



COMPARATIVE PREVALENCE STUDY ON RESPIRATORY PROBLEMS AND SEPSIS IN INFANTS TO CHILDREN AND THEIR COMPLICATIONS IN TERTIARY CARE HOSPITAL

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Abstract

We Aim is to observe the prevalence of respiratory tract infections and sepsis in different age groups of children and evaluation of risk factors and their complications based on severity of disease. The objectives of this include such as identifying the Sociodemographic characteristics from infants to children. The data source is taken From case sheets of 125 patients admitted in GGH hospital in paediatric department, for the time period of 6 months by Observational study following the methods of severity assessment from patient demographics, including criteria of Age period 0-5 years, Infants, Toddlers, Children, Respiratory infections. Sepsis, Antenatal history of mother, Medication history of mother, Symptoms experienced by patients, Symptoms relieved by antibiotic treatment and excluded the Healthy patients. Age: Excluded >5 years children. Pregnant women's, Neonates. Fisher exact test is performed to know the relation between respiratory problems and sepsis.

Key Words: Paediatrics, Respiratory Infections, Sepsis, Case Study, 125 Patients, 6Months.

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INTRODUCTION

Respiratory disease is a medical term that encompasses pathological conditions affecting the organs and tissues that make gas exchange possible in higher organisms, and includes conditions of the upper respiratory tract, trachea, bronchi, bronchioles, alveoli, pleura and pleural cavity, and the nerves and muscles of breathing. Respiratory diseases range from mild and self-limiting, such as the common cold, to life-threatening entities like bacterial pneumonia, Bronchiolitis, pulmonary embolism, acute asthma and lung cancer. Respiratory disorders in infants and children are challenging problems for every clinician involved in the management of these patients.

Pneumonia is an inflammatory condition of the lung affecting primarily the microscopic air sacs known as alveoli. Typical signs and symptoms include a varying severity and combination of productive or dry cough, chest pain, fever, and trouble breathing, depending on the underlying cause. Pneumonia is usually caused by infection with viruses or bacteria and less commonly by other microorganisms, certain medications and conditions such as autoimmune diseases. Risk factors include other lung diseases such as cystic fibrosis, COPD, and asthma, diabetes, heart failure, a history of smoking, a poor ability to cough such as following a stroke, or a weak immune system.

Bronchiolitis is inflammation of the bronchioles, the smallest air passages of the lungs. It usually occurs in children less than two years of age with the majority being aged between three and six months. It presents with coughing, wheezing and shortness of breath which can cause some children difficulty in feeding. This inflammation is usually caused by respiratory syncytial virus (70% of cases).

Sepsis is a life-threatening condition that arises when the body's response to infection injures its own tissues and organs.^[1] Common signs and symptoms include fever, increased heart rate, increased breathing rate, and confusion². There also may be symptoms related to a specific infection, such as a cough with pneumonia, or painful urination. Sepsis is caused by an immune response triggered by an infection. Most commonly, the infection is bacterial, but it may also be from fungi, viruses, or parasites. Common locations for the primary infection include lungs, brain, urinary tract, skin, and abdominal organs.

Pregnancy Complications

Women who test positive for GBS are said to be colonized. A mother can pass GBS to her baby during delivery. GBS can cause bladder and uterine infections for the mother. In serious cases, GBS can cause meningitis, sepsis, pneumonia, or stillbirth.

The signs and symptoms of early -onset GBS include

- Signs and symptoms occurring within hours of delivery.
- Sepsis, pneumonia, and meningitis, which are the most common complications.
- Breathing problems.
- Gastrointestinal and kidney problems.
- Treatment is as follows:
- During labour and until delivery, IV penicillin G or ampicillin.
- In patients with known penicillin allergy, sensitivities of the GBS isolate should be sent, although IV cefazolin is the best choice in penicillin-allergic patients at low risk for anaphylaxis.
- Urinary tract infections: Sulphonamides, amoxicillin, amoxicillin clavulanate, cephalaxin, and nitrofurantoin are acceptable.
- The neonate must be carefully observed for signs and symptoms of disease.

AIM

TO observe the prevalence of respiratory tract infections and sepsis in different age groups of children and evaluation of risk factors and their complications based on severity of disease.

