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PRESCRIPTION PATTERN OF BRONCHOPNEUMONIA IN PAEDIATRICS IN TERITARY CARE HOSPITAL

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ABSTRACT

Background: Pneumonia is an inflammation of the lung parenchyma caused by virus, bacteria, or fungi, in the alveoli (tiny air sacs) of infective origin and characterized by consolidation. Bronchopneumonia, or lobular pneumonia, is a type of pneumonia that causes inflammation in the bronchi. **Aims and Objectives:** Calculating the incidence of bronchopneumonia, studying the prescribing patterns of bronchopneumonia in pediatrics including the use of antibiotics according to the pathogens involved in the occurrence of the disease, educating parents about the importance of immunization (or) vaccination, finding the incidence after immunization against pathogen, identifying the predictors for developing bronchopneumonia. **Hypothesis testing: Significance between age and gender: Null hypothesis:** There is NO significant difference between the age groups of paediatrics population in occurrence of bronchopneumonia **Alternative hypothesis**: There is significant difference between the age groups of paediatrics population in occurrence of bronchopneumonia. **Significance between use of antibiotics: Null hypothesis:** There is NO significant difference in usage of antibiotics in treatment of bronchopneumonia. **Alternative hypothesis:** There is NO significant difference in usage of antibiotics in treatment of bronchopneumonia. **METHODS:** In-patients of paediatrics department diagnosed with bronchopneumonia. Statistical analysis: Incidence rate, Standard Deviation, Chi square test. **Results:** The incidence rate of bronchopneumonia-41% Incidence of bronchopneumonia after immunization-44.5% Teatment-Antibiotics, anti pyretics, secrelolytic agents, anti-histamines, bronchodialators, nebulisation and oxygen inhalation. **Conclusion**: In conclusion, our study reveals the prescription pattern of antibiotics and other drugs for bronchopneumonia along with incidence rate and risk factors. Antibiotics are widely prescribed for the treatment of bronchopneumonia especially monocef (2^{nd} generation cephalosporins) was used habitually. Along with antibiotics, anti pyretics, anti-histamines, mucosecrolytic agents were also used. Resistance of antibiotics was seen in 71 patients. The utilization rates and resistance of antibiotics prescribed in paediatrics are matter of great concern and need to be urgently addressed by use of guidelines, protocols, educational initiatives and antibiotic restriction policies at all levels of health care. Educational programmes should be conducted for the awareness of importance of immunization and risk factors of bronchopneumonia for the patient attendees in paediatrics.

KEYWORDS: Incidence, bronchopneumonia, severity of disease, immunization, prescription pattern, observational study.

INTRODUCTION

➢ **Bronchopneumonia**

Bronchopneumonia is defined as acute inflammation of the walls of small bronchial tubes with varying amounts of pulmonary consolidation due to spread of inflammation into peribronchiolar alveoli & the alveolar sacs & alveolar ducts may become confluent or haemorragic.

As opposed to the lobar pneumonia, bronchopneumonia is less likely to be found in association with the streptococcus. On the other hand, it is often found in association with the hospital-acquired pneumonia and the specific bacterial organisms that are behind it - meaning the staphylococcus aureus, E.coli, Klebsiella or pseudomonas.

Bronchopneumonia treatment in paediatrics

➢ **Pharmacological therapy**

- The choice of an initial, empiric agent is selected according to the susceptibility and resistance

patterns of of drugs to the suspected infected sites within the lung.

- High-dose amoxicillin the likely pathogens and experience at the institution, and the selection is tempered by knowledge of delivery is used as a first-line agent for children with uncomplicated community-acquired pneumonia, which provides coverage for S pneumoniae. Second- or third-generation cephalosporins and macrolide antibiotics such as azithromycin are acceptable alternatives but should not be used as first-line agents because of lower systemic absorption of the cephalosporins and pneumococcal resistance to macrolides. Treatment guidelines are available from the Cincinnati Children's Hospital Medical Center and, more recently, from the Infectious Diseases Society of America (IDSA).
- Macrolide antibiotics are useful in school-aged children, because they cover the most common bacteriologic and atypical agents (Mycoplasma, Chlamydophila, Legionella). However, increasing levels of resistance to macrolides among pneumococcal isolates should be considered (depending on local resistance rates). One study suggests that penicillin and macrolide resistance among S pneumoniae isolates has been increasing.

