

Assessing the Quality of Life of Children's with Acute Respiratory Tract Infections

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ABSTRACT

Background: Acute Respiratory Tract Infections (ARTIs) are one of the most commonly occurring diseases. Importantly, ARTIs are the most prevalent disease among children, especially for 2 to 6 year old children. ARTIs are often related to genetic factors, lower immune functioning, vitamin and mineral deficiencies, improper feeding and nursing, residential environment and other variables. **Aim:** This research aimed to provide scientific insight into ways to address and improve health related quality of life in children with ARTIs and their caregivers. **Objective:** To observe the quality of life with acute respiratory infection and to minimize the acute respiratory infections. **Methods:** A prospective cross sectional study was conducted on 200 patients, majority of the subjects belongs to the age group of 0.3 to 4years on contrast, least number of subjects were observed between the ranges of 5 to 11 years. **Results:** ARTIs found insignificant relationship between the social history and disease outcome. 18.5% of the subject parents found to be smokers. On a deeper analysis of smoking pattern and behavior among the parents, we found great impact of such attitude contributing to acute respiratory tract infection. Results of the study reveal that 81% of cases were reported in excellent score. **Conclusion:** Most of the parents were aware and they did not smoke near child. So this factor not involved effectively in child to get respiratory tract infection. We noticed partial correlation coefficient in case of parental smoking. This suggested us that parental smoking had very less impact on quality of life of patients with ARTIs.

Key words: Acute respiratory tract infections (ARTIs), Quality of Life, Children, Pneumonia, Asthma.

INTRODUCTION

Definition

Acute respiratory tract infection (ARI) is a serious infection that may interfere with normal breathing function. It usually begins as a viral infection in the nose, trachea, (or) lungs [WHO]. Acute respiratory tract infections kill 4 million children are caused by pneumonia.¹⁻¹⁶ ARI can easily spread from one person to another. It is particularly dangerous for children, older, adults and people and immune system disorders.¹⁷ Most RTI's get better without treatments but sometimes need to check GP (General Practitioner). The respiratory tract is much more vulnerable to infection than other parts of the body. This is because it is easy for bacteria (or) viruses to enter the tract when someone breathe in RTI. The RTI are more common during the winter this is possibly due to fact that during the winter month's

people are more likely to stay inside and in close contact with each other. Children tend to get more upper respiratory tract infections than adult up immunity to the many viruses that can cause colds.

Symptoms of Acute Respiratory Infection

The early symptoms of acute respiratory infection usually appear in the nose and upper lungs. Other symptoms include:

- Congestion, either in the nasal sinuses or lungs.
- Runny nose
- Sore throat
- Body aches
- Fatigue

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If the disease advances, there may be high fever and chills.

Other serious symptoms are

- Difficulty breathing
- Dizziness
- Low blood oxygen level
- Loss of consciousness

Causes of Acute Respiratory Infection

Some causes of the condition are unknown, a few have been identified. They are

- Adenoviruses
- Pneumococcus
- Rhinoviruses

The ARI are classified into two types:

Upper respiratory tract infection

Lower respiratory tract infection

Upper Respiratory tract infection

The upper RTI is generally considered to be the air way above the glottis (or) vocal cords this includes the nose, sinuses, pharynx and larynx

The infections of the URIT includes tonsillitis, pharyngitis, laryngitis, sinusitis, otitis media certain types of influences and the common cold.

- **Tonsillitis**

Tonsillitis is inflammation of the tonsils, two oral shaped pads of tissue at the back of the throat

Signs and Symptoms

Swollen tonsils, sore throat, tender lymph nodes.

Causes

Viruses, bacterial infection (streptococcus progenies)

- **Pharyngitis**

Inflammation of the pharynx which is in the back of throat pharyngitis is included by sore throat

Signs and Symptoms: Sneezing, Runny nose, headache, cough.

Causes: Viral agents and bacterial agents



Adenovirus

Group A streptococcus

- **Laryngitis**

An inflammation of the voice box from over use, irritation (or) infection

Signs and Symptoms: Sore throat, Hoarseness, Swollen glands, Trouble speaking.