OBJECTIVES

- To identify the Sociodemographic characteristics from infants to children.
- To identify the clinical characteristics in infants to children.
- Estimation of respiratory tract infections and sepsis cases in infants to children.
- Estimation of age related respiratory tract infections and sepsis in infants to children.
- To evaluate age related risk factors in infants to children.
- To evaluate age related complications in infants to children.
- To identify antibiotic treatment and number of symptoms relieved in infants to children.
- To examine the relation between respiratory tract infections and sepsis in infants to children.

INCLUSION CRITERIA

- Research original articles are included.
- Only full articles are included.

EXCLUSION CRITERIA

- News letters are excluded.
- Abstracts are excluded.

METHODOLOGY

STUDY SITE: Government general hospital, Kakinada.

SOURCES OF DATA

From case sheets of patients admitted in GGH hospital in paediatric department.

STUDY DESIGN AND STUDY PERIOD

An Observational study conducted for 6 months.

SAMPLE SIZE: 125 Patients.

METHODS OF COLLECTION OF DATA

Severity assessment from patient demographics.

INCLUSION CRITERIA

- Age: 0-5 years.
- Infants, Toddlers, Children.
- Respiratory infections.
- Sepsis.
- Antenatal history of mother.
- Medication history of mother.
- Symptoms experienced by patients.
- Symptoms relieved by antibiotic treatment.

EXCLUSION CRITERIA

- Healthy patients.
- Age: Excluded >5 years children.
- Pregnant women's.
- Neonates.

STATISTICAL ANALYSIS

Fisher exact test is performed to know the relation between respiratory problems and sepsis.

Does The Study Require Any Investigations Or Interventions To Be Conducted On Patients Or Other Humans Or Animals?

NO.

Has Ethical Clearance Been Obtained From Your Institution?

YES.

RESULTS

Sociodemographic Characteristics

Table No: 01

S.No.	Sociodemographic characteristics.	Total (n).	%.
1.	Age : 0 to 1 years (infants). 2 to 3 years (toddlers). 3 to 5 years (children).	55. 37. 33.	44%. 29.6%. 26.4%.

2.	Gender :	Males.	59.	47.2%.
		Females.	66.	52.8%.
3.	Mother status:	Uneducated.	73.	58.4%.
		Educated.	52.	41.6%.

% = No. Of Cases\Total No Of Cases*100.

Clinical Characteristics

Table No: 02

S.No	Symptoms	Total Symptoms Observed In Infants, Toddlers, Children's.	%
1.	FEVER	85.	68%
2.	SCR+	32.	25.6%.
3.	ICR+	38.	30.4%.
4.	WHEEZING.	20.	16%.
5.	TACHYPNEA.	37.	29.6%.
6.	COUGH & COLD.	88.	70.4%.

Estimation of Respiratory Problems and Sepsis Cases in Infants, Toddlers, Children in Total Cases.

INFANTS : 55

TODDLERS : 37

CHILDRENS : 33

TOTAL CASES : 125

Prevalence = Disease Experienced\Total No Of Patients*100

INFANTS : $55/125*100= 44\%$.

TODDLERS : $37/125*100= 29.6\%$.

CHILDRENS : $33/125*100= 26.4\%$.

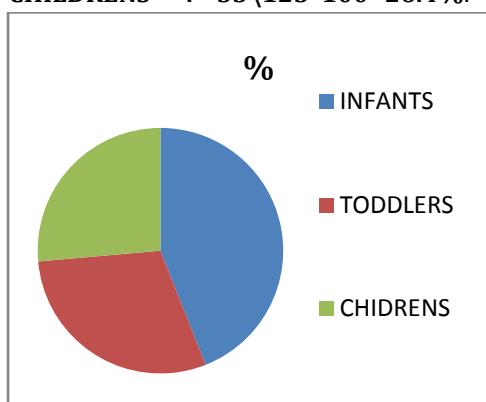


Figure No: 01 Estimation of Respiratory Problems and Sepsis

Cases in Infants, Toddlers, And Children in Total Cases.

