et al[10] Has shown in his study the case fatality rate was 19.4%.

Rekha Sriram et al[6] in his study the mortality rate among the culture positive cases was 46.5% with maximum case fatality seen in the late onset septicemia cases 57.1%.

RISK FACTORS

Betty Chacko et al[10] has show in his study a significant association of EOS with prolonged rupture of membranes, foul smelling liquor, dai (midwife) handling and maternal urinary tract infection was observed. Among infants at risk of EOS, 20.6% developed sepsis compared to only 0.5% of those without these risk factors. Even among those at high risk such as low birth weight,

preterm and asphyxiated neonates, incidence of EOS was negligible in the absence of a maternal risk factor.

Jain NK et al[8] in their study have shown that majority of study population was poor, didn't have proper ante-natal check ups, delivered at home and untrained birth attendants conducted most of the deliveries, which was associated with an increased risk of serious neonatal infection and respiratory distress syndrome was found to be the most common clinical presentation.

Abdul Hakeem Jokhio et al[11] has shown that training traditional birth attendants and integrating them into an improved health care system were achievable and effective in reducing perinatal mortality improving the perinatal and maternal health in developing countries.

Schuchat A, et al[12] have shown that an obstetric risk factor -preterm delivery, intrapartum fever, or membrane rupture > 18 hours – was found in 49% of GBS cases and 79% of other sepsis.

Kurien Anil Kuruvilla et al[13] have shown in his study that maternal factors significantly associated with EOS were meconium staining of liquor and multiple vaginal examinations.

LABORATORY TESTS

Robyn L. Rodwell et al[14] In his study shown that hematologic scoring system improve the diagnostic accurate of the complete blood cell count as a

screening test for sepsis and could simplify and standardize the interpretation of this global test.

Rekha Sriram et al[6] in his study combination of two or more sepsis screen parameters has better results in diagnosing neonatal septicemia compared to a single test while awaiting the blood culture results.

Hajiehe Borna, M.D. et al[15] have shown in their study that initial CRP had a high NPV (97%) but low PPV (36%) with the sensitivity and specificity of 79% and 85% respectively.

R.S. Jaswal et al[16] have shown that the negative predictive value of serial serum CRP is 100% in deciding duration of antibiotics therapy in neonatal septicemia up to7 days. Newborn with suspected septicaemia having raised CRP levels and positive blood culture need longer duration of antibiotics therapy (more than 7 days).

JR Hewitt et al[17] have shown that for the early diagnosis of neonatal sepsis the 5 most important tests were:band/total neutrophils (greater than or equal to 0.2); leukocyte count (less than 5,000/cu mm); latex-C-reactive protein (positive greater than 0.8 mg/100 ml); ESR (greater than or equal to 15 mm for the first hour); and latex haptoglobin (positive greater than 25 mg/100ml). When applied early 93% of cases subsequently proven to have infection had two or more abnormal tests. When less than two tests were positive, the probability that sepsis was not present was 99%.

Nuntnarumit P et al[18] have reported a sensitivity of 100%, specificity of 94%, PPV and NPV of 91.6% and100% respectively of CRP for detecting proven sepsis and localized infection at cut off point>or =5mg/l. Manucha et al 26.A CRP level measured at the beginning of septic work-up has a sensitivity of 76% and negative predictive value (NPV) of 96%.

Garland SM et al[19] have shown that a CRP level measured at the beginning of septic work-up has a sensitivity of 67% and negative predictive value (NPV) of 87%. The gold standard for the diagnosis of neonatal sepsis is positive blood culture. The rate of positive blood culture in various studies range from 10-40%. It is higher in early onset sepsis where maternal risk factor play a major role than in late onset sepsis which is community acquired. So it is also important to understand the role of other investigations in community acquired sepsis.

Definition

Neonatal sepsis is a clinical syndrome characterized by signs and symptoms of infection with or without accompanying bacteremia in the first month of life. It encompasses various systemic infections of the newborn such as septicemia, meningitis, pneumonia, arthritis, osteomyelitis, and urinary tract infections. Superficial infections like conjunctivitis and oral thrush are not usually included under neonatal sepsis.

Classification of neonatal sepsis

Neonatal sepsis can be classified into two major categories depending up on the onset of symptoms.

Early onset sepsis (EOS)

It presents within the first 72 hours of life. In severe cases, the neonate may be symptomatic at birth. Infants with EOS usually present with respiratory distress and pneumonia. The source of infection is generally the maternal genital tract. Some maternal / perinatal conditions have been associated with an increased risk of EOS. Knowledge about these potential risk factors would help in early diagnosis of sepsis. Based on the studies from India, the following riskfactors seem to be associated with an increased risk of early onset sepsis[1]:

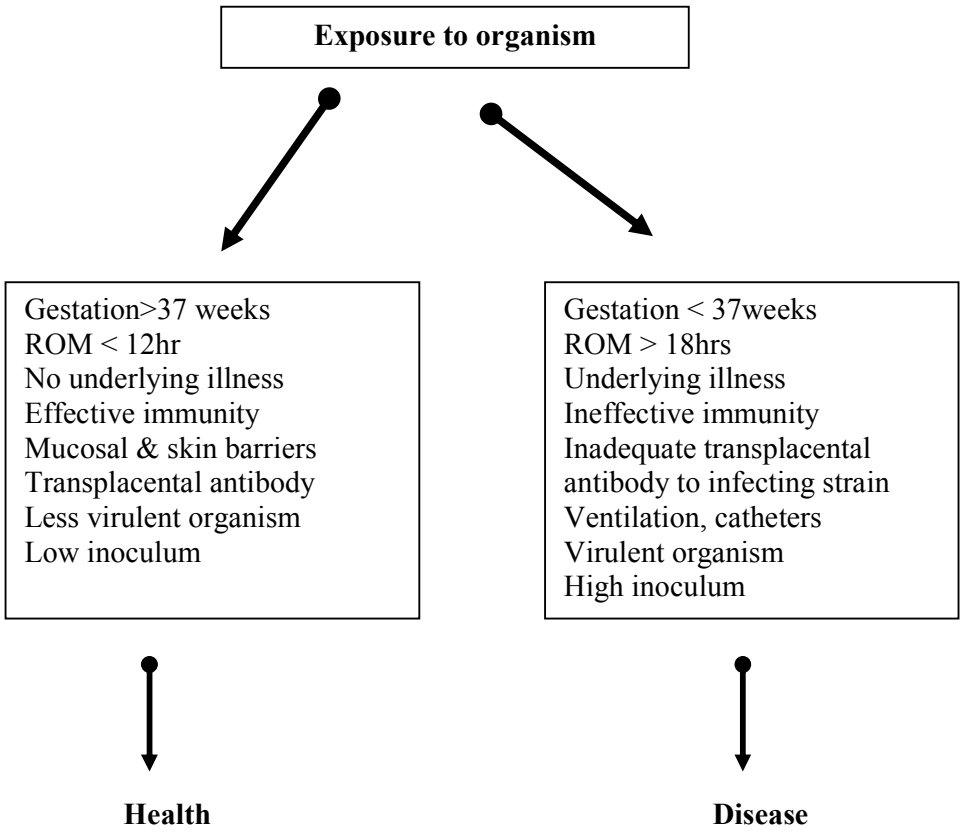
1. Low birth weight (< 2500 grams) or prematurity
2. Febrile illness in the mother with evidence of bacterial infection within 2 weeks prior to delivery.
3. Foul smelling and/or meconium stained liquor.
4. Rupture of membranes >24 hours.
5. Single unclean or > 3 sterile vaginal examination(s) during labor
6. Prolonged labor (sum of 1st and 2nd stage of labor > 24 hrs)
7. Perinatal asphyxia (Apgar score < 4 at 1 minute)

Presence of foul smelling liquor or three of the above mentioned risk factors warrant initiation of antibiotic treatment. Infants with two risk factors should be investigated and then treated accordingly.

Late onset sepsis (LOS)

It usually presents after 72 hours of age. The source of infection in LOS is either nosocomial (hospital-acquired) or community-acquired and neonates usually present with septicemia, pneumonia or meningitis. Various factors that predispose to an increased risk of nosocomial sepsis include low birth weight, prematurity, admission in intensive care unit, mechanical ventilation, invasive procedures, administration of parenteral fluids, , and use of stock solutions.

- **Factors influencing the balance between health and disease in neonates exposed to potential pathogens**



PATHOGENESIS OF ASCENDING BACTERIAL INFECTION[20]

Vertical transmission of Bacterial agents that infect the amniotic fluid and/ or vaginal canal may occur in utero or more commonly during labor and or delivery. Chorioamnionitis results from microbial invasion of amniotic fluid, often as a result of prolonged rupture of Chorioamnionitic membranes >18 hours. Bacterial colonization does not result in disease. Factors influencing which colonized infant will develop disease are not well understood but include prematurity, underlying illness, invasive procedures, inoculum size, virulence of the organism, and transplacental maternal antibodies.

Aspiration or ingestion of bacteria in amniotic fluid may lead to congenital pneumonia or systemic infection, with manifestations becoming apparent before delivery, at delivery, or after a latent period of few hours. Aspiration or ingestion of bacteria during the birth process may lead to infection after a period of 1-2 days. Resusitation at birth with endotracheal intubation, insertion of umblical catheter or both is associated with an increased risk of bacterial infections.

PATHOGENESIS OF LATE ONSET POSTNATAL INFECTIONS[20]

Usually presents after 72 hours of age. The source of infection in late onset infection is either nosocomial or community acquired and neonates .Usually present with septicemia, pneumonia or meningitis.

Postnatal infections may be transmitted by direct contact with hospital personnel, the mother, or other family members from breast milk or from inanimate sources such as contaminated equipment. The most common source of postnatal infections in hospitalized newborn is hand contamination of health care personnel.

IMMUNOLOGICAL STATUS OF A NEONATE

There have been many studies that compare immunologic function of newborn infants to that in adults. Diminished concentrations of immunologic factors and decreased function are often emonstrated. Despite these defects in immunity in premature and full-term infants, the rate of invasive infectious diseases is low in the absence of obstetric and neonatal risk factors. It is important to maintain this perspective when evaluating immunologic prophylactic measures such as the use of intravenous immunoglobulin in the newborn.

Clinical features

Non-specific features

The earliest signs of sepsis are often subtle and nonspecific; indeed, a high index of suspicion is needed for early diagnosis. Neonates with sepsis may present with one or more of the following symptoms and signs

(a) Hypothermia or fever (former is more common in preterm low birth weight infants)

(b) Lethargy, poor cry, refusal to suck

(c) Poor perfusion, prolonged capillary refill time

(d) Hypotonia, absent neonatal reflexes

(e) Brady/tachycardia

(f) Respiratory distress, apnea and gasping respiration

(g) Hypo/hyperglycemia

(h) Metabolic acidosis.

Specific features related to various systems

Central nervous system (CNS): Bulging anterior fontanelle, vacant stare, high-pitched cry, excess irritability, stupor/coma, seizures, neck retraction. Presence of these features should raise a clinical suspicion of meningitis. Cardiac: Hypotension, poor perfusion, shock. Gastrointestinal: Feed intolerance, vomiting, diarrhea, abdominal distension, paralytic ileus, necrotizing enterocolitis (NEC). Hepatic: Hepatomegaly, direct hyperbilirubinemia (especially with urinary tract infections). Renal: Acute renal failure. Hematological: Bleeding, petechiae, purpura. Skin changes: Multiple pustules, abscess, sclerema, mottling, umbilical redness and discharge.

Investigations

Since treatment should be initiated in a neonate suspected to have sepsis without any delay, only minimal and rapid investigations should be undertaken.

Blood Culture[1]

It is the gold standard for diagnosis of septicemia and should be performed in all cases of suspected sepsis prior to starting antibiotics. A positive blood culture with sensitivity of the isolated organism is the best guide to antimicrobial therapy. Therefore it is very important to follow the proper procedure for collecting a blood culture. The resident doctor/staff should wear sterile gloves prior to the procedure and prepare a patch of skin approx. 5-cm in diameter over the proposed veni-puncture site. This area should be cleansed thoroughly with alcohol, followed by povidoneiodine, and followed again by alcohol. Povidone-iodine should be applied in concentric circles moving outward from the centre. The skin should be allowed to dry for at least 1 minute before the sample is collected. One-mL sample of blood should be adequate for a blood culture bottle containing 5-10 mL of culture media. Since samples collected from indwelling lines and catheters are likely to be contaminated, cultures should be collected only from a fresh veni-puncture site. All blood cultures should be observed for at least 72 hours before they are reported as sterile. It is now possible to detect bacterial growth within 12-24 hours by using improved bacteriological techniques such as BACTEC and BACT/ALERT blood culture systems. These advanced techniques can detect bacteria at a concentration of 1-2 colony-forming unit (cfu) per mL.

Septic Screen[1]

All neonates suspected to have sepsis should have a septic screen to corroborate the diagnosis. However, the decision to start antibiotics need not be conditional to the sepsis screen result, if there is a strong clinical suspicion of sepsis. The various components of the septic screen include total leukocyte count, absolute neutrophil count, immature to total neutrophil ratio, erythrocyte sedimentation rate and C reactive protein. The absolute neutrophil count varies considerably in the immediate neonatal period and normal reference ranges are available from Manroe's charts[21].

A Practical Sepsis Screen

Components	**Abnormal Value**
Total leukocyte count	<5000/mm^3
Absolute neutrophil count	Low counts as per Manroe Chart[21] for term and Mouzinho's chart[22] for VLBW infants
Immature/ total neutrophil	>0.2
Micro-ESR	>15mm in 1st hour
C reactive protein (CRP)	>1mg/dL

The lower limit for normal total neutrophil counts in the newborn begins at 1800/cmm, rises to 7200/cmm at 12 hours of age and then declines and persists at 1800/cmm after 72 hours of age. For very low birth weight infants, the reference ranges are available from Mouzinho's charts. The ratio of immature to total neutrophils (I/T ratio) is ≤ 0.16 at birth and declines to a peak value of 0.12 after 72 hours of age. Presence of two abnormal parameters in a

screen is associated with a sensitivity of 93-100%, specificity of 83%, positive and negative predictive values of 27% and 100% respectively in detecting sepsis. Hence, if two (or more) parameters are abnormal, it should be considered as a positive screen and the neonate should be started on antibiotics. If the screen is negative but clinical suspicion persists, it should be repeated within 12 hours. If the screen is still negative, sepsis can be excluded with reasonable certainty. For early onset sepsis, documentation of polymorphs in the neonatal gastric aspirate at birth could serve as a marker of chorioamnionitis and it may be taken as one parameter of sepsis screen.