➢ **Anti-inflammatory therapy**

- Evidence-supported options for targeted treatment of inflammation independent of antimicrobial therapy are severely limited. Considerable speculation suggests that current antimicrobial agents, directed at killing invasive organisms, may transiently worsen inflammatory cascades and associated host injury because dying organisms release proinflammatory structural and metabolic constituents into the surrounding microenvironment. This is not to imply that eradicating invasive microbes should not be a goal; however, other methods of eradication or methods of directly dealing with the pathologic inflammatory cascades await further definition. In pneumoniaresulting from noninfectious causes, the quest for targeted, effective, and safe anti-inflammatory therapy may be of even greater importance.

➢ **Antiviral agents**

- Most infants with respiratory syncytial virus (RSV) pneumonia do not require antimicrobials. Serious infections with this organism usually occur in infants with underlying lung disease.
- Check for resistance patterns for other antiviral agents indicated for treatment or chemoprophylaxis of influenza. Since January 2006, the neuraminidase inhibitors (oseltamivir, zanamivir) have been the only recommended influenza antiviral drugs because of widespread resistance to the adamantanes (amantadine, rimantadine) among influenza A (H3N2) virus strains.

➢ **Bronchodilators**

Bronchodilators should not be routinely used. Bacterial lower respiratory tract infections rarely trigger asthma attacks, and the wheezing that is sometimes heard in patients with pneumonia is usually caused by airway inflammation, mucus plugging, or both and does not respond to bronchodilator. However, infants or children with reactive airway disease or asthma may react to a viral infection with bronchospasm, which responds to bronchodilators.

➢ **Nutritional Support**

Attempts at enteral feeding often are withheld in favor of parenteral nutritional support until respiratory and hemodynamic status is sufficiently stable.

MATERIALS AND METHODS

- **Study design:** Single centre Observational Study
- **Subjects**

✓ Patient attendees who are willing to sign the consent.

✓ Patients of 2 months – 12 yrs of age groups attending Pediatrics In-Patient Department.

✓ Patients who has been diagnosed with Bronchopneumonia

- **Material**

Statistical analysis: Incidence rate, standard deviation, chi square test

RESULTS

In this hospital based study of bronchopneumonia in 200 hospitalized children, it was observed that various factors influenced the risks for developing bronchopneumonia.

Variation according to age and gender

In our study, it was observed that males outweighed females. OUT OF 200 CASES, 101 (50.5%) were males compared to 99(49.5%) female children. And it is observed that young child age group (46%) is more affected by bronchopneumonia than infant age group (28%) and child age group (26%).

Table 1: Variation according to age and gender.

Age group	No. of patients		
	Male	Female	Total
Infant (1m-1yr)	32 (57%)	24 (42%)	56(28%)
Young child (1yr-6yrs)	56 (60%)	36 (39%)	92(46%)
Child (6yrs-12yrs)	13 (25%)	39 (75%)	52(26%)
Total	101(50.5%)	99(49.5%)	200(100%)

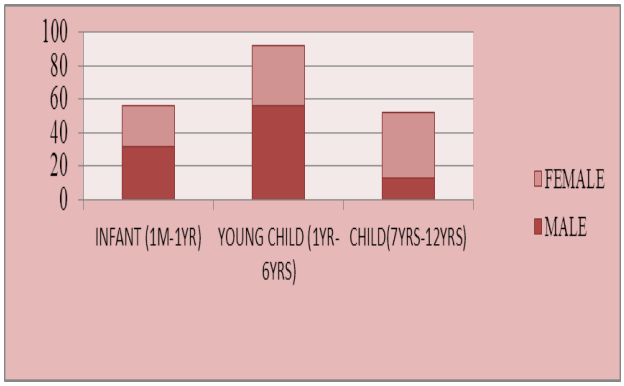


Fig. 1: Bar diagram showing variation according to age and gender.

