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Clinical Profile and Outcomes of Acute Respiratory Infections in Children Admitted to Tertiary Care Hospitals.

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ABSTRACT

Background:
Acute respiratory infections (Aris) serve as the major healthcare problems which cause mortality and hospital admissions among children especially across low- and middle-income nations. Aris consist of both mild upper respiratory tract infections alongside dangerous lower respiratory tract conditions which may progress to pneumonia. The diagnosis must happen early and effective treatments combined with risk factor detection ensures better results and it reduces disease impact.

Objectives:
This study determines the clinical characteristics along with risk elements and final results of children who receive hospital care for acute respiratory infections at tertiary care facilities while analyzing features leading to treatment intensity and hospitalization duration.

Study Design: A Perspective Study.

Place and duration of study. Department of pediatric MTI,LRH Peshawar from January 2022 to june 2022

Methods:
150 children from one month to twelve years old was included who received hospital admission due to Aris. The study collected clinical presentations together with laboratory test results and hospitalization times and patient outcomes. A statistical analysis was performed using SPSS version 24.0 through the platform. The statistical tests included mean and standard deviation along with chi-square with $p<0.05$ determining statistical significance.

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Results:
100 patients with 88 males constituting 58.7% of the total patient population while 62 patients comprised 41.3%. The participating patients had an average age of 3.6 ± 2.8 years old. The three main symptoms reported by patients were fever in 91% and cough in 86% along with respiratory distress in 68%. Approximately sixty percent of patients received pneumonia diagnosis with bronchiolitis becoming present in twenty-five percent of cases. The patients spent on average 5.2 days ± 2.1 days in the hospital. The combination of severe malnutrition together with patients waiting too long to seek hospital treatment led to longer stays and complications according to statistical results (p=0.003).

Conclusion:
Acute respiratory infections constitute a significant health problem for hospitalized children since they mostly affect children younger than five years old. Time-sensitive identification of serious illness symptoms coupled with prompt medical actions leads to better patient results. Worse outcomes in hospitalized children often relate to their malnutrition status and late medical services participation. The reduction of Aris hospitalizations together with its complications necessitates both primary healthcare system improvements and enhanced parental education programs.

KEYWORDS: Acute respiratory infections, Paediatrics, Hospital outcomes, Risk factor

Introduction:

Acute respiratory infections (Aris) stand as one of the most frequent reasons for child morbidity and mortality throughout the world because they cause approximately two million fatalities per year in children younger than five especially in low- and middle-income countries [1,2]. Aris infections span a wide spectrum from nonthreatening upper respiratory tract infections (URTIs) and severe lower respiratory tract infections (Leti's) that include pneumonia and bronchiolitis [3]. Pneumonia causes 15% of all deaths among children under five years worldwide and results in over 800,000 yearly fatalities [4]. The combination of young age along with malnutrition and low birth weight with improper immunization and home air contamination and substandard medical systems substantially raises patients' susceptibility to Aris [5,6]. Study demonstrates that disease burden depends heavily on seasonal changes along with population crowding and economic disadvantage especially affecting developing world nations [7].In Pakistan ARI diseases represent a significant public health crisis. The Pakistan Demographic and Health Survey (PDHS) shows 13-16% of children between 0 to 5 years old currently experience ARI symptoms while most of these children do not receive suitable healthcare [8]. The national programs use community-based interventions to lower mortality counts but hospital-based data collection lacks proper reporting. The heavy patient admissions because of Aris in paediatric wards demonstrate the necessity for ongoing healthcare service surveys and clinical audits to create better healthcare policies and improve hospital care operations [9]. Study conducted within hospital settings shows how severe disease manifestations present while assessing treatment methods and determining factors that increase hospital stay duration and treatment complications until death [10]. Acute respiratory infections within children often produce negative outcomes when the patient presents with comorbidities and delayed medical entry or insufficient nutrition levels according to multiple study findings [11]. The study outcomes can support hospitals in improving their readiness while enabling prompt responses and incorporating preventive measures into their current child health initiatives.

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Methods:

This study conducted at Department of pediatric MTI,LRH Peshawar from January 2022 to june 2022 .150 children who ranged from 1 month to 12 years in age and presented with both clinical and radiological findings of acute respiratory infection through non-probability consecutive sampling. A predesigned proforma contained spaces for recording both comprehensive clinical assessments and suitable diagnostic tests including CBC and chest X-ray and CRP and oxygen saturation. Medical staff recorded both hospital admission length and treatment-related complications and resulted patient outcomes including hospital discharge and treatment referral and mortality statistics. Treatment of children followed WHO recommendations for treating acute respiratory infections.

Inclusion Criteria:

This study enrolled children between 1 month old and 12 years with acute respiratory infection signs which included cough and fever along with respiratory distress.

Exclusion Criteria:

These children excluded from the study included those diagnosed with chronic respiratory diseases including asthma and cystic fibrosis and congenital heart disease and immunodeficiency syndromes to prevent pre-existing health conditions from biasing the study variables.