Causes

- Smoking and alcohol abuse
- Acid reflux
- Strong acids can travel up from stomach into your throat
- Allergies
- Bacterial and fungal infection
- Inhalation of chemical fumes
- Sinus disease

- **Sinusitis**

It is an inflammation (or) swelling of the tissue lining the sinuses

(Or)

A condition in which the cavities around the nasal passages become inflamed

Causes: Common cold, Allergic rhinitis, nasal polyps, deviated septum

Types

- Acute Sinueitis – last 2-4 words
- Subacute Sinus – last 4-12 words
- Chronic Sinueitis – last 12 weeks (or) longer
- Recurrent sinusitis – happens Several times a year

Signs and Symptoms: Sinus pressure, headache, inflammation of ear, sleeping difficulty, throat irritation

- **Otitis media**

An infection of the air filled space behind the ear drum (the middle ear).

Symptoms: Crying, Nasal Congestion, Nausea pain in ear.

Causes: Viral and bacterial infections

Common cause is dysfunction of Eustachian tube

Type A: Tympanogram

Common cold

The Viral infection of the nose and throat.

Signs and Symptoms – Runny (or) stuffy nose, cough, sore throat, Congestion, Sneezing, low- grade fever, malaise.

Cause: Rhinoviruses

- **Influenza:** A common viral infection that can be deadly, especially in high-risk groups.

Causes: Influenza virus.

Symptoms: Fever, runny nose, Sore throat, muscle pains, sneezing, feeling tired.

Lower Respiratory tract infection

The LRTI consists of trachea (wind pipe), bronchial tubes the bronchioles and lungs. LRTI are generally more serious than URTI. LRI's are leading cause of death among all infectious diseases. The most common LRI's are bronchitis and pneumonia influenza effect both upper and lower respiratory tracts but more dangerous strains such as the highly pernicious H5N tend to bind to receptors deep in the lungs.

- **Bronchitis**

An inflammation of the lining of bronchial tubes, which carry air to and from the lungs.

Signs and Symptoms: Chest Congestion, cough, shortness of breath, wheezing chest discomfort

Cause

- Acute bronchitis (Influenza virus)
- Chronic bronchitis(cigarette smoking, air pollution and duet (or) toxic gases in environment (or) work place)
- **Pneumonia**

Infection that inflames air sores in one (or) both lungs, which may fill without fluid (or) pus (penitent material).

Signs and Symptoms: Chest pain cough, fatigue, fever, lower than normal body temperature, nausea, shortness

of breath.

Cause:

Bacteria



fungi



virus



Streptococcus Pneumonia Soil bird dropping influenza virus adenovirus

Epidemiology

Acute Respiratory Infections (ARI) constitutes a leading cause of morbidity and mortality. ARI accounts for 4 million of the 1.5 million child deaths in the world, annually. Globally, 3060% of pediatric outpatient attendance and 20-30% of hospital admissions are due to ARI. Chronic illness like deafness, breathing difficulty and their subsequent disability among children, owe their origin to inadequately treated episodes of ARI. BOSTID researchers found the incidence rates of LRI in developing countries ranges from 0.4 to 8.1 episodes per 100 child-weeks.¹⁸ ARI occurs mostly in children under the age of 5. Five million LRI occur each year.¹⁹ Mortality rates in children under 5 years of age have declined by 49% globally since 2000, ARI causes 15% of all deaths in children under the age of 5 years globally. Nearly, 265,000 in-hospital deaths of young children took place due to ARI globally in 2010, 99% of which were reported in developing countries.²⁰ The mean mortality rates are higher in the older age groups, the contribution to the total number of deaths from all causes is greater for the younger age groups. The mean mortality rates for infants and children taken together and for the older age groups are 86.6 and 147.0 per 100 000, respectively.