Symptoms variation in bronchopneumonia

In children with bronchopneumonia, the most common symptoms were fever, cough followed by cold, difficulty in breathing, poor feeding and respiratory distress.

Table 2: Symptoms in bronchopneumonia.

Symptoms	No. of patients
Fever	200
Cough	200
Cold	180
Chest pain	30
Difficulty in breathing	164
Respiratory distress	148

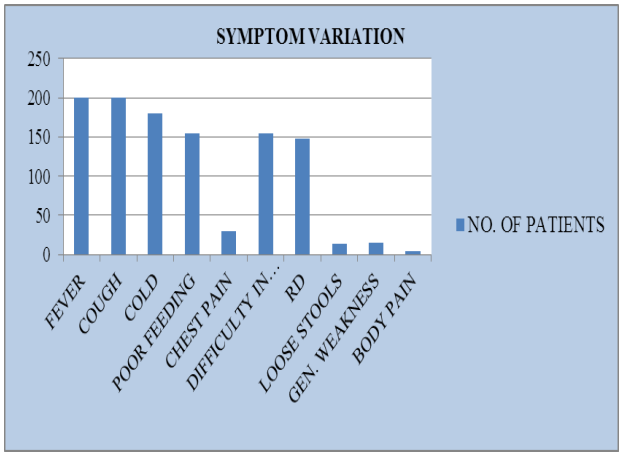


Fig. 2: Bar diagram showing symptoms in bronchopneumonia

Malnutrition

It was observed in our study and graded as per IAP Classification

Table 3: Grades of malnutrition in pediatrics suffering from bronchopneumonia.

Grading	No. of patients
Normal	60 (30%)
Grade I (80-90%)	36 (18%)
Grade II (70-79%)	40 (20%)
Grade III (<70%)	32%)

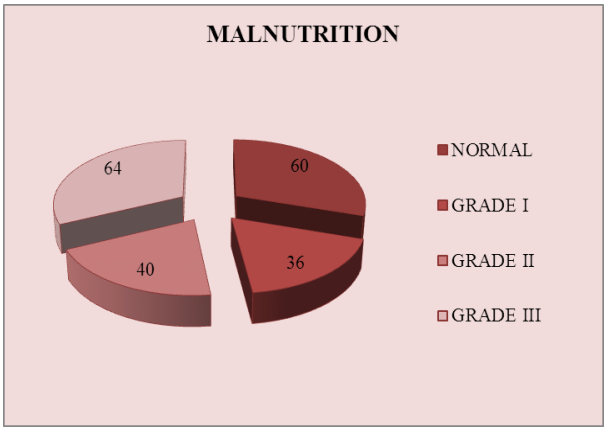


Fig. 3: Pie diagram showing grades of malnutrition in paediatrics suffering from bronchopneumonia.

Immunization

Our studies showed that out of 200 cases, 142 children (71%) were unimmunized or partially immunized compared to 58 children (29%) who were immunized.

Table 4: Immunization of patients suffering from bronchopneumonia.

Vaccination	No. of patients
Immunized	58 (29%)
Unimmunized	142(71%)

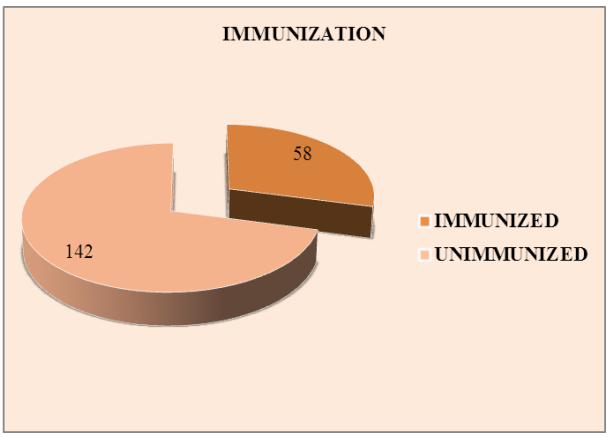


Fig. 4: Pie diagram showing immunization of patients suffering from bronchopneumonia.