To Estimate Age Related Respiratory Problems and Sepsis in Infants to Children's

Table No: 03

S.No	Disease	Infants	Toddlers	Children's
1.	Bronchopneumonia	35	22	24
2.	Broncholitis	15	14	12
3.	Sepsis	22	11	21

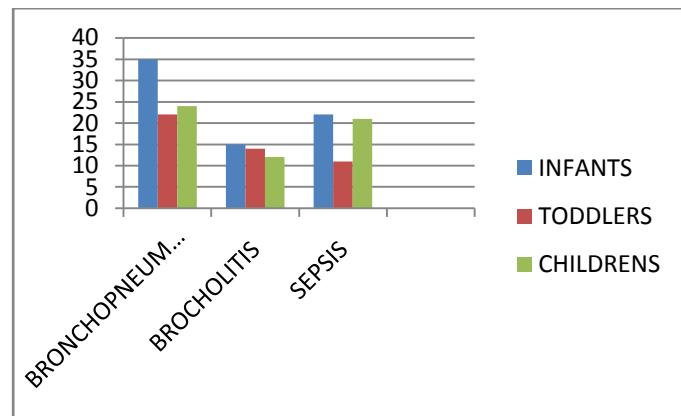


Figure No: 02 Estimate Age Related Respiratory Problems and Sepsis in Infants to Children's

To Evaluate Age Related Risk Factors Infants to Children's

Figure No: 04

S.N O	Risk Factor	Infants	Toddlers	Children's
1.	LOW BIRTH WEIGHT	17.	12.	16.
2.	JAUNDICE	21.	12.	17.
3.	MALNUTRITION	16.	14.	11.
4.	H/O OF SIMILAR COMPLAINT S.	31.	26.	28.

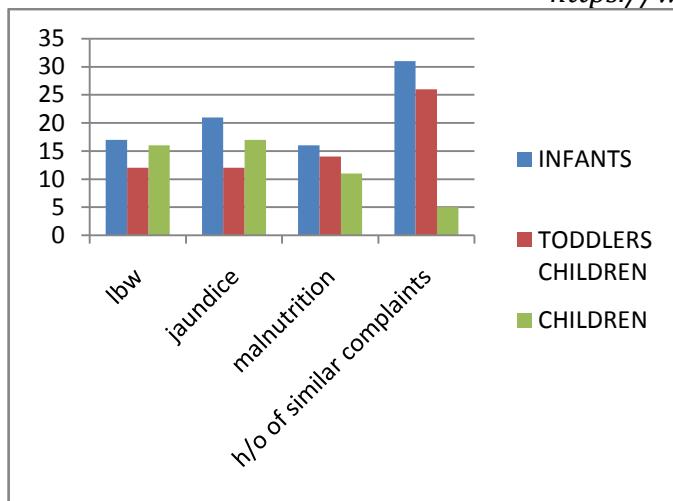


Figure No: 03 Evaluate Age Related Risk Factors Infants to Children's

To Evaluate Age Related Complications in Infants to Children

Figure No: 05

S.No	Disease	Infants	Toddlers	Children
1.	MENINGITIS	11	18	14
2.	URINARY TRACT INFECTIONS	9	7	3
3.	SEIZURES	13	16	21
4.	CHD	11	9	8

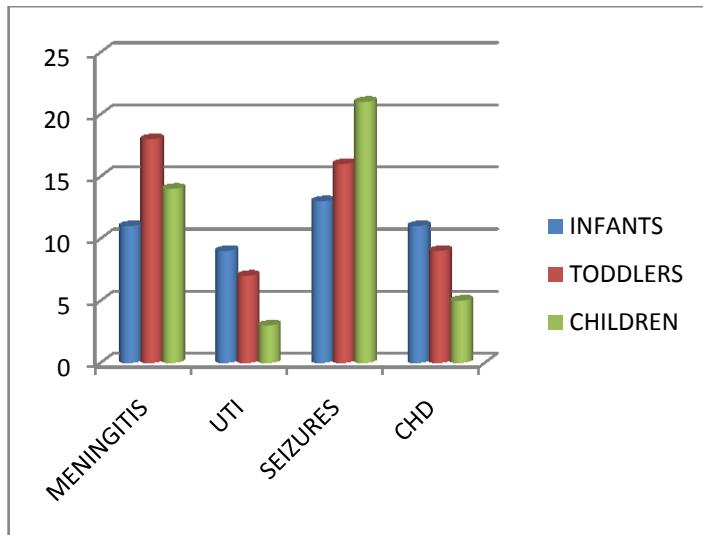


Figure No: 04 Evaluate Age Related Complications in Infants to Children

To Explain the Relation between Respiratory Problems and Sepsis in Infants to Children's.