- **Etiology**

Several different causes of ARI is

Upper Respiratory tract infection

- Acute pharyngitis
- Acute ear infection
- Common cold

Lower Respiratory tract infection

- Bronchitis
- Pneumonia
- Chiolitis

The causes of factors differ from one country to another

developing countries reveals that

- Air pollution
- Exposure to indoor air pollution
- Non – exclusive breast feeding
- Incomplete immunization
- Crowding more than seven members per household
- Poor nutrition
- Formula nutrition
- Wearing
- Young maternal age
- Low educational status of mother and father
- Pre mature birth
- Lack of availability of adequate medical care
- Low family income
- Parental cigarette smoking
- Household use of high-pollution, biomass fuel (charcoal, wood, dung, or straw)
- Lack of separate kitchen
- Being carried on the mother's back while cooling are primary cause.
- Other factors include:
- Indoor air quality
- Child's immune system
- Seasons
- Ability to resist invading organism
- Presence of great conditions (malnutrition, anaemia, fatigue, chilling of body)
- Presence of disorders affecting respiratory (allergies, cardiac abnormalities and cystic fibrosis)

Tools

- Mongolia Based Questionnaire form
- Kuppaswamy classification
- Excel
- Pearson Correlation test
- Grade level assessment of children

MATERIALS AND METHODS

Study site and approval

The study entitled 'Assessment of quality of life in Acute respiratory tract infection in children: A prospective study' was a prospective observational questionnaire based research study carried out for a period of four months in Apollo hospital, Arongonda, Chittoor district.

The protocol was reviewed and approved by Institutional Ethics Committee (IEC) of RVS Institute of Medical Sciences prior to the commencement of the study.

Subject's recruitment and confidentiality

Approvals from Medical Superintendent (MS) of Apollo Hospital were obtained to collect the data from their Institute. MS of the hospital was briefed with the study to be carried out at their hospital. Subjects of both genders from age three months to eleven years were recruited for the study. All the data was documented in specially designed predefined questionnaire to ensure confidentiality.

Study size

200 patients who met inclusion criteria were included in the study.

Study design

The study is a prospective observational study conducted in both inpatients and outpatients who came to pediatric ward with acute respiratory tract infection. The specially designed questionnaire (ANNEXTURE) validated by Mongolia baseline questionnaire comprising of patient demographic details, pollution, parental behavior towards their child disease (smoking, occupation) and child morbidity condition. The details collected by giving specific scores to the questions in the questionnaire. Questionnaire for assessment of quality of life (QOL) in children with ARI.

Inclusion Criteria

Infected children with Acute Respiratory Infection with hospital visit provided data specific to children 3 months to 11 years were included in the study.

Exclusion Criteria

If the case definition was not definitely defined or not consistently applied as well as if the investigated case as a co-infection rather than primary outcome were excluded from the study.

Data Collection

This study utilized two constructive data collection tools, namely semi-structured interviews and direct observations. The semi-structured interviews include the data collected from the parents regarding the subject demographics including their age, gender, their attitude towards their children to get disease and the patient disease condition. The direct observations are made using

questionnaire scale.

Semi- structured interviews

Questionnaire forms were provided to child's parents, we were completely explained every parameter and scoring pattern. According to provided information by their parents we were filled the forms.

Direct Observations

These direct observations were made to assess the patient's disease condition evaluation.

Scoring

Based on the report obtained by Semi- structured interviews, direct observations, each question has been assigned with a score of five point scale.²¹⁻³⁸ The highest score of 5 represents the excellent quality of life.

The score of 4 represents the good quality of life.

The score of 3 represents the average quality of life.

The score of 2 represents fair quality of life of patient with ARI.

The score of 1 represents poor quality of life of patients with ARI.

The large total score of each questionnaire was interpreted as poor, fair, average, good, excellent, the scores took as 0 to 23, 24 to 46, 47 to 69, 70 to 92, 93 to 115 respectively.

Statistical Analysis

The statistical analysis was performed using MS Excel. Descriptive summary statistics were presented either as mean and standard error of mean or percentage. Bivariate analysis was carried out using Pearson's correlation coefficient to rule out the association between two variables.