Lumbar puncture (LP)

The incidence of meningitis in neonatal sepsis has varied from 0.3-3% in various studies. The clinical features of septicemia and meningitis often overlap; it is quite possible to have meningitis along with septicemia *without* any specific symptomatology. This justifies the extra precaution of performing LP in neonates suspected to have sepsis.

Normal Cerebrospinal Fluid Examination in Neonates

CSE Components	Normal range
Cells/mm^3	8(0-30cells)
PMN(%)	60%
CSF protein (mg/dL)	90(20-170)
CSF glucose (mg/dL)	52(34-119)
CSF/blood glucose (%)	51(44-248)

Radiology

Chest x-ray should be considered in the presence of respiratory distress or apnea. An abdominal x-ray is indicated in the presence of abdominal signs suggestive of necrotizing enterocolitis (NEC). Neurosonogram and computed tomography (CT scan) should be performed in all patients diagnosed to have meningitis.

Management

Supportive

Adequate and proper supportive care is crucial in a sick neonate with sepsis. Oxygen saturation should be maintained. If the infant is hemodynamically unstable, intravenous fluids should be administered and the infant is to be monitored for hypo/hyperglycemia.

Indications for starting antibiotics[1]

The indications for starting antibiotics in neonates at risk of EOS include any one of the following

(a) presence of > 3 risk factors for early onset sepsis

(b) presence of foul smelling liquor

(c) presence of ≥ 2 antenatal risk factor(s) *and* a positive septic screen and

(d) strong clinical suspicion of sepsis.

The indications for starting antibiotics in LOS include

(a) positive septic screen and/or

(b) strong clinical suspicion of sepsis.

Duration of Antibiotic Therapy in Neonatal Sepsis

Diagnosis	**Duration**
Meningitis(with or without positive blood/ CSF culture)	21days
Blood culture positive but no meningitis	14days
Culture negative, sepsis screen positive and clinical course consistent with sepsis	7-10days
Culture and sepsis screen negative, but clinical course compatible with sepsis	5-7 days

Empirical choice of Antibiotics for Treatment of Neonatal sepsis

Clinical situation	**Septicemia & Pneumonia**	**Meningitis**
FIRST LINE Community-acquired (Resistant Strains are unlikely)	Penicillin or Ampicillin and Gentamicin	Add cefotaxime
SECOND LINE Hospital-acquired(some strains are likely to be resistant)	Ampicillin or Cloxacillin and Gentamicin or Amikacin	Add Cefotaxime
THIRD LINE Hospital-acquired sepsis(Most strains are likely to be resistant)	Cefotaxime or piperacillin-tazobactam or Ciprofloxacin and Amikacin	Same (Avoid Ciprofloxacin)

AGM GOVERNMENT HOSPITAL, TRICHY NICU – LEVEL 1

AGM GOVERNMENT HOSPITAL, TRICHY NICU – LEVEL 2

METHODOLOGY

This prospective study was done during the period of NOV 2010 to OCT 2011 the neonatal ward, department of PEDIATRICS, AGM government hospital, Trichy. This hospital is a tertiary care centre which services predominantly low income community. The study population constituted all neonates admitted with history and clinical features suggestive of neonatal sepsis. The sample size of 250 neonates with suspected sepsis was studied.

INCLUSION CRITERIA

All neonates with symptoms and clinical signs suggestive of sepsis with or without maternal and/or neonatal risk factors.

EXCLUSION CRITERIA

1) Birth Asphyxia
2) MAS
3) Physiological jaundice
4) Nosocomial infections (infants who were admitted for causes other than sepsis but develop features of sepsis there after)
5) ELWB<1kg

MANEUVER

This study was approved by the Ethical Committee of our institute. Neonates with suspected sepsis whose parents gave consent were enrolled for the study. After selection, a complete history with importance given to maternal risk factors (pre-maturity, intrapartum fever, PROM >18 hours, per vaginal examination >3 during delivery, etc.) and neonatal risk factors (feeding pattern, administration of native medicines, etc.) was taken for all newborns who were admitted with features of sepsis from the parent or care taker and a thorough physical examination was done. The findings were recorded in a predesigned proforma. All suspected septic newborns were investigated at the time of admission with chest x-ray, blood culture, C-reactive protein, lumbar puncture (if necessary) and peripheral smear studies for total WBC count, IT Ratio and toxic granules. The patients were treated with empirical antibiotics and modified based on these investigations. With all these data the risk factors, clinical presentation, etiology of sepsis, outcome of sepsis with the management will be analyzed. Based on clinical features and results of investigations, diagnosis of cases is categorized in to 3 groups as

1) Clinical sepsis
2) Probable sepsis
3) Proven sepsis

Clinical sepsis

Neonates in whom only clinical features are consistent with sepsis, without or one laboratory abnormalities or growth of organism in body fluid cultures.

Probable sepsis

Neonates in whom clinical and laboratory findings are consistent with sepsis but culture negative. The neonates who were positive for two or more haematological parameters.

Proven sepsis

Neonates with positive blood culture or positive cerebrospinal fluid culture or positive culture of other body fluids.

All the statistical analysis in this study was performed by using SPSS software version 10.0 package. Statistical tools are used in the analysis. P-value of <0.05 is considered statistically significant.

RESULTS

In this study 250 neonates with suspected sepsis admitted in the newborn ward were enrolled. Which included 158 male and 92female patients. There were 156 inborn and 94 outborn neonates. Sepsis work up was done for all the neonates including, C-reactive protein, peripheral smear studies for WBC counts, immature to nature leucocytes ratio (IT Ratio) and the presence of toxic granules in neutrophils, Micro ESR Blood culture, CSF culture(wherever required). & X ray chest.

Table - 1

Distribution of cases according to place of delivery

(n = 250)

Cases	Intramural n (%)	Extramural n (%)	Total
Newborn sepsis	156 (62.4)	94 (37.6)	250

P value < 0.05

Newborn sepsis accounted for 156 (62.4%) in the inborn and 94(37.6%) in the outborn category (Table 1).

Table 2

Distribution of case according to sex

(n = 250)

Cases	Male	Female	Total
Newborn sepsis	158	92	250

P Value < 0.05

There was significant difference for prevalence of sepsis between male (63.2%) and female (36.8%) neonates. (Fig. 2)

Male to female ratio was 1.5 : 1 (Table 2).

Fig. 2

Distribution of case according to sex

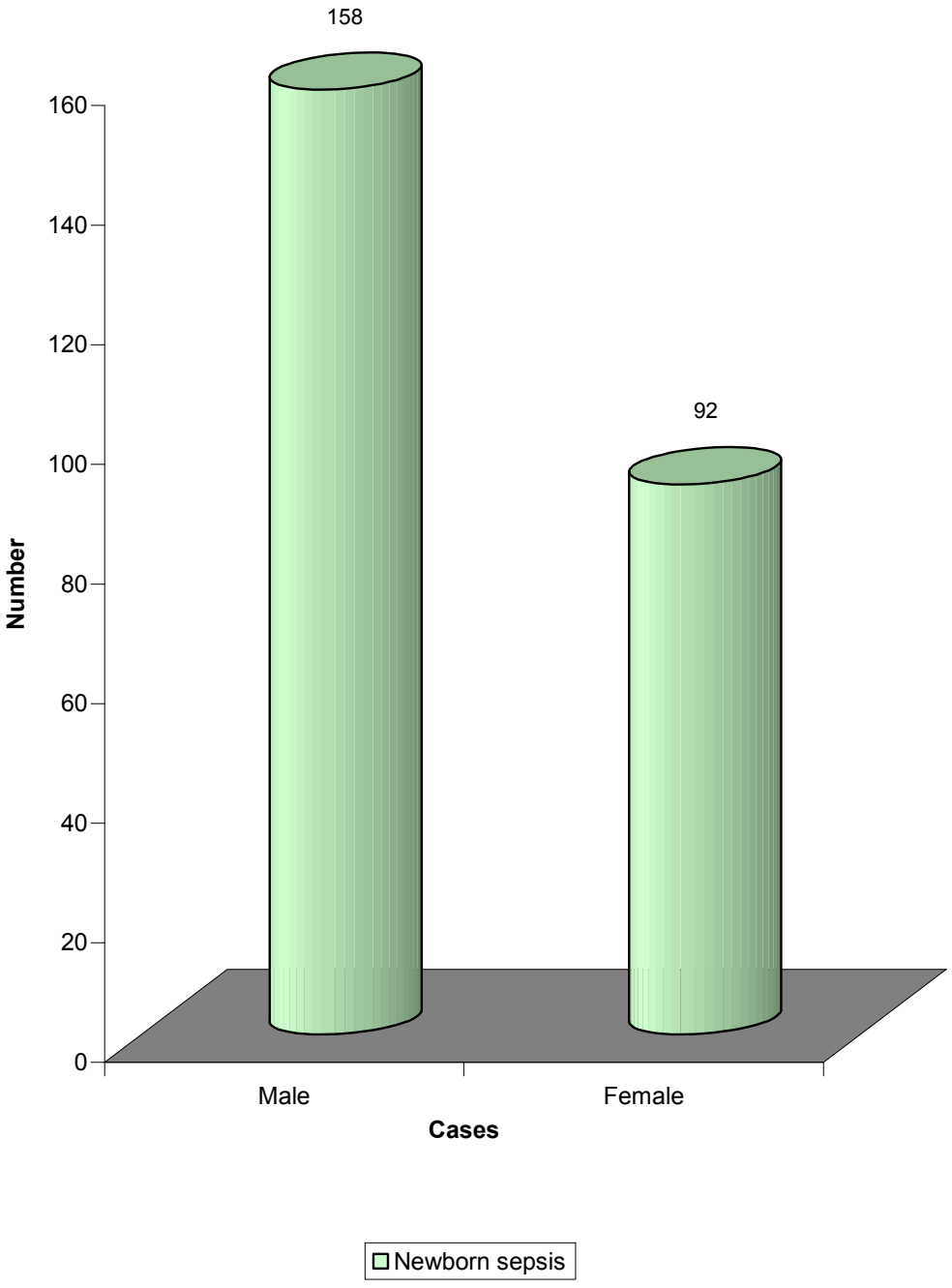


Table - 3

Distribution of cases according to the weight

(n = 250)

	Low Birth weight < 2.5 kgs n(%)	**Normal Birth weight > 2.5 kgs n(%)**	**Total n**
Newborn sepsis	164(65.6)	86(34.4)	250

P Value < 0.05

Table 3 shows that sepsis was significantly much higher in low birth weight (65.6%) than normal birth weight (34.4%).

Based on the sepsis results the diagnosis was categorized into 3 groups.

Table - 4

Categories of Neonatal sepsis

(n = 250)

Categories of sepsis	n	%
Clinical Sepsis	116	46.4
Probable Sepsis	84	33.6
Proven Sepsis	50	20

Table 4 shows that among the 250 neonates admitted, 116 neonates were clinical sepsis, 84 were probable sepsis and 50 were proven sepsis.

Fig. 3

Classification of Neonatal sepsis

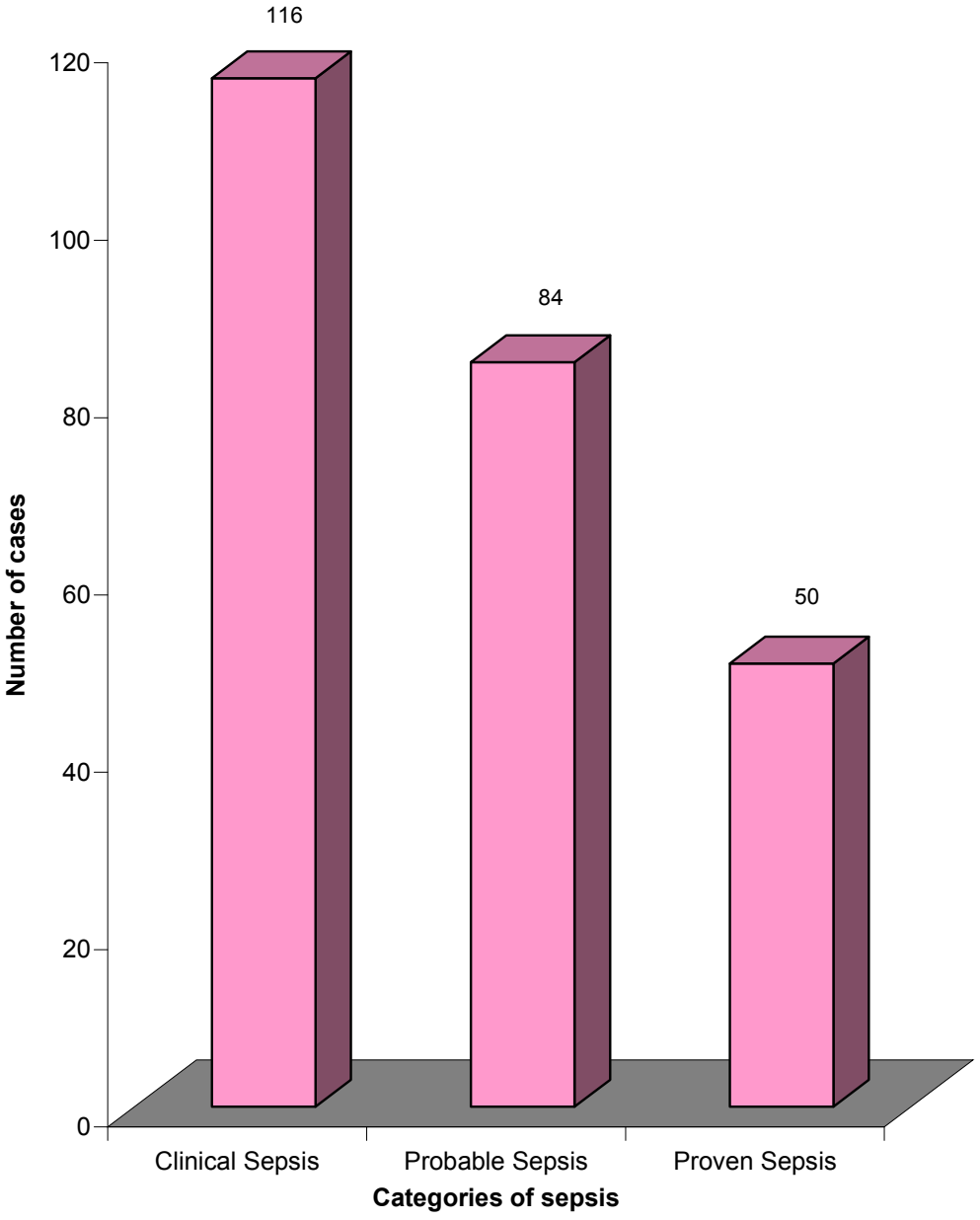


Figure 3 shows that out of the 250 neonates with suspected sepsis 50(20%) are proven sepsis, 84(33.6) are probable sepsis and 116(46.4) are clinical sepsis.