Table No:06

S.No	Category	Infants	Toddlers	Children's
1	No. of Respiratory problems progressed to sepsis	35	24	29
2	Normal sepsis cases	22	11	21

Calculation: In this FISHER EXACT TEST is used to known whether the results are significant or not.

	C1	C 2	C3	Total
R1	35	24	29	88
R2	22	11	21	54
Totals	57	35	50	142

Fisher exact probability test:

$$PA=0.635977238518207.$$

$$PB=0.635977235182068.$$

Note: That PA and PB are both non directional (two tailed).

Normal Values: 1 (Or) 5.

Relation Was Not Significant.

Antibiotic Treatment and No of Symptoms Relieved In Infants to Children's

Table No: 07

S.No	Antibiotic	Category	Fever	Cold	Cough	Rashes	Pallor	Respiratory Distress	Noisy Breathing
1	Amoxicillin	Infants	Yes	Yes.	Yes	Yes	Yes	Yes	Yes
2	Amikacin	Toddlers	Yes	Yes.	Yes	Yes	Yes	Yes	Yes
3	Ceftriaxone	Children's	Yes	Yes.	Yes	Yes	Yes	Yes	Yes

DISCUSSION

Sociodemographic characteristics

Under this category age, gender, mother status, area of residence these factors were included to known the disease prevalence from infants to children. Infants are more subjected to infections compared to children's, and Females are exposed compare to males. Braz.J.infect et.al conducted study on these factors and estimates infants are likely exposed to most of infections and he shows demographics of the patients for infections and shows in contrast in results. Other researchers conducted several prospective and retrospective studies on this factor to identify the demographic characters of the children and social status, area of residence of their mothers to identify the further complications which are mainly observed once after the infection starts like eg. pneumonia with or without meningitis or pneumonia with suspected meningitis.

Clinical characteristics

Under this category major symptoms which are experienced from infants to children were identified and their severity was observed. Fever, and cough and cold are mainly experienced symptoms in case of infants. Braz.J.infect et.al conducted study on symptoms of infants to children's and shows in contrast results. Based on these severity of symptoms experienced by children's diagnosis was confirmed whether it is a mild (or) moderate (or) severe pneumonia.

To Estimate Age Related Problems And Sepsis In Infants To Children

Mainly infants are more subjected to respiratory infections like pneumonia, Broncholitis compared to other categories like toddlers and children's. David.K.Shay et.al, explains that pneumonia associated death are more when compared to Bronchiolitis and sepsis, and shows in contrast results, and explains that safe vaccination to children's and adults reduce further infections. It is seen in infants less than 1 year because the primary cause was exposure of mothers to GBS infections in their 3rd trimester. GBS can cause bladder and uterine infections for the mother. In serious cases, GBS can cause meningitis, sepsis, pneumonia, or stillbirth.

other definite cause may be low birth weight of the baby or due to premature birth or due to exposure of neonatal jaundice because once the infection starts it may leads to pneumonia, meningitis or it may cause severe organ damage and leads to sepsis.

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To evaluate age related risk factors in infants to children

Mainly risk factors include low birth weight of the baby, history of neonatal jaundice, malnutrition, or due to experience of similar complaints in past like (pneumonia, sepsis). Ighor Rudan et.al, conducted study on Definite Risk factors like Mal Nutrition, Low Birth Rate, and possible Risk factor like Mother's Education are mainly contributed to infections like pneumonia in case of infants.

1. LBW

The primary causes of VLBW are premature birth (born <37 weeks gestation, and often <30 weeks) and intrauterine growth restriction (IUGR), usually due to problems with placenta, maternal health, or to birth defects were major risk factors which is mainly responsible for exposure of infections like pneumonia after the birth.

2. Neonatal jaundice

Jaundice was caused due to increased bilirubin levels and also caused due to viral or bacterial in some cases that may leads to hepatitis in neonates which is main risk factor that may leads to infections in future.

3. Malnutrition

Malnutrition is a condition in which an individual has **insufficient energy** to maintain their body's essential functions, including growth, maintenance and movement.

Primary malnutrition

Refers to malnutrition which is caused by **inadequate energy intake**.

Secondary malnutrition

Arises when an individual's dietary intake is sufficient, but energy is not adequately absorbed by the body as a result of infectious conditions such as diarrhoea, measles or parasitic infections, and respiratory tract infections like pneumonia.