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{((n\sum x^2 - (\sum x)^2))\sqrt{((n\sum y^2 - (\sum y)^2))}}$$

Where $\sum x$ = Sum of interpreted score of one variable of patient

$\sum y$ = Sum of interpreted score of second variable of patient

\sum = Sum of squares of interpreted score of one variable of patient

\sum = Sum of squares of interpreted score of second variable of patient

N= Total score

Correlation coefficient formulas are used to find how strong a relationship is between data. The formulas return a value between -1 and 1, where

1 indicates a strong positive relationship.

-1 indicates a strong negative relationship.

A result of zero indicates no relationship at all.

The prevalence is calculated as percentage of patients who are positive for affected quality of life of children with ARI.

Prevalence (%) = number of children identified / total number of students *100

Selection of candidates for study

The entire study was carried out in a private hospital.

As per the inclusion criteria, the pediatric patients from age 3 months to 11 years were chosen for the study. A total of 200 patients were selected for the study. The details of the patients are collected by using questionnaire.

Table 1: Age wise distribution of children.

Age in yrs	No of children	Percentage (%)
0.3 to 3	93	46.5
3 to 5	52	26
5 to 8	34	17
8 to 11	21	10.5

Table 2: Distribution of scores to total number of patients for each question.

Q.NO	Score:1	2	3	4	5	0
1.	19	51	78	45	7	
2.	38	76	52	25	9	
3.	29	25	40	76	30	
4.	3	27	136	26	8	
5.	4	32	63	72	29	
6.	27	3	7	10	153	
7.	9	18	46	62	65	
8.	13	38	66	34	49	

RESULTS

Table 1 shows that out of total 200 patients, majority of the subjects belongs to the age group of 0.3 to 3 years (72.5%). On contrast, least number of subjects were observed between the ranges of 5 to 11 years (27.5%).

A validated questionnaire was analyzed which is depicted in Table 2, which comprised of knowledge of child's parents, practice of parents on prevention of respiratory disease, attitude of child's parents, smoking habit among family members and morbidity.

About 74% of subject's parents were either without education less than or equivalent to secondary level were present whereas 26% of the parents found with higher education.

And about 80% of subject's parents found with high scores, only 17% of subject's parents reported less score in questionnaire.

Table 3 depicts total interpreted score with respective to gender wise distribution of patients and Table 4 Correlates the total interpreted scores with respective to ages of Children's with ARI. The above tables showed that the maximum number of patients were reported, in parents with less knowledge got less score according to questionnaire. i.e., about 80% of subject's parents found with high scores, only the 17% percentage of subjects parents reported less scores.

Table 3: Total interpreted score with respective to gender wise distribution of patients.

Prevalence score	No of male children	No of female children
Poor	0	0
Fair	0	0
Average	22	6
Good	69	55
Excellent	28	20

Table 4: Correlation of total interpreted scores with respective to ages of Children's with ARI. Factor 3

Prevalence score	No of children with 3mon to 3 yrs	No of children with 3yrs to 5 yrs	No of children with 5yrs to 8 yrs	No of children with 8yrs to 11 yrs
Poor	0	0	0	0
Fair	0	0	0	0
Average	12	8	3	5
Good	59	29	22	14
Excellent	22	15	9	2

Age wise Distribution

The pediatric patients were categorized age wise as these parameters are more relevant for the study.

The results are represented below:

The validated Questionnaire comprises of the following parameters knowledge of child's parents, practice of parents on prevention of respiratory diseases, attitude of child's parents, smoking of family members and morbidity of studied child.

1. Score 1- Poor
2. Score 2- Fair
3. Score 3- Average
4. Score 4- Good
5. Score 5- Excellent

Comparison of results by using Correlation coefficient

Large total of each questionnaire score was categorized into poor, fair, average, good, excellent for final interpretation of results.

