



Research Article

A PROSPECTIVE STUDY ON ASSESSMENT OF RISK FACTORS AND MANAGEMENT OF LOWER RESPIRATORY TRACT INFECTIONS IN PAEDIATRICS

Yogi Eshwar Kumar P^{1*}, Pradeep Kumar C¹, Siva Prasanna K¹, Sudhakar S²

¹Pharm.D, Department of Pharmacy Practice, Annamacharya college of Pharmacy, Rajampet, Kadapa, Andhra Pradesh, India

²Assistant Professor, Department of Pharmacology, Annamacharya college of Pharmacy, Rajampet, Kadapa, Andhra Pradesh, India

*Corresponding Author Email: yogieshwar796@gmail.com

Article Received on: 28/09/20 Approved for publication: 20/10/20

DOI: 10.7897/2230-8407.111082

ABSTRACT

Aim & Objective: The main aim of the study to assess the risk factors and management of lower respiratory tract infections in the department of pediatrics and PICU, RIMS Hospital, Kadapa. **Method:** A prospective observational study was conducted for a period of six months from July 2018 – December 2018. Data was analyzed for patient's demographics, risk factors, clinical complications and management. **Results:** A total of 120 patient's data was collected in duration of 6 months, out of which 85 were male and 35 were female. The maximum number of patients (89) were within the age group 1month-1year (Infants). 105 patients were of pneumonia followed by Bronchiolitis 15. The most commonly seen risk factors were anemia followed by Low birth weight and pollution from biomass fuels etc. No clinical complications and mortality were reported. Most commonly prescribed drugs were Ceftriaxone, Amikacin and syrup Ambroxol and supportive therapy was given. **Conclusion:** Major risk factors found were Anemia, low birth weight, pollution from biomass fuels, overcrowding, lack of breast feeding, under nutrition. To conclude, our study clearly highlighted various risk factors, incidence of various Lower respiratory tract infections, complications and mortality if any and management of various Lower respiratory tract infections.

KEY WORDS: LRTI, Pneumonia, Risk factors, Clinical complications, Management.

INTRODUCTION

Respiratory tract infection (RTI) is defined as infectious disease of the upper or lower respiratory tract¹. Acute lower respiratory infections include pneumonia (infection of the lung alveoli), as well as infections that affects the airways are acute bronchitis and bronchiolitis, influenza and whooping cough². Pneumonia is inflammation of the air sacs in the lungs in response to an injury, like an infection³.

It is caused by bacteria, viruses, or fungi, it is transmitted from environment or from people who are infected with them⁴.

Bronchiolitis is inflammation of the bronchioles, usually caused by acute viral infection. The most common lower respiratory tract infection in infants and children who are 2 years of age and younger are viral bronchiolitis. Respiratory syncytial virus (RSV) is the most commonly identified infectious agent. Adenovirus, human metapneumovirus, influenza virus, and parainfluenza virus are the other identified pathogens⁵.

Bronchitis is an inflammation of your bronchial tubes (the tubes that carry air to your lungs and the bronchial tree) and are of two types of bronchitis: acute bronchitis, and chronic bronchitis⁶.

Flu or gripe, also known as Influenza is an acute viral infection of the upper or lower respiratory tract that is noted by fever, chills, and a generalized feeling of weakness and pain in the muscles,

and together with varying degrees of soreness in the head and abdomen⁷.

Risk Factors: In all the above cases the risk factors are mostly similar and the common risk factors are:

Low Birth Weight, Breast Feeding, Crowding, Overcrowding, Indoor air Pollution, Under nutrition, Incomplete immunization, Passive smoking, Maternal Education, Sex, Preterm Birth, Anemia, Vitamin D deficiency, Birth Interval, Previous Pregnancy, Previous illness, Vitamin A deficiency⁸. The management of lower respiratory tract infections vary from person to person depending on severity of symptom, risk factors, and etiology. The treatment includes Cough medicine, Bronchodilators, Mucolytics, Anti-inflammatory medicines and glucocorticoid steroids, Oxygen therapy, Pulmonary rehabilitation program, Antibiotics⁹.