Based on the age at the time of clinical presentation neonates were classified as early onset sepsis (EOS) when the age is less than 72 hours and as late onset sepsis (LOS) when the age is more than 72 hours. Table 5 shows that of the 250 neonates 136 were early onset sepsis and 114 were late onset sepsis.

Table - 5

Early onset vs late onset sepsis

(n = 250)

Age at clinical presentation	**Proven Sepsis n (%)**	**Probable Sepsis n (%)**	**Clinical Sepsis n (%)**	**Total n**
Early Onset Sepsis	28 (20.5)	44 (32.3)	64 (47.2)	136
Late Onset Sepsis	22 (19.3)	40 (35.1)	52 (45.6)	114

Clinical features

The most common clinical presentations in this study were refusal to suck, lethargy, weak cry, Tachypnea, chest retractions and fever. The frequency and percentage of occurrence of clinical signs are shown in the following Table 6. The distribution of these clinical signs among the sepsis groups, namely clinical, probable and proven sepsis is shown in (Table 7) it is evident from this table that the percentage of non specific clinical sign like refusal to suck, lethargy, fever are almost equally distributed among the there groups of sepsis so that the presence of there signs were of no significance.

Table - 6

Frequency of Clinical Symptoms and signs

Clinical Signs	n	%
Refusal to suck	228	91.20
Lethargy	216	86.40
Weak cry	180	72
Tachypnoea	158	63.2
chest Retractions	142	56.8
Fever	126	50.4
Incessant cry	116	46.4
abdominal distension	86	34.4
Grunt	72	28.8
Seizure	32	12.8
Hypothermia	30	12
Shock	28	11.2
Apnea	26	10.4
Bulging fontanelle	16	6.4
Sclerema	10	2.5

Where as % of tachypnea, chest retraction, grunt, incessant cry, Abdominal distension were more in probable and proven sepsis than clinical sepsis. Chest Xray showed broncho pneumonia for 17 neonates and pneumonitis changes in 28 neonates.

Signs like chest retraction, grunt and abdominal distenstion were associated with infections like pneumonia, in most clinical situations. These signs are found in higher percentage in probable and proven sepsis group than in clinical sepsis group. It is also observed that the occurrence of signs like seizure, shock and bulging fontanelle were not found in the clinical sepsis group Table 5.

Table - 7
Clinical symptoms and signs

Symptoms and Signs	Proven n=50	Probable sepsis n=84	Clinical Sepsis n=116	Total
Refusal to suck	50	78	100	228
Lethargy	46	78	92	216
Weak cry	40	86	54	180
Tachypnoea	38	74	46	158
chest Retractions	30	66	46	142
Fever	30	64	32	126
Incessant cry	20	56	40	116
abdominal distension	20	44	22	86
Grunt	24	32	16	72
Seizure	18	14	0	32
Hypothermia	18	12	0	30
Shock	14	12	0	26
Apnea	14	6	0	20
Bulging fontanelle	12	4	0	16
Sclerema	10	0	0	10

Outcome in neonatal sepsis

At the time of admission, sepsis screen was done for all the neonates enrolled and newborn with high clinical suspicion were given antibiotic therapy with Ampicillin and gentamycin. Antibiotics were administered intravenously. The neonates were periodically reviewed clinically and with laboratory results. Based on the organism grown in culture the antibiotic regimen was changed according to the sensitivity pattern. Table 8 shows that, 58(23.2%) neonates expired and 192(76.8%) neonates recovered. Among the expired group (32) 55% were in the proven sepsis group. In the probable sepsis group 26(44%) out of the 43 neonates expired and none expired in the clinical sepsis group (Fig. 4).

Table - 8

Mortality in 3 types of sepsis

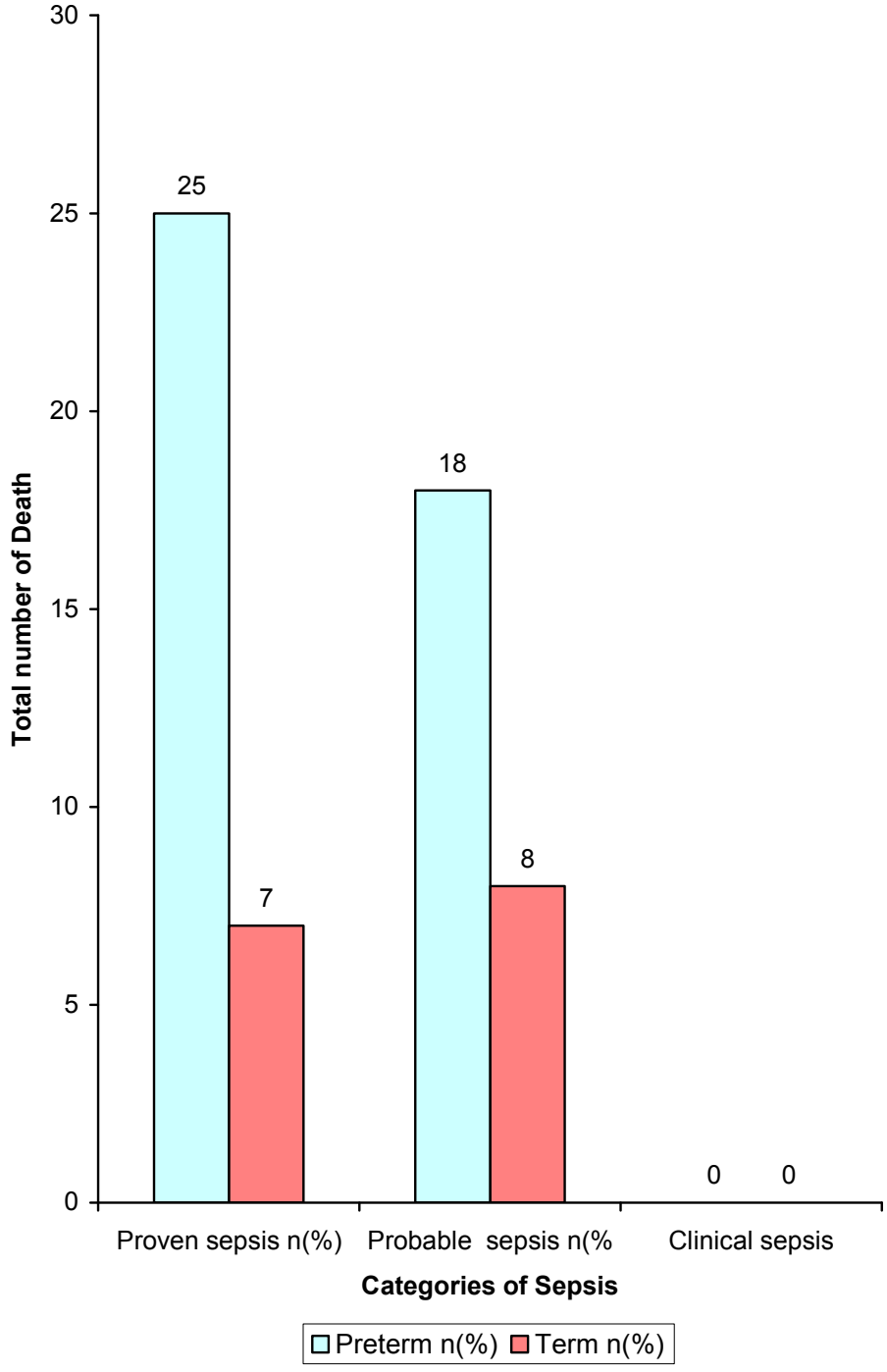
(n = 58)

Outcome	Proven sepsis n(%) n=32		Probable sepsis n(%) n=26		Clinical sepsis	
Expired	LBW n(%)	Normal birth weight n(%)	LBW n(%)	Normal birth weight n(%)	LBW n(%)	Normal birth weight n(%)
	25 (43.10)	7 (12.06)	18 (31.03)	8 (13.79)	-	-

Significantly higher group of death in LBW babies (43). Of which 25 were in proven sepsis and 18 were in probable sepsis. Normal weight had mortality of 15 of which 7cases were in proven sepsis and 8cases were in probable sepsis.

Fig. 4

Mortality in 3 types of sepsis



Results were further analyzed in the following order:

1. Causative organisms and their sensitivity pattern
2. Indicators of probable sepsis (SEPSIS SCREEN)
3. Perinatal risk factors
4. Laboratory investigations in early identification

Causative organisms and their sensitivity pattern

In this study, of the 250 neonates, blood culture was positive in 50 neonates. CSF culture was done in 28 neonates who had features of meningitis. Among them none had positive CSF culture but showed positive cell cytology in 12 cases and these neonates were blood culture positive 3 neonates had neuroimaging findings of hydrocephalus as sepsis sequelae. Majority of infections were caused by gram negative organisms in culture proven cases About 84% of infections were caused by gram negative organisms (Table 9).

Table - 9

Organisms causing sepsis

(n =50)

Proven sepsis	**n**	**%**
Grampositive	8	16
Gram negative	42	84

Table 9 shows 84% of Infections were caused by gram negative organisms. Gram positive were 16%.

Table - 10

Organism and their frequency

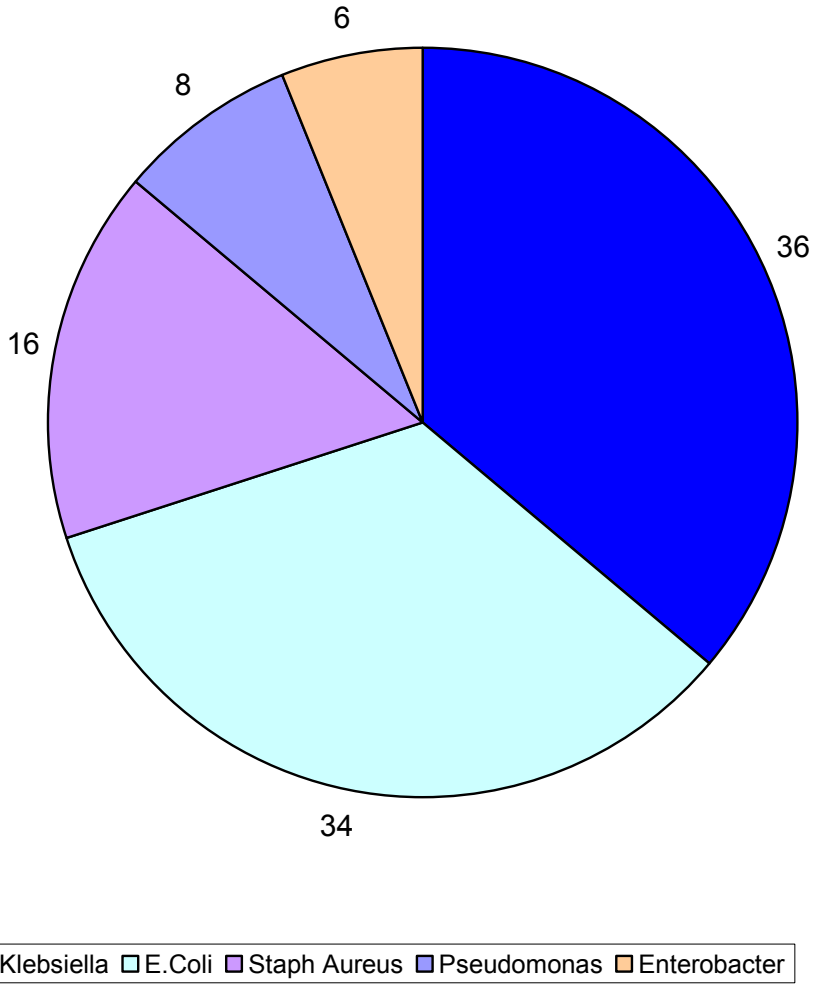
(n = 50)

Specific organisms	N	%
Klebsiella	18	36
E.Coli	17	34
Staph Aureus	8	16
Pseudomonas	4	8
Enterobacter	3	6

Table 10 shows Klebsiella was the commonest organism with 36%, E.Coli was 34%. Pseudomonas and Enterobacter had 8% and 6% respectively. Among the gram positive staph aureus was the only organism 16% (Fig.5).

Fig. 5

Organisms and their frequency (%)



Among the early onset sepsis 91.5% were gram negative organisms and 8.3% were gram positive organisms Table. 11. Fig. 6 shows klebsiella were 45.8% and E.Coli were 41.6% in early onset sepsis. Staph aureus were 8.3%. In late onset sepsis klebsiella and E.Coli were 26.9%, pseudomonas were 15.3%. Staph aureus were 23%.

Among late onset sepsis (76.7%) were gramnegative organisms, grampositive were 23%. Pseudomonas (15.3%) were found in late onset sepsis in which 2 newborns had septic arthritis, 1 newborn had Right foot cellusitis, 1 had scalp abscess.

Table - 11

Organism in Early and late onset sepsis

(n = 50)

	Klebsiella n (%)	**E.coli n (%)**	**Staph.aureus n (%)**	**Pseudomonas n (%)**	**Enterobacter n (%)**
Early onset sepsis	11 (45.8)	10 (41.6)	2 (8.3)	0	1 (4.1)
late onset sepsis	7 (26.9)	7(26.9)	6 (23)	4 (15.3)	2 (7.6)

Table 11 shows among the early onset sepsis 91.5% were gram negative organism. Among late onset sepsis (76.7%) were gram negative organism and 23% gram positive organism. In both group Gram negative organisms were common.