Feeding practices

Out of 200 children 62 (31%) children were exclusively breast fed and then weaned adequately compared to 138 (69%) children who were given bottle feeds exclusively or in addition to breast feeds. majority of mothers were using the bottle without adequate concentration of formula and sterilization.

Table 5: Feeding practices of patients suffering from bronchopneumonia.

Feeding practice	No. of patients
Bottle feed	138 (69%)
Breast feed	62 (31%)

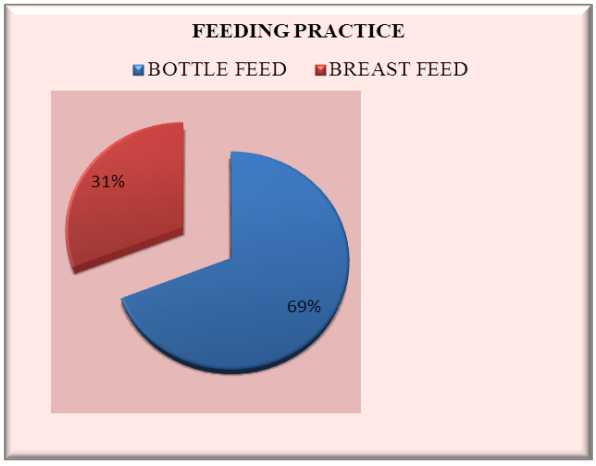


Fig. 5: Pie diagram showing feeding practices of patients suffering from bronchopneumonia.

Parental Smoking

Out of 200 cases, 102 (51%) fathers used to smoke cigarettes or beedis compared to 98 (49%) of children with non smoking parents. this could also contributed to development of bronchopneumonia.

Table 6: History of parental smoking in patients suffering from bronchopneumonia.

History of parent smoking	No. of patients
Smokers	102 (51%)
Non smokers	98 (49%)

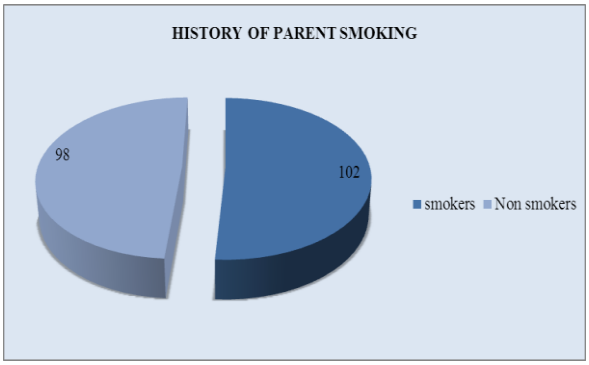


Fig. 6: Pie diagram showing history of parent smoking in patients suffering from bronchopneumonia.

Season Susceptibilty

Out of 200 cases studied, most of the cases of bronchopneumonia are seen in winter season i.edec – feb (47%) followed by autumn i.e (sep-nov) (25%), summer i.e (23%) and spring (7.5%).

Table 7: Season susceptibility in bronchopneumonia.

Season	No. of patients affected
Spring(mar-may)	15 (7.5%)
Summer (jun- aug)	36(23%)
Autumn (sep-nov)	45 (25%)
Winter (dec-feb)	4 (47%)

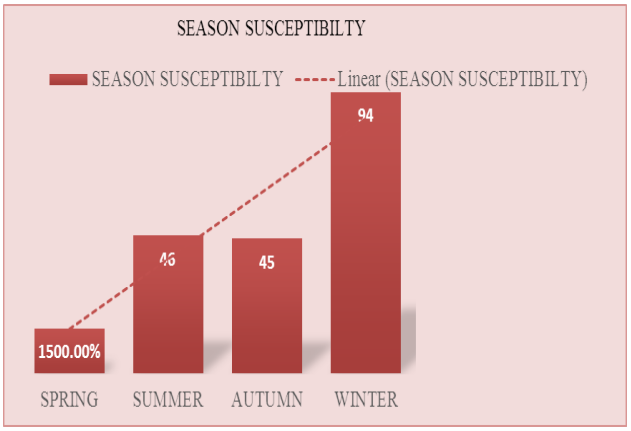


Fig. 7: Bar diagram showing season susceptibility in bronchopneumonia.