Data Collection:

Patients received assessment through a structured questionnaire with demographic sections and clinical information, risk factors about nutrition and vaccination status, radiological investigation results, treatment received and clinical outcomes. Within 24 hours of admission paediatric residents underwent training to obtain data by studying patients, conducting physical assessments and holding interviews with guardians until the time of discharge.

Statistical Analysis:

SPSS version 20.0 served both for entering data points and conducting their analysis. The study team calculated descriptive statistics which included means, standard deviations along with frequencies. The study utilized Chi-square tests for categorical data analysis with independent t-tests for statistical assessment of continuous variables. The study considered a p-value less than 0.05 to reach statistical significance levels.

Results:

100 children with a higher number of males comprising n=88 (58.7%) compared to females n=62 (41.3%). The study participants had a mean age of 3.6 years with an average age standard deviation of 2.8 years. Sixty percent of the children participated in the study were under the age of five. The study participants primarily came from impoverished homes while showing partial vaccination status and no vaccination status among 68% of the subjects. The three primary clinical indicators exhibited by patients were fever affecting 91% of patients alongside cough occurring in 86% of patients followed by respiratory distress seen in 68% of patients. The condition of chest indrawing was detected in 46% of patients alongside hypoxia that manifested as SpO_2 < 90% in 22% of patients. The main diagnoses were pneumonia (60%) and bronchiolitis (25%) together with croup (10%). The treatment of these children produced complications affecting 27% of patients while 10% suffered pleural effusion and 8% developed respiratory failure and 9% needed ventilatory support. Thirty-eight children showed severe malnutrition according to Z-score < -3 which negatively influenced both their hospital stay duration

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(p=0.003) and their risk of complications (p=0.001). The average hospital stay for patients amounted to 5.2 ± 2.1 days. Children experienced recovery at a rate of 90% and were released while referral to intensive care became necessary for 8% among them and 2% ended in mortality as severe pneumonia caused multi-organ failure.

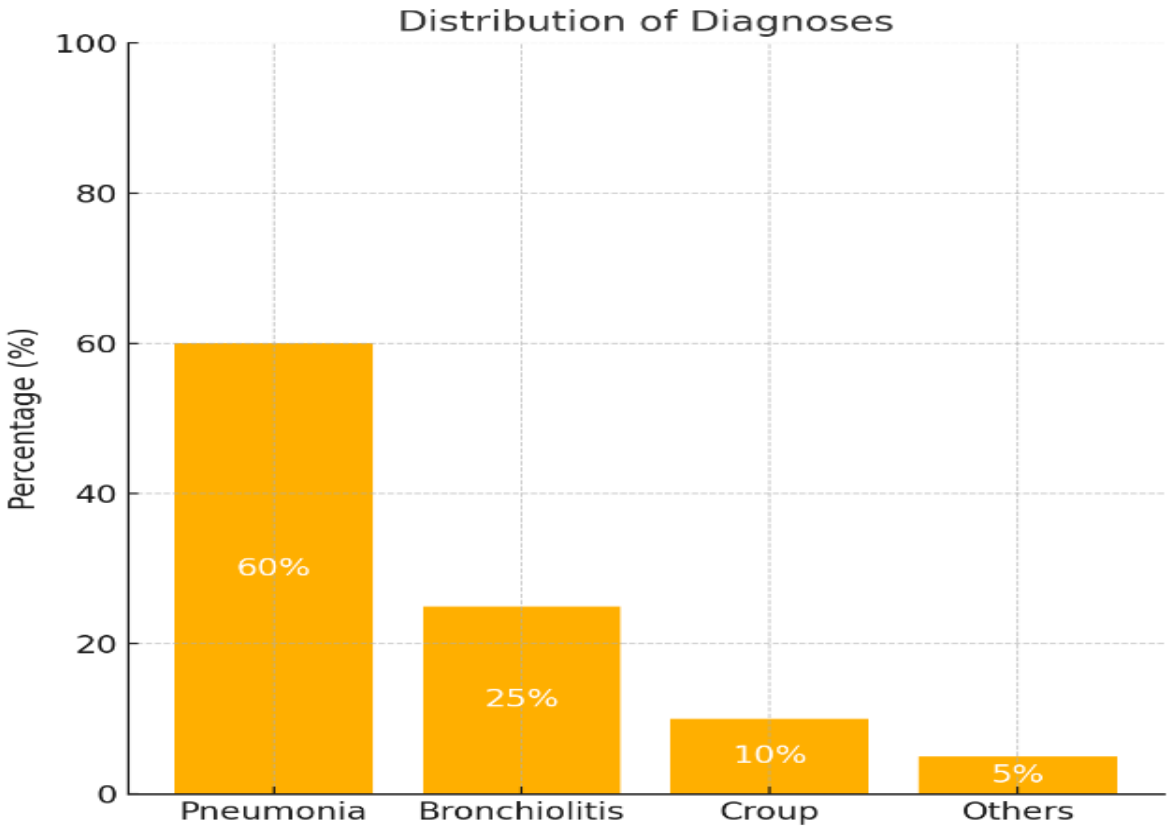

Table 1: Demographic and Clinical Characteristics

Variable	Value
Total Patients	150
Male	88 (58.7%)
Female	62 (41.3%)
Mean Age (years)	3.6 ± 2.8
Under 5 years	90 (60%)
Unimmunized/Partially Immunized	102 (68%)