Fig. 6

Organism in Early and late onset sepsis

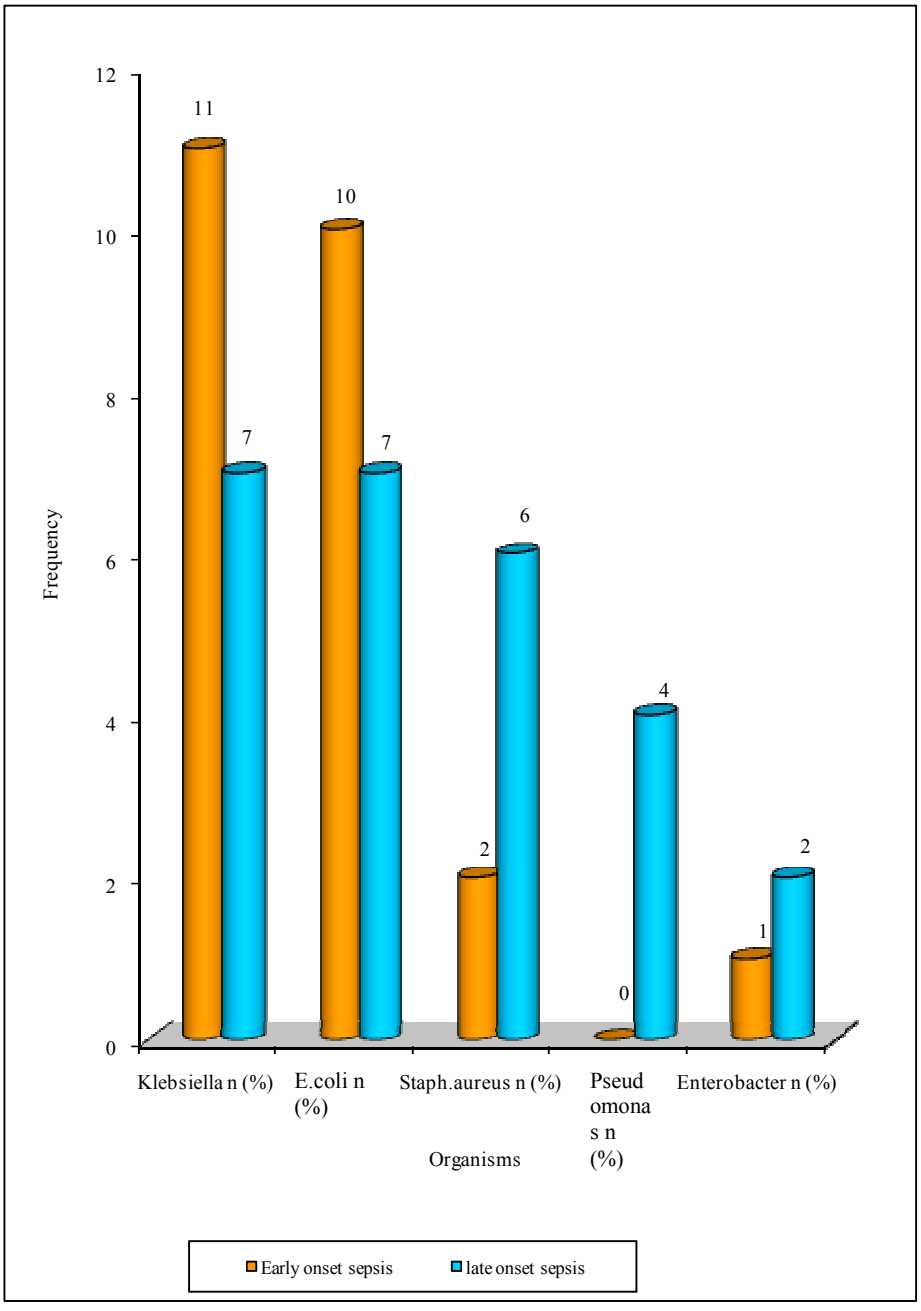


Table - 12

Mortality in Various Organism

Specific organisms	Early onset sepsis n (%)	late onset sepsis n (%)	Total n
Klebsiella	9(28.1)	3(9.3)	12
E.Coli	8(25)	3(9.3)	11
Staph Aureus	1(3.1)	4(12.5)	5
Pseudomonas	0(0)	3(9.3)	4
Enterobacter	1(31)	0(0)	1

Table 12 shows mortality is high with gram negative organism in early onset sepsis. In late onset sepsis Gram positive had high mortality 12.5%.

Antibiotic sensitivity pattern

In this study the sensitivity pattern of various organisms to antibiotics are described as follows (Table 13).

Klebsiella was sensitive to amikacin 72.1% and resistant to ampicillin and cetotaxim in 77% and 11.1% neonates respectively E.coli was sensitive to cefotaxim 93.9% amikacin in 52.8% and ciprofloxacin in 52.9%, it was resistant to ampicillin in 92%.

Staphylococcus aurues was sensitive to amikacin 12.5% and cloxacillin 87.5%. It was resistant to ampicillin 87.5% ciprofloxacin 75%, cefotaxim 87.5%.

Staphylococcus aurues was sensitive to Meropenam 75% and Vancomycin to 87.5%.

Pseudomonas was sensitive to 75% to ceftazidime and amikacin 50% enterobacter was sensitive to cefotaxim and ceftazidime as 66.6%.

Table 13

Organisms and their sensitivity pattern

Organism	S	Ampicillin n (%)	Gentamycin n(%)	Amikacin n(%)	Ciprofloacin n(%)	Cloxacillin n(%)	Cefotaxime n(%)	Ceftazidime n(%)	Meropenam n(%)	Vancomycin n(%)
Klebsiella n = 18	H	2 (11.1)	2 (11.1)	8 (44.4)	6 (33.3)	-	8 (44.4)	8 (44.4)		
	M	2 (11.1)	7 (38.8)	5 (27.7)	5 (27.7)	10 (55.5)	8 (44.4)	9 (50)		
	R	14 (77)	9 (50)	5 (27.7)	7 (38.8)	8 (44.4)	2 (11.1)	1 (5.5)		
E.coil n = 17	H	2 (11.7)	3 (17.6)	5 (29.4)	7 (41)	-	9 (52.9)	9 (52.9)		
	M	3 (17.6)	6 (35.2)	4 (23.5)	5 (29.4)	9 (52.9)	7 (41)	7 (41)		
	R	12 (92)	8 (47)	8 (47)	5 (29.4)	7 (41)	1 (5.8)	1 (5.8)		
Staph.aureus n = 8	H	0	0	0	0	4 (50)	0	0	6 (75)	7 (87.5)
	M	1 (12.5)	1 (12.5)	1 (12.5)	2 (25)	3 (37.5)	1 (12.5)	1 (12.5)	2 (25)	1 (12.5)
	R	7 (87.5)	7 (87.5)	7 (87.5)	6 (75)	1 (12.5)	7 (87.5)	7 (87.5)	0	0
Pseudomonas n = 4	H	0	0	0	0	0	0	3 (75)	3 (75)	1 (25)
	R	1 (25)	2 (50)	2 (50)	1 (25)	1 (25)	2 (50)	1 (25)	1 (25)	3 (75)
	M	3	2 (50)	2 (50)	3 (75)	3 (75)	2 (50)	0	0	0
Enterbacter n = 3	H	0	0	0	1 (33.3)	1 (33.3)	2 (66.6)	2 (66.6)	2 (66.6)	
	R	1 (33.3)	1 (33.3)	1 (33.3)	2 (66.6)	2 (66.6)	1 (33.3)	1 (33.3)	1 (33.3)	
	M	2 (66.6)	2 (66.6)	2 (66.6)	0	0	0	0	0	

S – Sensitivity; H – Highly Sensitive; M – Moderately Sensitive; R –Resistant

Table - 14

The Distribution of Maternal Risk Factors among Cases

Risk Factors	Proven Sepsis n	Probable Sepsis n	Clinical Sepsis n	Total	Statistical tools (p)
Foul Smelling liquor	21	22	8	59	1.237
Prolonged Rupture of Membrane > 18 Hrs	17	20	6	43	1.048
Prolonged labour > 24 Hrs	22	17	32	71	1.780
Unclean or vaginal Examination > 3	32	68	78	178	0.001
Gestattional age < study Or Wt < 2.5 kgs	30	52	82	164	.0.000

Maternal Risk Factors

In this study maternal risk factors were analyzed for early onset sepsis only. Among the 114 deliveries in the EOS group, 74 were vaginal deliveries, 5assisted and 35were caesarian deliveries. Among the neonates whose mothers had complete tetanus toxoid immunization in the ante-natal period, the percentage ofsepsis was higher in the clinical sepsis group whereas in the proven and probable sepsis groups, the percentage of occurrence of sepsis was low. This is not statistically significant ($p>0.05$). Among the 6 home deliveries, 6 deliveries were conducted by trained dais. The risk of premature rupture of membranes for >18 hours was present, in which a higher percentage was found in the probable sepsis group, but it is not statistically significant ($p>0.05$).

There is no significant difference in occurrence of sepsis with prolonged labour more than 24 hrs in 3 sepsis group.

A significant percentage of sepsis occurred in all the three groups of sepsis when more than three vaginal examinations were done during delivery. It was statistically significant ($p<0.05$). The most common maternal illness complicating pregnancy was anemia (80 neonates) followed by pregnancy induced hypertension (38 neonates). There is no significant difference in the occurrence of sepsis in neonates born for mothers who had antenatal illnesses.

MODIFIABLE RISK FACTORS

Based on the above analysis, it is found that perinatal risk factors like, unnecessary vaginal examinations, low gestational age and low birth weight are modifiable.

Table - 15

The Correlation of Sepsis Screen Parameters in the neonatal sepsis babies

(n = 250)

Sepsis Screen	Proven Sepsis n=50[%]	Probable Sepsis n=84[%]	Clinicalsepsis n=116[%]	Total	P value
CRP	45(90)	74(88)	75(64.6)	194(77.6)	0.523
WBC Count<5000	12(24)	32(38)	8(6.9)	52(20.8)	0.004
Toxic granules	36(72)	64(76)	14(12)	114(45.6)	0.378
IT ratio>0.2	42(84)	56(66.6)	8(6.9)	106(42.4)	0.031
Micro ESR >15mm/hr	20(40)	50(59.5)	11(9.4)	81(32.4)	.0.027
Two or more parameters	47(94)	74(88)	0	121(48.4)	0.001

The table above shows among the 84 probable sepsis neonates 74 were CRP positive. In this study C-reactive protein was qualitatively estimated and they were positive (>1.6mg/dL) in 194 neonates, 45 in proven sepsis, 74 in probable sepsis, 75 in clinical sepsis. This was found to be statistically insignificant ($p > 0.05$). WBC Counts <5000 was found in 24% in proven, 38% in probable Sepsis and 6.9% in clinical sepsis. This was found to be statistically significant ($p < 0.05$). Among the 250 neonates IT Ratio > 0.2 was found in 42.4% neonates, 42.0% in proven sepsis, 56% in probable sepsis and 8% in clinical sepsis.

This was found to be statistically significant ($p < 0.05$). Toxic granules were positive in 114 neonates, 72% in proven sepsis, 64 % in probable sepsis and 12% in clinical sepsis ($p > 0.05$). This was statistically insignificant Micro ESR > 15mm/hr were 40% in culture proven, 59.5% probable sepsis, and 9.4% in clinical sepsis. This was statistically significant p value < 0.05.

Table - 16

The Sensitivity, Specificity, Positive Predictive Value and Negative Predictive Value of Sepsis Screen Parameters

Sepsis Screen Parameter (%)	Sensitivity (%)	Specificity (%)	Positive Predictive Value (%)	Negative Predictive Value (%)
C-reactive Protein Positive : >1.6mg/dl)	83.1	37.2	53.1	91.0
Leucopenia (TLC <5,000 CELLS/mm)	47.2	76.2	54.2	90.0
Toxic Granules	63.7	77.3	46.0	67.0
I/T RATIO > 0.2	66.6	77.3	33.0	88.0
M-ESR >15 mm in the1st hour	72.3	61.3	36.0	86.0
Two or More Tests Positive	56.5	85.8	95.3	29.3

The above table shows the sensitivity, specificity, positive predictive value and negative predictive value when hematological parameters are combined. The sensitivity of CRP was higher than the sensitivity of any of these combinations. But the specificities of varying combinations were lower than the specificity of CRP.

DISCUSSION

Sepsis is the commonest cause of neonatal morbidity and mortality. It is responsible for about 30-50% of total neonatal deaths.[23] Sepsis related morbidity and mortality is largely either preventable or treatable with rational antimicrobial and supportive therapy. LBW is a strong risk factor for neonatal sepsis due to multiple reasons. Unsafe delivery or unclean delivery at inappropriate place is another important predisposing factor for sepsis.

Earliest clinical features of neonatal sepsis are often subtle and non specific therefore a high index of suspicion is needed for early diagnosis specially so if risk factors are also present. In the present study majority of neonates presented with refusal to feeds (91.2%) lethargy (86.4%) tachyphea (75%) and fever (50.4%) which is comparable to various other study[5]. In this study documented hypothermia (12%) were apnea in (10.4%), convulsions (12.8%) which is correlated well with various study.[24]

Male neonates were reported to be affected more with sepsis as compared to females in some studies.[8,25] This is in concordance with our study as well ($p < 0.05$) Bias for male sex, place of study, sample including other factors may be responsible for increased number of male cases in these studies.

There was statistically significant difference ($p < 0.05$) in sepsis cases born in the study institution (inborn) as compared to those brought from outside (out born). In inborn category (62.4%) had sepsis as compared to (37.6%) in out born group.

This is because of the fact that more Antenatal case are referred from periphery at last stage of labour having greater perinatal risk factors, more number of newborn are exposed to organism in the hospital environment in postnatal ward.

Early onset sepsis was document significantly more as compared to late onset sepsis ($p < 0.05$)[1,4]. Early onset neonatal sepsis in general is more common because of various high risk perinatal factors for sepsis operate during this period.

LBW is a strong risk factor contributing to sepsis. In this study birth weight is inversely related to development of sepsis which is statistically highly significant ($p < 0.000$). This is in concordance with other studies where low birth was found to be important risk factor for sepsis.[1,4] LBW babies are mostly also premature and are predisposed to sepsis due to multiple reasons like immune incompetence at various levels of defense, more subjected to invasive interventions etc.

Mortality due to sepsis is 23.2% which is comparable to other hospital based studies.[4,10]

Maximum culture positive cases were seen in neonates with EOS as compared to neonates with LOS in the present study. This could be due to ascending infection following rupture of membranes or through the infected birth canal or at the time of resuscitation of the newborn in the labour room. Immature immunological responses of the neonates in the first week of life makes them more susceptible to infections in this period.

Similar observations were made in the studies by other authors[3,26,27]. The proportion of culture positive septicemia cases in this study was higher among the low birth weight neonates as compared to the normal birth weight neonates[23]. The rate of infection is inversely proportional to the birth weight, and low IgG levels due to impaired cellular immunity in the low birth weight neonates contributes to the increased susceptibility to infections in these neonates.

Preterms are more susceptible to infections due to inherent deficiencies of both humoral and cellular defense mechanisms. It is suggested that the incidence of septicemia increases with the decreased gestational age of the neonates[23], thereby making preterms more vulnerable to infection. Studies by some authors showed a higher proportion of cases among the term neonates compared to the preterm neonates.[3] In this study, the mean duration of hospitalization in proven sepsis group was significantly longer.