Investigations

200 cases were studied and the investigations are seen, the following data is obtained.

Table 8: Investigation in bronchopneumonia.

Investigation	No. of patients	
	Normal	Abnormal
CBP	155	45
CRP	136	64
Chest x ray	88	112

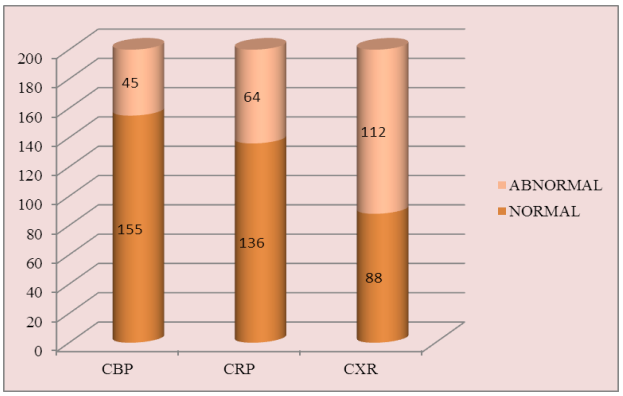


Fig. 8: Bar diagram showing investigations of bronchopneumonia.

Culture grown

Out of 200 cases studied, 68 (34%) were no growth isolated, 40(20%) grew s. pneumonia, 23(11%) grew streptococcus aureus, 20(10%) grew h. influenzae, 12 (6%) included contaminants and 37 (18%) cultures not sent.

Table 9: Culture growth.

Culture	No. of patients
No growth	68 (34%)
S. pneumonia	40 (20%)
Strep.aureus	23 (11%)
H. influenza	20 (10%)
Contaminants	12 (6%)
Culture not sent	37 (18%)

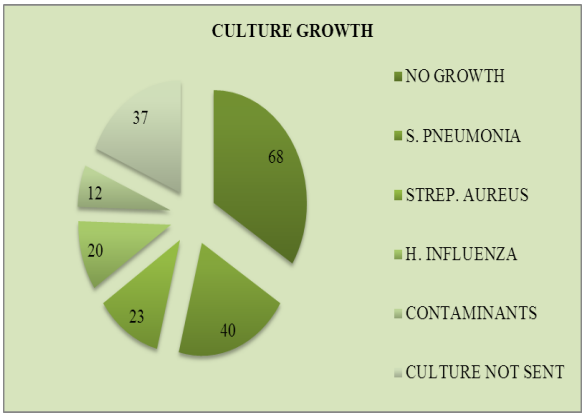


Fig. 9: Culture growth.

Incidence of bronchopneumonia

In the study carried out in paediatrics department, the incidence rate of bronchopneumonia was found to be 0.41 (41%).

Table 10: Incidence of bronchopneumonia.

Population type	No. of patients
Total subjects in pediatric dept	785
Bronchopneumonia affected patients	328

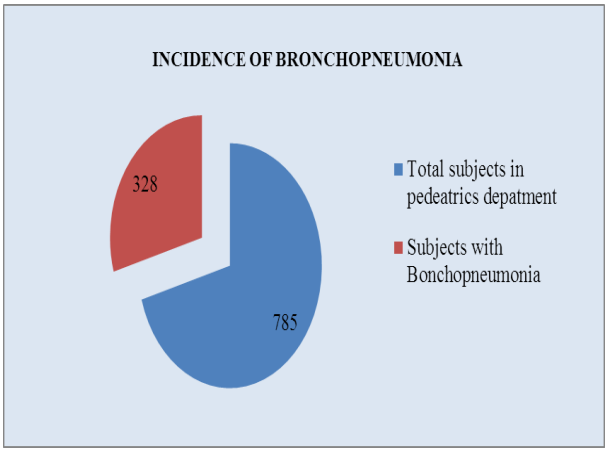


Fig. 10: Pie diagram showing incidence rate in bronchopneumonia.