0 -23: Poor

24 – 46: Fair

47 – 69: Average

70 – 92: Good

93 – 115: Excellent

Factor 1

Patients were categorized based on their parents knowledge about disease and the scores were represented graphically shown in Figure 1.

The patients are distributed according to their parent's action to prevent ARI for the selected candidates and

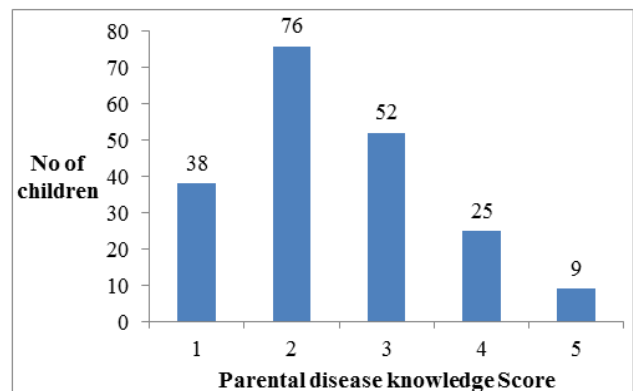


Figure 1: Distribution of scores for their parental disease knowledge.

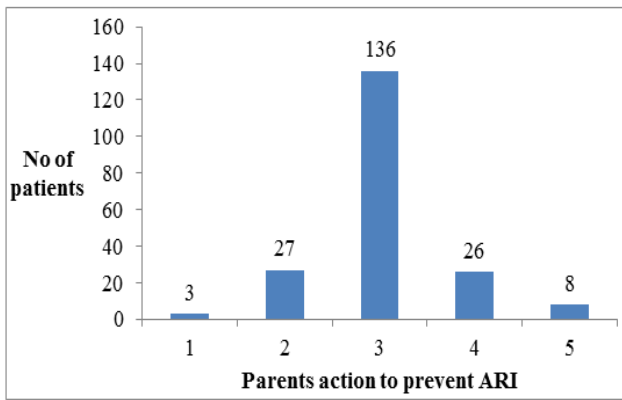


Figure 2: Bar graph representing the total number of patient's distribution according to their parent's action to Prevent ARI.

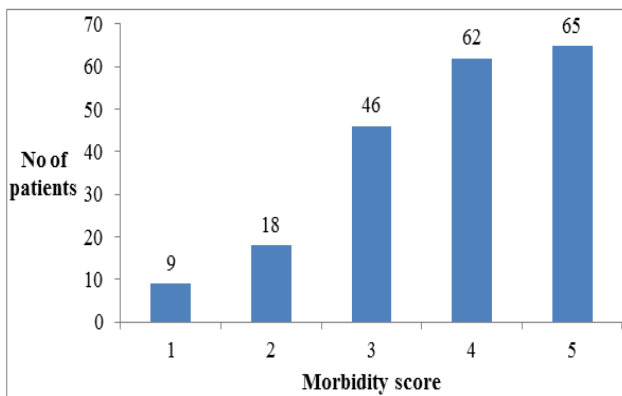


Figure 3: Graph representing the distribution of scores of patients based on Cough when get out of bed in morning.

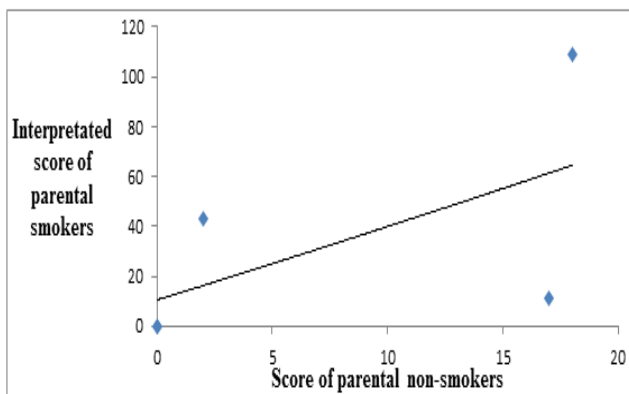


Figure 4: Correlation of interpreted scores of patients according to parental smoking.

shown in Figure 2.