Maximum number of cases (64.9%) was seen in neonates delivered by spontaneous vaginal delivery in the present study. The higher rates of neonatal septicemia in vaginally delivered neonates may be due to the surface colonization of the neonate with the microbial flora of the birth canal during vaginal delivery. In the present study, the higher proportion of culture positive septicemia among hospital inborn neonates points to a probable hospital acquired source of infection in them.

The present study clearly shows a higher proportion of cases having unclean PV before delivery, and prolonged labour for >24 hrs as the commonest predisposing factors in developing definitive septicemia.

In the present study, 50 /250 cases studied were culture positive, giving a positivity rate of 20%. These results were comparable with the studies conducted by other authors while, some authors showed a very low culture positivity rate (range = 25% to 42%) in their study. The low culture positivity in these studies may be due to intrapartum administration of antibiotics to mothers which can affect the blood culture results in neonates.[28]

Gram negative organisms formed the majority of the isolates as compared to Gram positive organisms (84% vs 16% respectively) in the present study. Klebsiella pneumoniae (36%) was the predominant isolate, followed by E.coli (34%). Similar observations were made in other studies.[3,5,9] However studies by few other authors showed S.aureus as the commonest isolate[29], while P.aeruginosa was the commonest athogen isolated in another study.[10] NNPD data 2002-2003 shows that amongthe intramural births, Klebsiella pneumonia is the most frequently isolated pathogen (32.5%), followed by Staphylococcus aureus (13.6%) while, among the extramural neonates (referred from community/other hospitals); Klebsiella pneumonia is again the commonest organism isolated (27%), followed by Staphylococcus aureus (15%) and Pseudomonas (13%).

The CRP test had high sensitivity but had low positive predictive value in diagnosing septicaemia.

Various studies by other authors show variable results to this test.[15,18,28] The differences in the results of this parameter shown by the different studies is due to variations in the diagnostic criteria, the time of onset of infection (early or late) and different methods of CRP estimation. Neonatal septicemia is associated with leucopenia.[30] In the present study, Leucopenia i.e. Total WBC counts <5000 cells/cu.mm was taken as the diagnostic criteria for detecting neonatal septicemia. Leucopenia had a low sensitivity, and positive predictive value but, a very high specificity, negative predictive value similar to the observation made by another study.[17,31] The differences in the results of this parameter in different studies may be due to variations in the blood sampling time, the severity of infection, the diagnostic criteria followed, the age of the neonates.

I/T ratio is ≤ 0.16 at birth and declines to a peak value of 0.12 after 72 hours of age. A ratio of 0.2 is a highly sensitive marker of neonatal septicemia.[30] In this study, I/T ratio had a high sensitivity, specificity and the negative predictive values of 66.6%, 77.3% and 88% respectively while, the positive predictive value was comparatively low at 33%. Different studies have shown variable results in this parameter which may be due to the variations in the blood sampling time, the severity of infection, the age of the

neonates, the diagnostic criteria followed and the reduced sensitivity of this test after the first week of life.[28]

Micro-ESR had low positive predictive value, but a higher specificity and negative predictive value in detecting septicemia in the study. Similar observations were made by the other authors. micro-ESR was a poor predictor of neonatal septicemia in our study compared to the studies conducted by other authors. When two or more sepsis screen tests were combined together, the sensitivity and the negative predictive values decreased to 56.5% and 29.3% respectively, while the specificity and the positive predictive values increased to 85.8% and 95.3% respectively and was found to be statistically significant in detecting septicemia compared to the individual sepsis screen tests in this study. Similar observations were made by the other authors.[17,28]

Maximum case fatality was seen in the early onset septicaemia caused by gram negative organisms, The reported mortality rate in various studies from India ranges between 45% to 58% with most studies reporting a higher mortality rate (range = 37% to 47%) among the EOS cases.[30]

In this study, gram negative organisms E.coli and Klebsiella were found to be sensitive to amikacin followed by ciprofloxacin, third generation cephalosporins and gentamycin. For most of the gram negative organisms, gentamycin and third – generation cephalosporins were effective Staphylococcus aureus were sensitive to amikacin 72.1% and cloxacillin in 55.5% neonates and to meropenam 75% and vancomycin 87.5% neonates.

E.coli were resistant to ampicillin in 92% neonates and to cefotaxime in 5.8% neonates and klebsiella to ampicillin in 77% and cefotaxime in 11.1 neonates. Staphylococcus aureus were resistant to ampicillin in 87.5% and ciprofloxacin in 75% neonates. In general, the sensitivity of the gram negative isolates to Amikacin supports continued use of this agent in the initial, empirical treatment of septicemic neonates in our hospital, and also supports WHO recommendations that management of young infants up to age 2 months include parenteral use of benzyl penicillin or ampicillin plus an aminoglycoside such as Gentamycin, Amikacin.

CONCLUSION

Blood culture was positive in 50**(20%)** neonates. About 84% of infections were caused by gram negative organisms, **Klebsiella** being the commonest organism causing sepsis. For most of the gram-negative organisms, Amikacin and third generation cephalosporins were effective. The common clinical presentations are lethargy (65.8%), refusal to suck (65.8%), tachypnea (98.3%) and fever (58.3%). When clinical signs like chest retractions, grunt and Abdominal distension, bulging fontanelle were present the likelihood of proven sepsis is high.

The incidence of sepsis was shown to be higher among neonates with Perinatal risk factors such as risk factors, multiple vaginal examination during labour, lowbirthweight and preterm neonates. CRP has a high negative predictive value but low positive predictive value with sensitivity and specificity of 83% and 37.2% respectively.

The specificity of combinations of hematological parameters were higher than that of CRP. The positive predictive value and specificity was high when two or more tests were combined together. Neonatal septicemia is still a leading cause of mortality and morbidity in developing countries like India. It is more common among males, low birth weight and preterm neonates. It is also found to be more common among the hospital inborn neonates with spontaneous vaginal delivery. Early onset septicemia is more common compared to late onset septicemia. Gramnegative organisms are the

predominant causative agents in neonatal septicemia. Infections are a major threat to the premature and low birth weight neonates with multidrug resistant microorganisms emerging as a major problem.

Blood culture is still the “Gold standard” for the diagnosis of septicemia in neonates and should be done in all cases of suspected septicemia. In view of the changing spectrum of the causative agents of neonatal septicemia and their antibiotic susceptibility patterns from time to time and from one hospital to another, a positive blood culture and the antibiotic susceptibility testing of the isolates are the best guide in choosing the appropriate antimicrobial therapy in treating neonatal septicemia.

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Annexure 1

Proforma for Neonatal Sepsis

SR No: ☐ IP No. ☐

Name Sex: M / F Term/Preterm:

Gestation age: _____ wks Age on admission:____days

Ballards Scoring _____ wks ____hrs

Birth Wt: _____gm

Wt at admission: _____gm

Date of Birth ☐☐☐☐☐☐☐☐

Date of Admission: ☐☐☐☐☐☐☐☐

Date of Discharge: ☐☐☐☐☐☐☐☐

Date of Death : ☐☐☐☐☐☐☐☐

Duration of stay :_____ days

Self Referral : Y / N

Referred from facilities

1. Home
2. HSC
3. PHC
4. Taluk HQ Hospital
5. District HQ Hospital
6. Tertiary referral unit
7. Private OP
8. Private Nursing Home
9. None

ANTE-NATAL DATA

1. Total no of hospital visits

   [0/1/2/3/4/5/more]

2. Total no of home visits by health worker

   [0/1/2/3/4/5/more]

3. IFA intake [Y/N]

4. Tetanus toxoid injections: [Y/N]

MATERNAL DELIVERY DATA

2. Mode of delivery: [1/2/3] [1-Vaginal/2-Assisted/3-caesarian]

3. Place of delivery: [1/2] [1-Home/2-Institution]

   - Home: [1/2]

     [1-Untrained/2-Trained personnel]

   - Institutional: [1/2/3/4/5/6]

     [1-HSC/2-PHC/3-Taluk HQ hospital/4-District HQ hospital/5-Tertiary referral unit/6-Private Nursing home]

   - Conducted by: [1/2/3/4]

     [1-Nurse/2-Doctor/3-Obstetrician/4-None]

4. Type of facility

   - Equipment: [1/2/3] [1-Labour room/2-Theatre facilities/3-facilities for neonatal care]

MATERNAL RISK FACTORS

2. Birth order [1/2/3/4/5/more]
3. Multiple gestations [Y/N/NK]
4. Intrapartum fever [Y/N/NK]
5. PROM > 18hrs [Y/N/NK]
6. Vaginal examinations >3 in labour [Y/N/NK]
7. Meconium staining: [Y/N/NK]
8. Cloudy amniotic fluid: [Y/N/NK]
9. Foul smelling amniotic fluid: [Y/N/NK]
10. UTI in the last trimester: [Y/N/NK]
11. Maternal Illness: [1/2/3/4/5]

    [1-PIH/2-Anaemia/3-Diabetes/4-Heart disease/5-Others]
12. Maternal education: _____Paternal education: _____

NEONATAL RISK FACTORS

1. Birth asphyxia: [Y/N/NK]
2. Cord status: [1/2/3] [1-Bandage/2-Ointment/3-Dry]
3. Feeding
    a. Feeding pattern [1/2/3] [1-Exclusive/2-Not exclusive]
    b. Prelacteal feeds: [Y/N] If Yes specify _____
4. Clean clothes: [Y/N]
5. Bath to the baby: [Y/N]
6. Home remedies: [Y/N/NK] If Yes specify _____

CLINICAL EXAMINATION

1. Superficial infections
    - Umbilical sepsis: [Y/N]
    - Pyoderma: [Y/N]
    - Conjunctivitis: [Y/N]
2. Apneic spells: [Y/N]

SYMPTOMATOLOGY

General

- Lethargy
- Refusal to suck
- Poor cry
- Poor weight gain
- Incessant cry

Respiratory System

- Respiratory rate ___/min
- Chest retractions
- Grunt
- Apnea

Central nervous system

- ALOC
- Seizures

- Bulging Fontanels
- Poor neonatal reflexes

Shock

Temperature

- Fever
- Hypothermia

Gastro intestinal tract

- Abdominal distention
- Vomiting
- Diarrhea

Others

- Sclerema
- Bleeding

LABORATORY FINDINGS

Blood culture: [Positive/Negative]

If positive- organism and sensitivity

C-reactive protein: [Positive/Negative]

Peripheral smear studies:

WBC Count: [1/2/3] [1-<5000/2-5000-15,000/3->15,000]

IT Ratio>0.2: [Y/N]

Toxic granules: [Y/N]

X-Ray chest and abdomen

Lumbar puncture

- Cells
- Protein
- Sugar
- Culture & sensitivity

OUTCOME

1. Recovered
2. Expired

FINAL DIAGNOSIS

Annexure – 2

BLOOD CULTURE

Blood for culture should be drawn under strict aseptic condition. The media is warmed to room temperature prior to inoculation. The skin over the vein is prepared as for a surgical procedure. It is cleaned with 70% alcohol and povidone iodine is applied. One minute is allowed for the iodine to act. With sterile gloves adequate quantity of blood using a sterile dry syringe is taken and inoculated directly into blood culture media (brain heart infusion broth), using the same needle. Blood to medium ratio was 1:10.

Annexure – 3

RHELAX CRP

Principle

RHELAX CRP slide test is a qualitative test for detection of CRP which is based on the principle of agglutination. The test specimen (serum) is mixed with RHELAX CRP latex reagent and allowed to react. If CRP concentration is greater than **1.6 mg/dL** a visible agglutination is observed. If CRP concentration is less than 1.6 mg/dL, then no agglutination is observed.