History of similar complaints

History of frequently experiencing infections like pneumonia in infant or toddlers stage may prognosis to other conditions like

meningitis, and blood infections, organ damage in childrens so, these risk factors may leads to future complications in childrens.

To evaluate age related complications in infants to children:

Mainly complications include meningitis, urinary tract infections, and febrile seizures. Infants and children's who were previously experienced infections may leads to these complications. Thomas R.Teen et.al, conducted study on complications of streptococcal infections and contribute **S.pneumoniae** was the most commonly identified cause of Meningitis ,Febrile seizures and shows Results like Children's are more likely admit in hospitals for these complications and Children mortality rate was more when compared to Infants.

1. Meningitis

Meningitis is major complication in children's compared to infants and toddlers. Risk factors for the development of meningitis include low birth weight (below 2500 g), premature delivery, and exposure of streptococcus infections previously. If not cured it may leads to seizures', septicemia.

2. Febrile seizures

It is major complication in children's compared to infants and toddlers. Any illness that causes a high temperature (fever) can cause a febrile seizure. Most occur with common illnesses such as ear infections, coughs, colds, flu and other viral infections. Serious infections such as pneumonia, meningitis, etc are common causes of febrile seizures.

3. Urinary tract infections

It is less commonly observed in children's and toddlers compared to infants. Childhood urinary tract infections are fairly common and are generally caused by bacteria. In infants it is mainly caused due to maternal exposure of GBS infections.

4. Coronary heart diseases

Due to premature birth, intra uterine growth restriction is mainly prone to infections to major organ damage like heart, kidney, and liver which may leads to infections. It is major complication in infants compared to toddlers and children's.

5. Antibiotic treatment and number of symptoms relieved in age groups

Generally amoxicillin, amikacin, ceftriaxone are the antibiotics prescribed in case of pneumonia, broncholitis, and in sepsis cases. According to pharmacology these drugs can relieve symptoms like fever, cough, cold, rashes, pallor, noisy breathing and respiratory distress. Additionally other drugs like NSAIDS are given to relieve elevated body temperatures and vitamin supplements in case of malnutrition. Bronchodilators are given to dilate bronchioles. Immunosuppressants like vancomycin are prescribed to improve immune system.John F.steiner et.al, conducted research and explains Antibiotics were more effective in treating URI 'S, Common cold and Bronchiolitis and shows in contrast results.

To explain the relation between respiratory problems and sepsis in infants to children

Majority of respiratory infections like pneumonia and bronchiolitis are progressed to other conditions like meningitis,

UTI'S, gastroenteritis, URTI'S like pharyngitis, laryngitis, tonsillitis, and lower respiratory tract complications like Asthma, COPD. This factor was mainly included to know whether there is a progression in between respiratory problems and sepsis. But it shows not significant based on above results.Annette M.Esper et.al, conducted survey on Relation of infection prolong in infants to children, and shows Results. once infection state may leads to Medical conditionslike Renal Failure, COPD, associated with Organ Dysfunctions like Respiratory, GI, CNS, CVS infections.

CONCLUSION

Under our project Infants were more subjected to infections compared to children, and Females were more exposed compared to Males. Children of uneducated mothers were mostly exposed to infections due to lack of knowledge. And rural area children were more exposed to infections due to lack of awareness and hygienic conditions.Under our project fever and cough&cold are main symptoms experienced mostly in case of infants than children.Estimated that infants are mostly subjected to infections like pneumonia when compared to other categories.Mainly infants are more subjected to respiratory infections like pneumonia, broncholitis compared to other categories like toddlers and children's due to definite risk factors like LBW, Malnutrition, Neonatal jaundice. Mainly complications include meningitis, urinary tract infections, and febrile seizures. Infants and children. In our comparative study disease severity and complications of respiratory tract infections like (pneumonia, bronchoilitis) and sepsis according to age wise was observed and reported. In our country many studies were conducted on these streptococcal infections and identified that risk factors like LBW, Neonatal Jaundice, Malnutrition, History of experiencing infections are more responsible for future complications like Meningitis and Febrile seizures and UTI'S frequently in children's. A part from these maternal complications like GBS infections in 3rd trimester was treated with suitable antibiotics that may decrease future complications in infants. Pneumococcal vaccinations was given to the children in correct time in required doses may stop infection prognosis in toddlers and children. Maintaining hygienic conditions may also reduce disease prognosis in children in future.

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