Treatment of bronchopneumonia

Prescription pattern of antibiotics

Out of 200 patients, 96 (48%) children were given monocef, 24(12%) were given augpen + amikacin, 23 (11%) were given augpen, 22(10.5%) were given monocef + amikacin, 20 (10%) were given amikacinand 15(7%) were given piptaz

Table 11: Prescription pattern of antibiotics in patients suffering from bronchopneumonia.

Antibiotic given	No. of patients
monocef + amikacin	22 (11%)
augpen + amikacin	24 (12%)
piptaz	15 (7%)
monocef	96 (48%)
augpen	23 (11%)
amikacin	20 (10%)

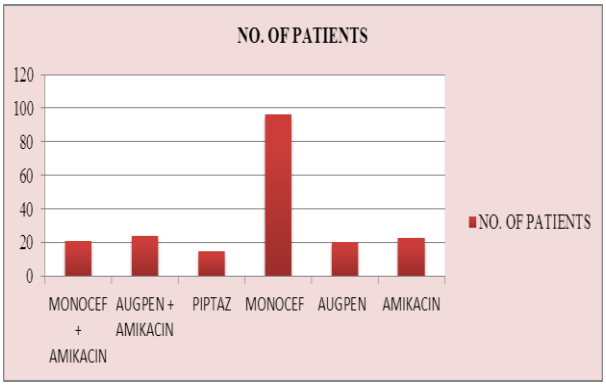


Fig. 11: Bar diagram showing prescription pattern of antibiotics in patients suffering from bronchopneumonia.

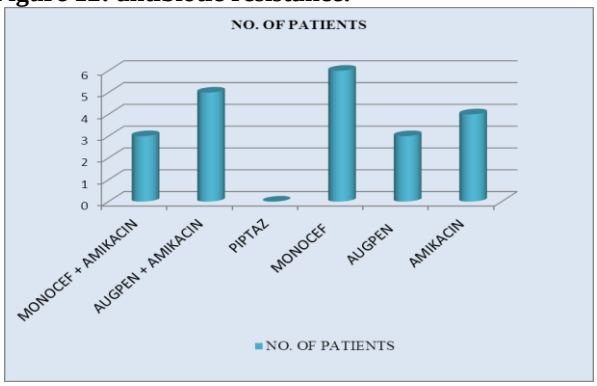
Resistance of antibiotics

Out of 200 patients, 3 patients was found to have resistance against monocef + amikacin, 5 have resistance against augpen + amikacin, 6 have resistance against monocef, 3 have resistance against augpen, 4 have resistance against amikacin

Table 12: Anbtibiotic Resistance.

Antibiotic	Resistance in patients
monocef + amikacin	3
augpen + amikacin	5
Piptaz	0
Monocef	6
Augpen	3
Amikacin	4

Figure 12: antibiotic resistance.



Adverse drug reactions

Out of 200 patients, 48 (24%) have rashes as adrdurong treatment, 26 (13%) have acidity, 23 (11.5%) have nausea/ vomiting, 7 (0.03%) have diarrehea.

Table 13: Adverse Drug Reactions.