name	ip no	weight< 2.5kgs	weight> 2.5kgs	<or= 3days	late onset sepsis>72 hrs	vaginal examinatio n>3	Foul smelling liquor	exclusive breast feeds	apnea	lethargy	refusal to suck	incessant cry	respiratory distress	chest retraction	grunt	fever	hypothermia	bulging fontanelle	shock	abdominal distension	sclerema	crp	wbc<5000	Micro ESR	IT RATIO>0.2	toxic granules	blood culture positive n=50	ECOLI n=18	KLEBSIELLA n	STAPYLOCOCCUS n=8	PSEUDOMONAS n=4	ENTEROBACTER n=3	CLINICAL SEPSIS n=116	PROBABLE SEPSIS n=84	PROVEN SEPSIS n=50	outcome Expired
B/O NIRMALA	15206	yes	no		2		Yes	No	NO	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	No	No	Yes	Yes	positive	POSITIVE							yes	YES
B/O LAKSHMI	15208	no	yes		1		Yes	No	Yes	No	Yes	Yes	No	Yes	No	No	Yes	No	No	No	No	Yes	No	No	No	Yes	Yes	no						E		no
B/O GOVINDAMMAL	15209	yes	no		2		Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No	Yes	No	No	No	Yes	Yes	no					E			no
B/O SAROJA	15201	yes	no		1		Yes	No	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	No	Yes	No	No	Yes	Yes	positive		POSITIVE					yes	no
B/O RADHHA	15210	no	yes		2		No	Yes	NO	No	No	No	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	no					E			no
B/O MARIAMMAL	15212	yes	no		3		No	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	Yes	No	No	No	No	no					E			no
B/O PADMA	15214	yes	no		1		No	No	NO	No	Yes	Yes	Yes	No	Yes	No	Yes	No	No	No	No	No	No	Yes	No	No	No	no						E		yes
B/O RAJALAKSHMI	15216	yes	no			5	Yes	No	Yes	No	No	Yes	Yes	No	No	Yes	No	No	Yes	No	No	No	No	No	Yes	Yes	No	no					L			no
B/O B/OMAGAMAI	15219	no	yes			4	Yes	No	NO	No	Yes	Yes	Yes	No	No	No	No	Yes	No	No	No	No	No	No	Yes	Yes	No	POSITIVE			POSITIVE				yes	no
B/O PADMINI	15220	yes	no			7	Yes	No	Yes	No	No	Yes	No	No	No	No	Yes	No	Yes	No	No	No	No	Yes	No	Yes	Yes	No	no						L		no
B/O SIKANTHARBEEVI	15222	yes	no			6	Yes	No	NO	Yes	No	Yes	No	Yes	No	Yes	No	No	No	No	No	No	Yes	Yes	Yes	Yes	No	no					L			no
B/O PICHAIAMMAL	15224	no	yes			8	Yes	No	Yes	No	Yes	No	No	Yes	Yes	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	no					L			no
B/O VASANTHA	15226	no	yes	3			No	No	No	No	No	No	No	Yes	Yes	No	No	No	No	No	No	No	Yes	Yes	No	Yes	Yes	no					E			no
B/O BEGAM	15228	yes	no	2			No	No	Yes	No	No	No	Yes	No	Yes	No	No	No	No	No	No	No	Yes	Yes	No	Yes	Yes	no					E			no
B/O SHANTHI	15230	yes	no	1			No	No	No	No	Yes	No	Yes	Yes	No	No	No	No	Yes	No	No	No	Yes	Yes	No	Yes	Yes	no						E		no
B/O SELVI	15232	no	yes			9	No	No	No	No	No	No	Yes	Yes	Yes	No	No	No	No	No	Yes	No	Yes	No	No	Yes	Yes	no					L			no
B/O KALAVATHI	15234	yes	no	2			Yes	No	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	No	No	No	Yes	No	Yes	No	No	Yes	Yes	no					E			no
B/O LAKSHMI	15236	yes	no	2			No	No	No	No	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	No	Yes	No	Yes	Yes	Yes	no						E		yes
B/O PERIYAMMAL	15238	no	yes			7	No	No	No	No	Yes	Yes	Yes	No	No	No	No	No	No	No	No	No	Yes	No	No	Yes	Yes	POSITIVE			POSITIVE				yes	yes
B/O GOTHAIAMMAL	15242	yes	no			5	No	No	Yes	No	Yes	Yes	No	Yes	No	No	Yes	No	No	No	No	No	No	No	No	No	No	no					L			no
B/O MALARKODI	15242	no	yes	1			Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No	No	Yes	No	No	No	No	No	No	No	no					E			no
B/O PRIYA	15244	yes	no			4	No	No	Yes	No	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	no						L		yes
B/O BACKIYAM	15246	yes	no			5	No	No	Yes	No	Yes	Yes	No	No	Yes	No	No	Yes	No	No	No	No	No	No	Yes	Yes	Yes	no					L			no
B/O SAMINABEGAM	15248	no	yes			7	No	No	Yes	No	No	No	Yes	No	Yes	No	No	No	Yes	No	No	Yes	No	No	Yes	Yes	Yes	no					L			no
B/O MUTHUKANNU	15250	yes	no	1			Yes	No	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	No	No	No	Yes	No	No	No	Yes	No	Yes	no					E			no
B/O PERIYAKKA	15252	no	yes	1			No	Yes	Yes	No	No	No	No	Yes	Yes	No	No	No	No	No	Yes	No	No	No	Yes	No	Yes	no						E		no
B/O MURUGAYEE	15254	yes	no			5	No	Yes	Yes	No	Yes	No	No	No	Yes	No	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	POSITIVE			POSITIVE				yes	YES
B/O RASHIABEGAM	15256	yes	no			4	No	No	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	No	Yes	No	Yes	No	Yes	No	Yes	no						L		yes
B/O NIRMALA	15271	no	yes			8	Yes	No	Yes	Yes	Yes	No	No	No	No	Yes	Yes	No	Yes	No	Yes	No	No	No	No	No	Yes	no					L			no
B/O LAKSHMI	15267	yes	no	1			Yes	No	No	No	Yes	No	No	No	No	No	No	No	No	No	Yes	No	No	Yes	No	No	Yes	no						E		YES
B/O GOVINDAMMAL	15275	yes	no	1			Yes	No	No	No	No	No	Yes	Yes	No	No	No	No	No	No	Yes	No	No	No	No	Yes	Yes	POSITIVE	POSITIVE						yes	no
B/O SAROJA	15277	yes	no			9	Yes	No	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	No	No	No	Yes	No	Yes	No	No	Yes	Yes	no						L		yes
B/O RADHHA	15279	no	yes	1			No	No	No	No	No	Yes	No	Yes	Yes	No	No	No	Yes	No	No	No	Yes	No	No	Yes	Yes	no					E			no
B/O MARIAMMAL	15281	yes	no			4	No	No	Yes	No	Yes	No	Yes	No	Yes	No	No	Yes	No	No	No	No	Yes	No	No	No	No	no						L		no
B/O PADMA	15283	yes	no	1			No	No	No	No	Yes	No	Yes	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	no					E			YES
B/O RAJALAKSHMI	15285	no	yes			10	No	Yes	No	Yes	Yes	No	Yes	No	No	Yes	No	No	No	No	No	No	No	No	Yes	No	no					L			no
B/O KAMATCHI	15287	yes	no	1			No	No	Yes	No	Yes	Yes	Yes	No	No	No	No	No	Yes	No	No	No	Yes	No	No	No	No	P				POSITIVE			yes	yes
B/O PADMINI	15289	yes	no			4	No	No	Yes	No	No	Yes	Yes	No	No	No	Yes	No	No	No	No	No	No	Yes	No	No	Yes	no					L			no
B/O SIKANTHARBEEVI	15291	yes	no	1			Yes	No	Yes	No	No	Yes	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	Yes	no					E			no
B/O PICHAIAMMAL	15293	no	yes			12	No	No	Yes	No	Yes	Yes	No	Yes	No	No	Yes	No	No	No	No	No	No	No	Yes	No	Yes	no					L			no
B/O VASANTHA	15295	yes	no			5	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	Yes	No	Yes	No	No	no						L		YES
B/O BEGAM	15297	no	yes			13	No	Yes	Yes	No	No	Yes	No	Yes	Yes	Yes	No	No	Yes	No	No	No	No	No	Yes	Yes	No	no						L		no
B/O SHANTHI	15299	yes	no			5	No	No	Yes	No	Yes	Yes	No	No	Yes	No	No	No	Yes	No	No	No	No	No	Yes	Yes	No	no					L			no
B/O RANI MARY	15301	no	yes			12	Yes	No	No	Yes	No	Yes	Yes	No	No	Yes	Yes	No	Yes	No	No	Yes	No	Yes	Yes	Yes	No	no						L		yes
B/O KALAVATHI	15303	yes	no	1			No	No	No	No	No	Yes	No	No	No	No	No	Yes	Yes	No	No	No	No	No	Yes	Yes	Yes	positive	POSITIVE						yes	YES
B/O LAKSHMI	15305	tes	no			5	No	No	Yes	No	Yes	Yes	No	No	No	No	No	No	Yes	No	No	No	No	No	Yes	No	no						L			no
B/O PERIYAMMAL	15307	yes	no			4	Yes	Yes	No	No	No	No	Yes	No	No	No	No	Yes	No	Yes	No	No	No	No	No	No	No	no						L			YES
B/O GOTHAIAMMAL	15309	no	no	2			Yes	No	No	No	No	No	No	No	No	Yes	Yes	No	Yes	No	Yes	Yes	Yes	No	No	No	No	no						E			no
B/O MALARKODI	15311	yes	no			4	Yes	No	Yes	No	Yes	No	No	No	No	No	No	Yes	No	No	No	No	Yes	No	No	No	No	no						L			no
B/O SENBAGAM	15313	yes	no	1			Yes	No	No	No	No	No	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes	No	No	No	No	no					E			no
B/O BACKIYAM	15315	yes	no	1			Yes	Yes	No	No	No	No	No	No	No	Yes	No	No	Yes	No	No	No	No	No	No	Yes	Yes	no						E		no
B/O PONNU	15317	yes	no			4	Yes	No	No	Yes	No	Yes	No	No	No	Yes	Yes	No	Yes	No	No	No	No	No	No	No	No	no					L			no
B/O MUTHUKANNU	15319	yes	no			5	No	No	No	No	Yes	No	Yes	Yes	No	No	No	No	No	No	No	No	Yes	No	Yes	No	No	no						L		no
B/O PERIYAKKA	15321	yes	no			4	No	No	Yes	No	No	No	No	Yes	Yes	No	No	No	No	No	No	No	No	No	No	Yes	Yes	no					L			no
B/O MURUGAYEE	15323	no	yes	3		5	Yes	Yes	No	No	No	No	Yes	Yes	No	Yes	Yes	No	No	No	No	No	No	No	Yes	No	POSITIVE		POSITIVE					yes	no
B/O RASHIABEGAM	15325	yes	no	1			No	No	No	No	Yes	No	Yes	No	Yes	Yes	No	No	No	No	No	No	No	No	No	Yes	No	no						E		yes
B/O NIRMALA	15327	yes	no			4	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	No	no						L		no
B/O LAKSHMI	15329	yes	no	3			Yes	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Yes	no					E			no
B/O GOVINDAMMAL	15331	no	yes			7	No	Yes	Yes	Yes	No	Yes	No	No	No	Yes	No	No	No	No	No	No	No	No	No	No	No	no						L		no