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Table 2: Clinical Presentations and Diagnoses

Clinical Feature / Diagnosis	Frequency (%)
Fever	137 (91%)
Cough	129 (86%)
Respiratory Distress	102 (68%)
Chest Indrawing	69 (46%)
Hypoxia (SpO2<90%)	33 (22%)
Pneumonia	90 (60%)

Table 3: Complications and Outcomes

Outcome / Complication	Value
Pleural Effusion	15 (10%)
Respiratory Failure	12 (8%)
Ventilatory Support	14 (9%)
Mean Hospital Stay (days)	5.2 ± 2.1
Malnutrition (Z-score <-3)	38 (25.3%)

Discussion:

This study contributes important clinical information about acute respiratory infections (Aris) which affects hospitalized children in tertiary care facilities. Study results demonstrate pneumonia and bronchiolitis as primary hospitalization causes in children under five years because lower respiratory infections are confirmed as major killers according to worldwide study [12]. Study has established that females have fewer chances than males (58.7%) to develop respiratory infections due to underlying physiological distinctions [13]. A multicenter Indian study established the accuracy of these findings by showing that severe ARI affects almost 70% of all children younger than five in resource-limited areas [14]. The most frequent symptoms in patients included fever and cough with respiratory distress and chest indrawing and hypoxia confirming that these cases involved lower respiratory tract involvement. The study results by Lodha et al. showed that 30-40% of hospitalized paediatric pneumonia patients exhibited respiratory distress along with hypoxemia [15]. The diagnosis of pneumonia represented 60% of cases which matches UNICEF and WHO estimates about pneumonia being the main infectious trigger of childhood mortality that results in approximately 800,000 yearly deaths worldwide [16]. Medical evidence from previous studies reveals that infant respiratory tract infections known as bronchiolitis made up 25% of patient cases and showed a seasonal pattern during winter months [17]. Hospital admissions became more prolonged while the number of complications increased when doctors detected malnutrition in 25.3% of their patients. The findings of Chishti et al. confirm how children with Aris have higher death rates and slower recovery times when they have malnutrition [18]. Children with poor nutrition combined with weakened immunity experience worse

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respiratory complications because of this dependency between nutrition and immune function. Characteristics of complications included pleural effusion and respiratory failure which required ventilatory support in 9% of patients. The observed rates match findings from other developing countries which face limited critical care capacity and thus face delayed treatment leading to increased patient morbidity. Most patients showed excellent recovery (90%) possibly because of well-established hospital treatment plans and prompt supportive interventions. The study demonstrates that early diagnosis and treatment of Aris requires special attention for high-risk patient groups who are unimmunized and malnourished. The study results match studies from around the world thus confirming the necessity to improve immunization rates and nutritional services and referral systems to reduce disease prevalence. The evaluation of long-term respiratory consequences together with reinfection rates among patients after discharge needs further study through extended follow-up periods.

Conclusion:

The primary reason for hospitalizing children stands as acute respiratory infections with special impact on children below five years old. The health results are negatively affected by three main factors: malnutrition in combination with delayed healthcare resources and less than complete immunization of children. Proper early recognition should be combined with supportive care measures and prevention strategies focused on vaccination and health education to decrease hospital-based Aris morbidity and complications and mortality.

Limitations:

The study evaluation utilized only two tertiary care facilities but did not capture community-wide infection rates. The study design used prevents investigators from monitoring long-term effects through time. Selection bias can enter the study through non-probability sampling methods. The study did not acquire microbiological verification of causative organisms because limited resources existed.

Future Directions:

Future studies require community-based pathogen surveillance to identify ARI pathogens at their natural habitats. Study following patients for longer periods requires evaluation of multiple health outcomes and determination of reinfection risks. Study investigations combining interventions which focus on nutritional rehabilitation, vaccination programs and oxygen therapy availability would give policymakers specific strategies for reducing morbidity and mortality from ARI.

Abbreviations

Aris Acute Respiratory Infections

URTIs Upper Respiratory Tract Infections

Leti's Lower Respiratory Tract Infections

PDHS Pakistan Demographic and Health Survey

WHO World Health Organization

CBC Complete Blood Count

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CRP C-Reactive Protein

SpO_2 Peripheral Capillary Oxygen Saturation

Z-score Standard Deviation Score (used in growth assessment)

ICU Intensive Care Unit

SPSS Statistical Package for the Social Sciences

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Authors' Contributions:

Study concept and design- Mohsin Hayat[1]

Data collection or management-, Mohammad Irshad[2]

Data analysis- Ashfaq Ahmad[3]

Manuscript writing/editing- Rashida Sadiq[4], Muhammad Aftab[5], Hunain Khan [6]

Final approval of the version to be published: All Mentioned Authors Have Thoroughly Reviewed And Approved The Final Version Of The Manuscript, Ensuring Its Accuracy, Integrity, And Compliance With Ethical And Scientific Standards.

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