ADRs	No. of patients	Management
Nausea / vomiting	23 (11.5%)	Inj. zofer 1 cc iv
Rashes	48 (24%)	Calasoft lotion for l/a
Diarrehea	7 (0.03%)	Enterogermina sachets
Acidity	26 (13%)	Inj pan 20mg iv

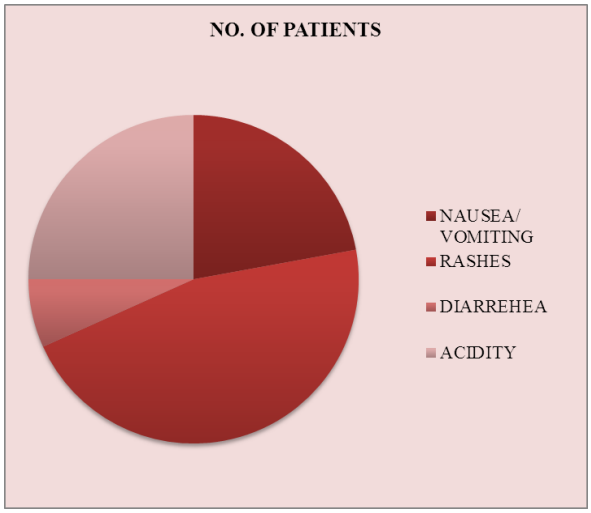


Fig. 13: ADRS of antibiotics.

Statistical Analysis

Table 14: Standard Deviation of age and gender.

Statistical analysis	infant male	infant female	young child male	young child female	child male	child female
Mean	8.43	7.95	3.72	3.72	9.76	9.61
Variance	319.82	216.90	114.21	80.92	36.21	159.89
Standard deviation	17.88	14.72	10.68	8.99	6.01	12.64

Table 15: Chi square test illustrating significane between Age and gender.

Age group	O	E	O-E	$(O-E)^2$	$(O-E)^2/E$
Infant male	32	16.16	15.84	250.9	15.47
Infant female	24	11.88	12.12	146.8	12.35
Young child male	56	28.88	27.12	735.49	25.46
Young child female	36	16.83	19.17	367.48	21.83
Child male	13	6.06	6.94	48.1	7.93
Child female	39	18.81	20.19	407.6	21.66
Total					104.6

Table 16: Illustrating Hypothesis Testing of the variaables.

Hypothesis Testing	Age and Gender	Antibiotics
Degree of freedom	2	1
P-value	104.6	141.09
Table value	0.05%	0.05%
Result	Null Hypothesis Rejected	Null Hypothesis Rejected

Table 17: Chi square test illustrating significane between antibiotics.

Antibiotic	O	E	O-E	$(O-E)^2$	$(O-E)^2/E$
monocef+amikacin	22	33.33	-11.33	128.36	3.85
augpen+amikacin	24	33.33	-9.33	87.04	2.61
Piptaz	15	33.33	-18.33	335.98	10.08
Monocef	96	33.33	62.67	3927.5	117.83
Augpen	23	33.33	-10.33	106.70	3.20
Amikacin	20	33.33	-13.33	117.68	3.53
Total					141.09

Table 18: illustrating Hypothesis testing.

Hypothesis testing	Significance between age and gender	Significance between use of antibiotics
Null hypothesis	There is no significant difference between the age groups of paediatrics population in occurrence of bronchopneumonia	There is no significant difference in usage of antibiotics in treatment of bronchopneumonia
Alternative hypothesis	There is significant difference between the age groups of paediatrics population in occurrence of bronchopneumonia	There is significant difference in usage of antibiotics in treatment of bronchopneumonia.

CONCLUSION

In conclusion, our study reveals the prescription pattern of antibiotics and other drugs for bronchopneumonia along with incidence rate and risk factors. Antibiotics are widely prescribed for the treatment of bronchopneumonia especially monocef (2^{nd} generation cephalosporins) was used habitually. Along with antibiotics, anti pyretics, anti-histamines, mucosecrolytic agents were also used. Resistance of antibiotics was seen in 71 patients. The utilization rates and resistance of antibiotics prescribed in paediatrics are matter of great concern and need to be urgently addressed by use of guidelines, protocols, educational initiatives and antibiotic restriction policies at all levels of health care. Educational programmes should be conducted for the awareness of importance of immunization and risk factors of bronchopneumonia for the patient attendees in paediatrics.

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