B/O	SAROJA	15402	yes	no			4	No	No	No	No	Yes	Yes	Yes	No	No	No	No	No	Yes	No	No	Yes	No	Yes	No	No	No	No	no					L				no
B/O	RADHHA	15404	yes	no			4	Yes	No	No	No	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	no					L				no
B/O	PODHUMPONNU	15406	no	yyes	2			No	No	Yes	No	No	Yes	Yes	No	No	Yes	No	No	No	No	No	Yes	No	No	Yes	No	No	No	no					E				no
B/O	PADMA	15408	yes	no				No	Yes	Yes	No	Yes	Yes	No	No	No	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	no						E			yes
B/O	RAJALAKSHMI	15410	yes	no			4	Yes	No	No	No	Yes	Yes	Yes	No	No	No	No	No	Yes	No	No	No	Yes	Yes	No	No	No	no					L				no
B/O	B/OMAGAMAI	15412	yes	no			5	No	No	No	No	No	Yes	No	No	No	No	No	Yes	Yes	No	Yes	No	Yes	No	No	Yes	Yes	POSITVE								yes	YES
B/O	PADMINI	15414	yes	no	1			No	No	Yes	No	Yes	Yes	Yes	No	No	No	No	No	Yes	No	No	No	Yes	No	No	Yes	No	no			POSITIVE			E				no
B/O	SIKANTHARBEEVI	15416	yes	no			4	Yes	Yes	No	Yes	No	Yes	No	No	No	Yes	Yes	No	Yes	No	No	No	Yes	No	No	Yes	No	no							L			no
B/O	PICHAIAMMAL	15418	yes	no	2			Yes	No	Yes	No	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	Yes	No	no					E				no
B/O	VASANTHA	15420	no	yes			5	Yes	No	No	No	Yes	No	Yes	No	No	No	No	No	Yes	No	No	No	Yes	No	No	No	No	no						L			yes
B/O	LATHA	15422	yes	no			4	No	Yes	Yes	No	No	No	Yes	No	No	No	Yes	Yes	Yes	No	No	No	No	No	No	No	No	no					L				no
B/O	SHANTHI	15424	no	yes	3			No	No	Yes	No	No	No	Yes	Yes	No	Yes	No	No	Yes	No	Yes	No	No	No	Yes	No	No	no							E		YES
B/O	SELVI	15426	yes	no	1			No	No	Yes	No	Yes	No	Yes	Yes	Yes	No	No	No	Yes	No	No	No	No	No	No	No	Yes	no						E			no
B/O	KALAVATHI	15428	yes	no			5	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	No	No	Yes	No	No	No	No	No	No	No	Yes	no					L				no
B/O	LAKSHMI	15430	no	yes	3			No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	No	Yes	No	No	No	No	No	No	No	Yes	no					E				no
B/O	PERIYAMMAL	15432	yes	no	2			No	Yes	Yes	No	No	Yes	No	No	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes	Yes	no					E				no
B/O	GOTHAIAMMAL	15434	yes	NO	3			No	Yes	Yes	No	Yes	Yes	No	No	No	No	No	Yes	No	No	No	Yes	No	No	No	Yes	no							E			no
B/O	MALARKODI	15436	yes	NO			7	No	No	No	No	No	Yes	No	No	No	No	No	No	Yes	No	Yes	No	No	No	No	No	Yes	no					L				no
B/O	KALA	15438	yes	NO			8	Yes	No	No	No	No	Yes	No	No	No	No	Yes	Yes	Yes	No	No	No	No	No	No	No	Yes	positive	POSITIVE							yes	YES
B/O	BACKIYAM	15440	yes	no	3			Yes	No	Yes	No	Yes	Yes	Yes	No	No	No	Yes	No	No	No	No	No	Yes	Yes	No	No	No	Yes	no						E			no
B/O	KAVITHA	15442	no	yes			6	Yes	Yes	No	Yes	No	No	No	No	No	Yes	Yes	No	No	No	Yes	No	Yes	No	Yes	Yes	Yes	no					L				no
B/O	MUTHUKANNU	15444	yes	no			4	Yes	No	Yes	No	No	No	Yes	No	No	No	Yes	No	No	No	No	No	Yes	No	No	Yes	Yes	no						L			no
B/O	PERIYAKKA	15446	no	yes	3			Yes	No	No	No	Yes	No	Yes	No	No	No	No	No	No	No	No	No	No	No	No	Yes	No	no					E				no
B/O	MURUGAYEE	15448	yes	no	2			Yes	Yes	No	No	No	No	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	no						E			yes
B/O	RASHIABEGAM	15450	no	yes			8	Yes	No	No	No	No	No	Yes	No	No	No	Yes	No	No	No	No	No	Yes	No	No	No	No	no					L				no
B/O	NIRMALA	15452	yes	no			8	No	No	Yes	No	Yes	No	Yes	Yes	No	No	No	No	Yes	No	No	No	No	Yes	Yes	No	No	positive	POSITIVE							yes	YES
B/O	LAKSHMI	15454	no	yes			9	No	No	No	No	No	No	Yes	Yes	Yes	No	Yes	No	No	No	No	No	No	Yes	No	No	Yes	no							L		no
B/O	GOVINDAMMAL	15456	yes	no			4	No	No	No	No	No	No	Yes	Yes	No	Yes	No	No	No	No	No	No	No	Yes	Yes	No	no					L				no
B/O	SAROJA	15458	yes	no			4	No	No	Yes	No	Yes	No	Yes	No	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	positive			POSITIVE					yes	YES
B/O	RADHHA	15460	no	yes	3			No	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	no							E			no
B/O	MARIAMMAL	15462	yes	no	1			Yes	No	No	No	Yes	No	No	No	No	Yes	Yes	Yes	No	No	No	No	Yes	No	No	Yes	No	no					E				no
B/O	PADMA	15464	yes	no			4	No	No	Yes	Yes	No	Yes	Yes	No	No	Yes	No	No	No	No	No	No	No	No	No	Yes	No	no					L				no
B/O	RAJALAKSHMI	15466	no	yes			7	No	No	No	No	Yes	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No	Yes	Yes	No	no						L				no
B/O	KANI	15468	yes	no			4	No	No	No	No	No	Yes	No	No	Yes	No	No	Yes	No	No	No	No	No	Yes	Yes	positive		POSITIVE								yes	no
B/O	PADMINI	15470	yes	no	2			No	No	Yes	No	No	Yes	Yes	No	Yes	Yes	No	No	No	No	No	Yes	Yes	No	No	Yes	No	no						E			yes
B/O	SIKANTHARBEEVI	15472	yes	no	3			No	Yes	Yes	No	No	Yes	No	No	Yes	No	No	No	No	No	Yes	No	No	No	No	No	No	no					E				no
B/O	PICHAIAMMAL	15474	yes	no			4	Yes	No	Yes	No	Yes	Yes	Yes	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	positive		POSITIVE						yes	YES
B/O	VASANTHA	15476	yes	no	3			Yes	No	Yes	No	Yes	Yes	Yes	No	No	No	No	Yes	No	No	No	No	No	Yes	No	No	No	positive			POSITIVE					yes	YES
B/O	BEGAM	15478	no	yes			8	Yes	No	Yes	No	Yes	Yes	Yes	No	No	No	No	Yes	No	No	No	No	No	Yes	No	No	No	no					Y	L			no
B/O	SHANTHI	15480	no	yes		T		Yes	No	No	Yes	Yes	Yes	Yes	No	No	Yes	No	No	No	No	No	No	Yes	No	No	Yes	Yes	no					L				no
B/O	SELVI	15482	yes	no	1			No	No	No	No	Yes	No	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	Yes	no					E				no
B/O	KALAVATHI	15484	yes	no			4	No	No	No	No	Yes	Yes	Yes	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	Yes	No	Yes	no					L				no
B/O	LAKSHMI	15486	no	yes	3			Yes	No	Yes	No	No	No	No	Yes	Yes	Yes	No	No	No	No	No	No	No	Yes	No	No	Yes	positive			POSITIVE					yes	yes
B/O	PERIYAMMAL	15488	yes	no	1			No	No	No	No	No	No	Yes	Yes	No	No	Yes	No	No	No	No	No	No	Yes	No	No	Yes	no						E			no
B/O	GOTHAIAMMAL	15490	no	no	1			No	No	No	No	Yes	Yes	No	Yes	No	No	No	No	No	Yes	No	No	No	Yes	No	No	Yes	no					E				no
B/O	MALARKODI	15492	no	yes			13	No	No	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	No	Yes	No	No	Yes	No	No	Yes	no					L				no
B/O	LAKSMI	15494	yes	no			4	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	No	Yes	No	No	Yes	no						L			no
B/O	BACKIYAM	15496	yes	no	1			No	No	No	No	Yes	Yes	No	No	No	Yes	No	No	No	No	No	No	No	Yes	Yes	No	No	no					E				no
B/O	SAMINABEGAM	15498	no	yes			12	No	No	Yes	No	No	Yes	No	No	No		Yes	Yes	No	No	No	No	Yes	No	No	No	No	positive	POSITIVE				L			yes	no
B/O	MUTHUKANNU	15500	yes	no	1			No	No	No	Yes	No	Yes	Yes	No	No	Yes	No	No	No	No	No	No	No	No	No	No	No	no							E			no
B/O	PERIYAKKA	15502	yes	no			4	Yes	No	No	No	Yes	Yes	No	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	No	no					L				no
B/O	MURUGAYEE	15504	yes	no			4	No	No	Yes	No	No	Yes	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	Yes	No	no						L			no
B/O	RASHIABEGAM	15506	no	yes	2			No	No	No	No	No	Yes	No	Yes	Yes	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	positive	POSITIVE							yes	YES
B/O	NIRMALA	15508	yes	no	1			No	Yes	No	No	Yes	Yes	No	No	No	No	Yes	No	No	No	No	No	No	No	No	No	No	no					E				no
B/O	LAKSHMI	15510	yes	no			4	Yes	No	Yes	No	No	Yes	Yes	No	Yes	No	No	No	No	No	Yes	No	No	No	No	No	No	no					L				no
B/O	GOVINDAMMAL	15512	yes	no			4	No	No	No	No	No	Yes	Yes	No	No	No	No	No	No	No	Yes	No	No	No	Yes	No	No	no						L			no
B/O	SAROJA	15514	no	yes			9	No	No	No	No	No	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	No	No	No	No	No	No	no					L				yes
B/O	RADHHA	15516	no	yes	2			No	No	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	Yes	No	No	Yes	No	No	No	no							E			yes
B/O	MARIAMMAL	15518	yes	no	1			Yes	No	No	No	No	Yes	Yes	Yes	No	No	No	No	No	No	Yes	No	No	No	No	No	Yes	no					E				no
B/O	PADMA	15520	yes	no			4	No	No	No	No	No	Yes	Yes	No	No	No	No	No	No	No	Yes	No	No	Yes	No	No	No	positive			POSITIVE					yes	YES
B/O	RAJALAKSHMI	15522	no	yes			8	No	No	Yes	No	Yes	No	Yes	No	No	Yes	Yes	No	No	No	No	No	No	Yes	No	No	No	no					L				no
B/O	VALAR	15524	yes	no			4	No	No	Yes	No	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No	No	no							L			no
B/O	PADMINI	15526	yes	no	1			Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	Yes	No	No	No	no							E			yes
B/O	SIKANTHARBEEVI	15528	yes	no			4	No	No	Yes	No	No	Yes	Yes	Yes	No	No	Yes	No	No	No	No	No	No	Yes	No	Yes	No	positive			POSITIVE					yes	YES
B/O	PICHAIAMMAL	15530	no	yes	2			No	No	Yes	Yes	Yes	No	No	Yes	No	Yes	No	No	No	No	No	No	No	Yes	No	No	No	no					E				no
B/O	VASANTHA	15532	yes	no	1			Yes	No	Yes	No	No	Yes	No	Yes	Yes	No	No	No	No	No	Yes	No	No	Yes	No	No	Yes	P	POSITIVE							yes	no
B/O	BEGAM	17583	yes	no			4	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	Yes	No	Yes	Yes	No	No	No	no					L				no
B/O	SHANTHI	17588	no	yes	2			No	No	Yes	No	No	Yes	No	No	Yes	Yes	No	No	No	No	Yes	No	No	Yes	Yes	No	No	no						E			no
B/O	SELVI	17593	no	yes			5	No	No	No	No	No	Yes	No	Yes	No	No	No	No	No	No	Yes	No	No	Yes	No	No	No	positive	POSITIVE							yes	YES
B/O	KALAVATHI	17598	no	yes			9	Yes	No	No	No	No	No	No	Yes	Yes	No	No	No	No	No	Yes	No	No	Yes	No	No	No	no					L				no

B/O	LAKSHMI	17603	yes	no	2		No	No	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	No	Yes	Yes	No	Yes	No	No	Yes	no							E		yes
B/O	PERIYAMMAL	17608	yes	no		4	No	No	No	No	No	No	No	Yes	Yes	No	No	No	No	No	No	No	Yes	No	No	No	No	no						L				no
B/O	GOTHAIAMMAL	17613	no	yes	3		Yes	No	No	No	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	No	Yes	No	No	No	No	no						E				no
B/O	MALARKODI	17618	no	yes		6	Yes	No	No	No	No	No	No	No	Yes	No	Yes	No	Yes	No	No	No	Yes	No	No	No	No	no							L			yes
B/O	RAMYA	17623	yes	no	2		Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	No	Yes	No	No	No	Yes	No	No	No	No	no						E				no
B/O	BACKIYAM	17628	yes	no		4	Yes	No	Yes	No	No	No	No	No	Yes	No	Yes	No	Yes	No	No	No	No	No	No	Yes	Yes	no							L			yes
B/O	SAMINABEGAM	17633	yes	no	2		Yes	No	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	No	Yes	No	No	No	No	No	Yes	Yes	No	positive			POSITIVE					yes	YES
B/O	KANI	17638	no	yes		7	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	No	No	No	Yes	No	No	Yes	No	no						L				no
B/O	PERIYAKKA	17643	yes	no	1		No	Yes	Yes	No	Yes	No	Yes	Yes	No	No	Yes	No	Yes	No	No	No	No	No	No	Yes	No	no							E			no
B/O	MURUGAYEE	17648	yes	no		4	No	No	Yes	No	Yes	No	Yes	No	No	No	Yes	No	Yes	No	No	No	No	No	No	Yes	Yes	no						L				no
B/O	RASHIABEGAM	17653	yes	no		4	Yes	No	Yes	No	Yes	No	Yes	No	No	No		No	Yes	No	No	No	No	No	No	Yes	No	positive		POSITIVE						yes	no
B/O	NIRMALA	17658	yes	no	1		No	No	No	No	Yes	No	Yes	No	No	No	Yes	No	Yes	No	No	No	No	No	No	Yes	No	no							E			no
B/O	LAKSHMI	17663	yes	no		5	No	No	No	No	Yes	No	Yes	No	No	No		No	Yes	Yes	Yes	No	No	No	No	Yes	No	no						L				no
B/O	GOVINDAMMAL	17668	yes	no	1		No	No	No	No	Yes	Yes	No	No	No	No	Yes	No	Yes	No	Yes	Yes	No	No	No	Yes	No	no						E				no
B/O	SAROJA	17673	no	yes	3		Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	No	No	Yes	No	Yes	No	Yes	No	No	Yes	Yes	positive			POSITIVE					yes	YES
B/O	RADHHA	17678	no	yes		8	No	No	No	Yes	Yes	No	No	No	No	Yes	No	No	Yes	No	Yes	No	No	No	Yes	Yes	No	positive				POSITIVE					yes	no
B/O	MARIAMMAL	17683	yes	no	1		No	No	Yes	No	Yes	No	Yes	Yes	No	No	No	No	Yes	No	No	No	No	No	No	Yes	No	no						E				no
B/O	PADMA	17688	yes	no		4	Yes	No	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	No	No	No	Yes	No	No	No	No	Yes	No	no							L			no
B/O	RAJALAKSHMI	17693	no	yes		9	No	No	No	No	Yes	No	Yes	Yes	No	No	Yes	No	No	No	Yes	No	No	Yes	No	Yes	Yes	no						L				no
B/O	B/OMAGAMAI	17698	yes	no	1		No	No	Yes	No	Yes	No	No	No	No	No	Yes	No	No	No	Yes	No	Yes	No	No	Yes	No	no						E				no
B/O	PADMINI	17703	YES	NO		4	No	No	No	No	No	Yes	Yes	No	Yes	No	Yes	No	No	No	No	No	Yes	No	No	Yes	No	no							L			no
B/O	SIKANTHARBEEVI	17708	YES	NO	2		Yes	No	No	No	No	No	No	No	Yes	No	Yes	No	Yes	No	No	No	Yes	No	No	Yes	No	positive			POSITIVE					yes	YES
B/O	PICHAIAMMAL	17713	yes	no		4	Yes	No	Yes	No	No	Yes	Yes	No	Yes	No	Yes	No	No	No	No	No	Yes	No	No	Yes	No	no						L				no
B/O	VASANTHA	17718	no	yes		7	Yes	No	No	No	No	No	No	No	Yes	No	Yes	No	No	No	No	No	Yes	No	No	Yes	Yes	no						L				no
B/O	BEGAM	17723	no	yes		9	No	No	Yes	No	Yes	No	No	No	Yes	No	Yes	No	Yes	No	No	No	Yes	No	Yes	No	No	no								L			no
B/O	SHANTHI	17728	yes	no	1		No	No	No	No	No	Yes	Yes	Yes	Yes	No	Yes	No	No	No	No	No	No	No	No	No	No	no								E			yes
B/O	SELVI	17733	yes	no		4	No	No	Yes	No	No	No	Yes	Yes	Yes	No	Yes	No	No	No	Yes	No	No	No	No	No	No	no								L			no
B/O	KALAVATHI	17738	no	yes	3		Yes	No	Yes	No	No	No	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	No	No	No	No	No	No	no						E				no
B/O	LAKSHMI	17743	yes	no	1		No	No	Yes	No	No	Yes	Yes	No	Yes	No	No	No	No	Yes	Yes	No	No	No	No	No	Yes	no							E				no
B/O	PERIYAMMAL	17748	no	yes		9	No	Yes	Yes	No	No	No	Yes	No	Yes	No	No	No	No	Yes	Yes	No	No	No	No	No	No	positive		POSITIVE						yes	no
B/O	GOTHAIAMMAL	17753	yes	no		4	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	No	No	Yes	Yes	Yes	No	No	No	No	No	No	no						L				no
B/O	MALARKODI	17758	yes	no	1		No	No	No	No	No	Yes	No	No	No	No	No	No	No	Yes	Yes	No	Yes	No	No	Yes	No	positive		POSITIVE						yes	no
B/O	LATHA	17780	no	yes	T		No	No	No	No	No	No	Yes	Yes	No	No	No	No	No	No	Yes	No	No	No	No	Yes	Yes	no							E			no
B/O	BACKIYAM	17781	yes	no	2	4	Yes	Yes	Yes	No	No	No	Yes	No	No	No	No	No	No	No	Yes	No	No	No	No	Yes	No	positive			POSITIVE					yes	YES
B/O	SAMINABEGAM	17782	no	yes		8	No	No	No	No	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	Yes	No	no						L				no
B/O	MUTHUKANNU	17785	yes	no	1		No	No	No	No	No	No	Yes	No	Yes	No	No	No	No	No	Yes	No	No	No	No	Yes	Yes	no						E				no
B/O	PERIYAKKA	17788	yes	no		4	Yes	No	Yes	No	No	No	Yes	No	Yes	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	No	no						L				no
B/O	MURUGAYEE	17791	no	yes	3		No	No	No	Yes	No	No	Yes	No	Yes	No	No	No	No	No	No	Yes	Yes	No	Yes	No	No	no							E				no
B/O	RASHIABEGAM	17794	yes	no	1		No	Yes	Yes	No	Yes	Yes	Yes	No	Yes	No	No	No	No	No	No	Yes	Yes	No	Yes	No	positive	POSITIVE	POSITIVE							yes	YES
B/O	NIRMALA	17797	no	no		8	Yes	No	No	No	No	No	Yes	No	Yes	Yes	No	No	No	No	No	Yes	Yes	No	Yes	Yes	no							L			no
B/O	LAKSHMI	17800	yes	no		4	No	No	No	No	No	No	Yes	Yes	Yes	No	Yes	No	No	Yes	No	No	No	Yes	No	Yes	No	no						L				no
B/O	GOVINDAMMAL	17803	yes	no	1		No	Yes	Yes	No	No	No	No	Yes	Yes	No	Yes	No	No	No	No	No	No	Yes	No	Yes	No	no						E				no
B/O	SAROJA	17806	no	yes	3		Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	No	Yes	No	No	No	No	No	No	Yes	No	Yes	No	no						E				no
B/O	RADHHA	17809	yes	no		4	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No	No	Yes	Yes	Yes	No	Yes	No	no							L			no
B/O	MARIAMMAL	17812	no	yes	3		No	Yes	No	No	No	No	Yes	No	No	No	Yes	No	No	No	No	No	No	Yes	No	Yes	No	positive			POSITIVE					yes	no
B/O	PADMA	17815	yes	no	1		No	Yes	Yes	No	No	No	Yes	Yes	No	No	Yes	No	No	No	No	No	No	Yes	Yes	Yes	Yes	no						E				no
B/O	RAJALAKSHMI	17818	yes	no		4	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	No	Yes	No	No	No	No	No	No	Yes	No	Yes	No	no							L			no
B/O	B/OMAGAMAI	17821	yes	no	1		No	No	Yes	No	Yes	No	Yes	Yes	Yes	No	No	No	No	No	No	No	No	Yes	No	Yes	No	no							E			no
B/O	PADMINI	17824	no	yes	3		Yes	No	Yes	No	No	No	Yes	No	Yes	No	No	No	No	No	No	No	No	No	No	Yes	No	no						E				no
B/O	SIKANTHARBEEVI	17827	yes	no		4	No	No	Yes	No	No	Yes	Yes	No	Yes	No	No	No	No	No	No	No	No	No	No	Yes	Yes	no							L			no
B/O	PICHAIAMMAL	17830	no	yes		6	No	No	Yes	No	No	No	No	Yes	Yes	No	No	No	No	No	No	No	No	No	No	Yes	No	positive			POSITIVE					yes	no
B/O	VASANTHA	17833	yes	no	1		Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	No	No	Yes	No	No	No	No	No	No	No	Yes	No	positive	POSITIVE							yes	YES
B/O	BEGAM	17836	yes	no		4	No	Yes	No	No	No	No	No	Yes	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	No	no						L				no
B/O	SHANTHI	17839	no	yes		9	No	No	No	No	Yes	Yes	Yes	No	No	No	No	No	No	No	No	No	Yes	No	No	Yes	Yes	no							L			no
B/O	SELVI	17842	yes	no		4	No	No	Yes	No	No	No	No	No	Yes	Yes	No	No	No	No	No	No	No	No	Yes	Yes	No	no						L				no
B/O	KALAVATHI	17845	no	yes	3		Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	No	positive			POSITIVE					yes	no
B/O	LAKSHMI	17848	no	yes	2		No	No	No	No	No	Yes	Yes	Yes	No	No	Yes	Yes	No	No	No	Yes	No	No	No	Yes	No	no							E			no
B/O	PERIYAMMAL	17851	no	yes		11	No	No	No	No	Yes	No	Yes	Yes	No	Yes	No	No	No	No	No	No	No	No	No	Yes	Yes	no						L				no
B/O	GOTHAIAMMAL	17854	yes	no	1		No	No	No	No	No	No	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	no						E				no
B/O	MALARKODI	17857	no	yes		11	No	No	No	No	No	Yes	Yes	No	No	Yes	Yes	No	No	No	No	No	No	No	No	No	No	no							L			no
B/O	VAANI	17860	yes	no	1		No	Yes	No	No	No	No	Yes	No	Yes	No	No	Yes	No	No	No	No	No	No	No	No	No	no							E			no
B/O	BACKIYAM	17863	yes	no		5	No	No	Yes	Yes	No	No	Yes	No	No	Yes	No	No	No	No	Yes	No	No	No	No	No	Yes	positive				POSITIVE					yes	YES
B/O	SAMINABEGAM	17866	no	yes		10	No	No	No	No	No	Yes	No	Yes	Yes	Yes	Yes	No	No	No	No	Yes	No	No	No	No	No	no						L				no