Patient's disease outcome was measured based on cough when get out of bed in the morning with this question in terms of scores. These are shown in Figure 3.

The relation between parental smokers with non smokers according to final interpreted score of children with acute respiratory tract infection was plotted using scatter

graph and Pearson's coefficient was found to be 0.601035, shown in Figure 4.

DISCUSSION

On the individual level the quality of life has been the major factor among the children with acute respiratory tract infection. We applied prospectively validated and predefined questionnaire-based score for the identification of individuals.

All the patients were subjected to screening by their parents or relatives, since the pediatric patient compliance is poor. This includes evaluation of knowledge about disease, disease prevention practices, attitude and smoking history of parents and children morbidity factor.

On a deeper analysis of smoking pattern and behavior among the parents, we found great impact of such attitude contributing to acute respiratory tract infection.

Whereas, unlike social history. The educational status has been noticed with significant influence over the quality of life and disease status as well. We noted 74% of the subject's parents either without education or education less than or equivalent to secondary level. Whereas 26% of the parents found with higher education. We believe educational status contribute in lowering or preventing the cases of respiratory tract infection in their children.

It was found that the pollution was slightly involved in disease occurrence in our study.

As per results it was found that parental smoking not effectively involved in children to get ARI. It may due to parents were hesitated to reveal their smoking habit.

Results of the study reveal that 81% of cases were reported in excellent score. Most of the parents were aware and they didn't smoke near child. So this factor not involved effectively in child to get respiratory tract infection.

Cough with eating and certain foods were present in moderate number of patients, a thing involved in this is due to age factor some of the patients not involved because they didn't started eating yet.

Based on children coughing habit the results were found to be, for almost all patients cough is present.

The correlation was done in five factors they include gender, age, overcrowding, parental education, parental smoking.

The 'r' value renders an absolute positive correlation depicting that gender difference affects the quality of life of patients with ARI.

The correlation coefficient 'r' value depicts an absolute positive correlation indicating that overcrowding strongly affects the quality of life of patients with acute respiratory tract infection.

The correlation coefficient 'r' value demonstrates a very partial positive correlation it revealed that parental smoking not strongly affected the quality of life of patients with acute respiratory tract infection. It may be due to our sample size was less or otherwise parents were unable to reveal their smoking habit.

The 'r' value establishes complete positive correlation 0.992422 indicating that age affects the quality of life of patients with acute respiratory tract infection. Patients with age less than 5 years are affected more with ARI.

The 'r' value depicts a moderate correlation indicating that parental education moderately affected the quality of life of patients with acute respiratory tract infection.

CONCLUSION

This study entitled 'Assessment of quality of life in Acute respiratory tract infection in children: A prospective study' was a prospective observational questionnaire based research study carried out for a period of four months in Apollo hospital, Chittoor district. The protocol was reviewed and approved by Institutional Ethics Committee (IEC) of RVS institute of medical sciences prior to the commencement of the study. 200 patients who met inclusion criteria were included in the studies.

From our prospective questionnaire based research study, we found more than three fourth of population with good (4) and excellent (5) scores. Only 24% of patient's lies in average score (3). Our study has not met with any case such those falls under the scores between poor (1) to fair (2) scores. This highlighted that Quality of life (QOL) has got significant dependence with concerned parenting. If not the randomization factor would play the key role. The Pearson's correlation coefficient between factors revealed that absolute positive correlation in variables like gender, age and parental education. It shows that these demographics have been strongly influencing the Quality of life of patients with acute respiratory tract infection in specific. We noticed Partial correlation coefficient in case of Parental smoking. This suggested us that parental smoking had very less impact on quality of life of patients with ARI. We expect either the parents were unwilling to

reveal their social history or there could be some other factors probably which our study has not dealt with.

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CONFLICT OF INTEREST

The authors declare no competing interest in publishing this research.

ABBREVIATIONS

ARTIs: Acute Respiratory Tract Infections; **WHO:** World Health Organization.

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