B/O	MUTHUKANNU	17866	yes	no	1		No	No	No	No	No	No	Yes	Yes	Yes	No	No	No	No	No	No	No	No	No	No	Yes	No	No	no					E				no
B/O	PERIYAKKA	17872	yes	no		10	No	No	No	No	No	Yes	No	Yes	Yes	Yes	No	Yes	No	No	No	No	No	No	No	No	No	No	no					L				no
B/O	MURUGAYEE	17875	no	yes		9	No	No	Yes	No	No	No	No	No	Yes	No	Yes	No	No	No	No	No	No	No	No	No	Yes	no						L			no
B/O	RASHIABEGAM	17878	yes	no	1		No	No	No	No	No	Yes	Yes	No	Yes	No	No	No	No	No	No	No	No	No	Yes	No	no					E				no
B/O	NIRMALA	17881	yes	no		5	No	Yes	Yes	No	No	No	Yes	No	No	No	No	No	No	No	No	No	No	No	No	Yes	No	no					L				no
B/O	LAKSHMI	17884	no	yes		9	No	No	Yes	No	No	Yes	Yes	No	No	Yes	No	Yes	No	No	No	No	No	No	No	Yes	No	no						L			no
B/O	GOVINDAMMAL	17887	yes	no		5	Yes	No	Yes	Yes	No	Yes	Yes	Yes	No	No	Yes	No	Yes	No	No	No	No	No	No	Yes	Yes	P	POSITIVE							yes	YES
B/O	SAROJA	17890	no	yes		8	No	No	Yes	No	No	Yes	Yes	Yes	No	No	No	No	Yes	No	No	No	No	No	No	Yes	No	no						L				no
B/O	RADHHA	17893	yes	NO	1		No	No	Yes	No	Yes	Yes	Yes	Yes	No	Yes	No	No	No	No	No	No	No	Yes	No	No	Yes	No	no							E		no
B/O	MARIAMMAL	17896	yes	NO		4	No	No	Yes	No	Yes	Yes	Yes	No	No		Yes	Yes	No	No	No	No	No	Yes	No	No	No	L	no						L			no
B/O	PADMA	17899	no	yes	3		No	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No	No	No	No	No	No	No	No	No	Yes	no						E				no
B/O	RAJALAKSHMI	17902	yes	no		4	No	No	No	No	Yes	Yes	Yes	No	Yes	No	No	No	No	No	No	No	No	No	No	No	No	positive					POSITIVE			yes	no
B/O	B/OMAGAMAI	17905	yes	no	1		No	No	No	No	Yes	No	Yes	No	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	No	no						E				no
B/O	PADMINI	17908	no	yes	3		No	Yes	Yes	No	Yes	No	Yes	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	No	no						E				no
B/O	SIKANTHARBEEVI	17911	yes	no		4	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	No	No	No	No	No	No	No	Yes	no							L			yes
B/O	PICHAIAMMAL	17914	no	yes		14	No	No	No	No	Yes	Yes	No	Yes	Yes	No	No	No	No	No	No	Yes	No	No	No	No	No	no							L			no
B/O	VASANTHA	17917	yes	NO	1		No	No	Yes	No	Yes	No	No	No	Yes	No	Yes	No	No	No	No	No	No	No	No	No	No	positive		POSITIVE						yes	YES
B/O	BEGAM	17920	no	yes	3		Yes	No	No	No	Yes	No	Yes	No	Yes	Yes	No	No	No	No	No	No	Yes	No	No	No	No	no							E			no
B/O	SHANTHI	17923	no	yes		12	No	No	No	No	Yes	Yes	Yes	No	No	No	No	No	No	No	No	No	No	Yes	No	Yes	positive		POSITIVE							yes	YES
B/O	SELVI	17926	yes	yes		4	No	No	No	No	Yes	Yes	Yes	No	No	Yes	Yes	No	No	No	No	No	No	No	No	No	No	no						L				no
B/O	KALAVATHI	17929	no	yes		12	No	No	Yes	No	No	Yes	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	Yes	no							L			yes
B/O	LAKSHMI	17932	yes	no	1		No	No	No	Yes	No	Yes	Yes	Yes	No	No	No	No	No	No	Yes	No	Yes	Yes	No	No	No	no						E				no
B/O	PERIYAMMAL	17935	yes	no		15	No	No	No	No	No	Yes	Yes	Yes	No	No	No	No	No	No	No	Yes	No	No	No	No	no							L			no
B/O	GOTHAIAMMAL	17938	no	yes	2		Yes	No	Yes	No	No	Yes	No	No	Yes	Yes	Yes	No	No	No	No	Yes	No	No	No	No	positive	POSITIVE							yes	YES
B/O	MALARKODI	17941	no	yes		7	No	No	Yes	No	No	Yes	No	No	Yes	No	No	No	No	No	No	Yes	No	No	Yes	Yes	no						L				no
B/O	MARY	17944	yes	no	1		No	Yes	Yes	No	No	Yes	No	No	Yes	Yes	No	No	No	No	No	No	No	No	No	No	no								E			yes
B/O	BACKIYAM	17947	no	yes	1	7	No	Yes	Yes	No	Yes	Yes	No	No	Yes	No	Yes	No	No	No	No	No	No	No	No	No	no						L				no
B/O	SAMINABEGAM	17950	yes	no	1		No	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	No	No	No	No	No	Yes	No	No	No	No	P		POSITIVE							yes	YES
B/O	MUTHUKANNU	17953	no	yes		6	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	No	No	No	No	Yes	No	No	No	No	No	No	positive	POSITIVE								yes	YES
B/O	PERIYAKKA	17956	yes	no	1		No	Yes	No	No	No	No	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	No	No	No	no								E			no
B/O	MURUGAYEE	17959	no	yes		7	No	No	No	No	No	Yes	Yes	Yes	Yes	No	No	No	No	No	Yes	No	Yes	Yes	No	No	No	no						L				no
B/O	RASHIABEGAM	17962	no	yes		9	No	No	No	Yes	No	No	Yes	No	Yes	No	No	No	No	No	No	No	Yes	Yes	No	No	No	no							L			no
B/O	NIRMALA	17965	yes	no		11	Yes	No	Yes	No	No	No	Yes	No	No	Yes	No	No	No	No	No	No	Yes	Yes	No	No	Yes	no						L				no
B/O	LAKSHMI	17968	yes	no		12	No	No	Yes	No	No	Yes	No	No	No	No	Yes	No	No	No	No	No	Yes	Yes	No	No	No	positive		POSITIVE							yes	NO
B/O	GOVINDAMMAL	17971	yes	no	1		No	Yes	Yes	No	No	No	No	Yes	No	No	No	No	No	No	No	No	Yes	Yes	No	No	No	no						E				no
B/O	SAROJA	17974	yes	no	1		Yes	No	Yes	No	Yes	No	No	Yes	No	No	No	No	No	No	No	No	No	Yes	No	No	No	no								E			no
B/O	RADHHA	17977	yes	no		6	Yes	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	no						L				no
B/O	MARIAMMAL	17980	yes	no	1		Yes	Yes	Yes	No	Yes	Yes	No	No	Yes	No	Yes	No	No	No	No	No	No	No	No	No	No	no						E				no
B/O	PADMA	17983	no	yes		4	Yes	No	Yes	No	Yes	No	Yes	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	No	positive	POSITIVE							yes	no
B/O	RAJALAKSHMI	17986	yes	no		8	Yes	No	No	No	Yes	No	Yes	Yes	Yes	No	No	No	No	No	No	No	No	No	No	Yes	no						L				no
B/O	B/OMAGAMAI	17989	yes	no		8	Yes	Yes	No	No	Yes	No	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes	No	No	No	No	no							L			no
B/O	PADMINI	17992	no	yes	1		No	No	No	Yes	Yes	No	Yes	No	Yes	No	Yes	Yes	No	No	No	No	No	Yes	No	No	No	no							E			no
B/O	SIKANTHARBEEVI	17995	yes	no		4	No	No	Yes	No	No	Yes	Yes	No	Yes	No	No	No	No	Yes	No	No	Yes	No	No	Yes	no							L			no
B/O	PICHAIAMMAL	17998	no	yes		7	No	Yes	Yes	No	No	No	Yes	No	Yes	Yes	No	No	No	No	No	No	No	Yes	No	No	No	positive	POSITIVE							yes	YES
B/O	VASANTHA	18001	yes	no	1		Yes	No	No	No	No	Yes	No	Yes	Yes	No	No	No	No	No	No	No	Yes	Yes	No	Yes	Yes	no						E				no
B/O	BEGAM	18004	no	yes	2		No	No	Yes	No	No	Yes	No	Yes	No	No	Yes	No	No	Yes	No	No	No	Yes	No	No	No	no						E				no
B/O	SHANTHI	18007	yes	no		4	No	No	No	No	No	Yes	No	Yes	No	Yes	No	No	No	No	No	Yes	Yes	No	No	No	No	no						L				no
B/O	SELVI	18010	no	yes		7	Yes	Yes	No	No	No	Yes	Yes	No	Yes	No	No	Yes	No	No	No	No	No	No	Yes	No	No	P									yes	no
B/O	KALAVATHI	18013	yes	no	1		No	No	Yes	Yes	No	Yes	Yes	Yes	No	Yes	No	No	No	No	No	No	No	Yes	No	No	No	no						E				no
B/O	LAKSHMI	18016	yes	no		4	No	No	No	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No	No	No	No	No	No	Yes	No	No	No	no							E			no
B/O	PERIYAMMAL	18019	no	yes	2		No	No	Yes	Yes	Yes	No	Yes	Yes	No	No	No	No	Yes	No	No	No	No	Yes	Yes	Yes	no						E				no
B/O	GOTHAIAMMAL	18022	yes	no	1		Yes	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	No	No	No	No	No	Yes	No	Yes	no							E			no
B/O	MALARKODI	18025	no	yes	3		No	No	Yes	No	Yes	No	Yes	No	No	No	No	No	No	No	No	No	No	Yes	Yes	No	Yes	no						E				no
B/O	ROSY	18028	yes	no	1		No	No	No	Yes	No	No	No	No	Yes	No	Yes	No	No	No	No	No	No	No	No	No	no								Y	yes	no
B/O	BACKIYAM	18031	yes	no		4	No	Yes	Yes	No	No	Yes	No	Yes	No	Yes	No	No	No	Yes	No	No	No	No	No	No	positive		POSITIVE								no
B/O	SAMINABEGAM	18034	yes	NO		5	Yes	Yes	No	No	No	No	Yes	Yes	No	No	Yes	No	No	No	Yes	No	No	No	No	No	no						L				no
B/O	MUTHUKANNU	18037	yes	no	1		Yes	Yes	Yes	No	No	No	No	Yes	No	Yes	Yes	No	No	No	No	No	No	No	No	No	no			POSITIVE				L	yes	no
B/O	RANI MARY	18040	yes	no		4	Yes	Yes	Yes	No	No	No	No	Yes	No	Yes	Yes	No	No	No	No	No	No	No	No	No	no						L				no