AIM

This study aims at assessing the risk factors and management of lower respiratory tract infections in pediatrics in RIMS Hospital, Kadapa.

OBJECTIVES

The key objectives of the study include:

1. To identify the age group with higher incidence of lower respiratory tract infections.

2. To assess and identify the most common risk factors in lower respiratory tract infections.
3. To identify the most common lower respiratory tract infection based on diagnosis.
4. To identify the clinical outcomes like mortality, clinical complications, time to resolution of symptoms in different types of lower respiratory tract infections.

METHODOLOGY

A Prospective observational study was conducted in Pediatrics department and PICU in RIMS hospital, Kadapa. Study was conducted over 6 months i.e., July 2018 to December 2018. Sample size was 120 cases.

Source of Data

Data was collected from treatment charts, Demographic details and physical examination, prescription and case sheets, questionnaire forms, subjects included in study.

Informed consent was taken from the study participants and the study is carried out as per International conference of Harmonization-Good Clinical Practices Guidelines (ICH-GCP) or as per Declaration of Helsinki guidelines. Approval from ethical committee was taken before initiating the study.

Inclusion Criteria

- Study includes age group of Birth to 13 years with clinical features suggestive of lower respiratory tract infections.
- Patients diagnosed already with any of the lower respiratory tract infection.
- Patient who are willing to participate in the study with clinical features suggestive of lower respiratory tract infections.

Exclusion Criteria

- Children with Congenital Heart Disease.
- Children with upper respiratory tract infections.
- Children with acquired immune deficiency like HIV are excluded in the study.

Statistical Analysis: The data generated in the study was analyzed using descriptive statistics namely total numbers, mean, standard deviation and percentage wherever applicable. Microsoft word and excel have been used to generate graphs, tables etc.

RESULTS

A total of 120 subjects were included from July 2018 to December 2018 for a period of six months from PICU and Pediatric wards of RIMS, Kadapa.

Among 5 LRTI infections (Pneumonia, Bronchiolitis, Bronchitis, Influenza and whooping cough), the most common was found to be Pneumonia (105) followed by Bronchiolitis (15). Out of 120, majority of the patients were males 85(70.84%) and females constitute 35 (29.16). (Figure 1).

Out of 120 subjects, the maximum patients of Lower Respiratory Tract Infections were Infants (1 month-1year) i.e. 89, followed by children of age 1-13 years i.e. 30, followed by Neonates (Birth-1 month) i.e. 1. (Table 1)

We identified different types of risk factors for LRTI. The most commonly seen risk factors in our study were anemia in 28 patients followed by low birth weight in 15 patients, followed by pollution from biomass fuels in 6 patients, overcrowding in 5 patients, lack of breast feeding in 4, under nutrition in 1, passive smoking in 1 patient as shown in the (Figure 2)

Out of 49 patients, the most common double risk factors contributed to LRTI patients were Anemia with Low birth weight in 9, followed by anaemia with pollution from biomass fuels in 7, next pollution from biomass fuels with passive smoking in 5, anemia with under Nutrition in 4, anaemia with lack of breast feeding in 4, low birth weight with pollution from biomass fuels in 3, Pollution with biomass fuels with lack of breast feeding in 3, passive smoking with overcrowding in 3, under nutrition with passive smoking in 2, overcrowding with Pollution from biomass fuels in 2, under nutrition with pollution from biomass fuels in 2, low birth weight with under nutrition in 1, passive smoking with lack of breast feeding in 1, anaemia with passive smoking in 1, overcrowding with anemia in 1. (Figure 3)

Out of 11 subjects, the most common triple risk factors contributed to LRTI patients were Low birth weight with under nutrition with anaemia in 2, followed by low birth weight with pollution from biomass fuels with anaemia in 2, next lack of breast feeding with pollution from biomass fuels with passive smoking in 1, low birth weight with lack of breast feeding with anaemia in 1, overcrowding with passive smoking with anaemia in 1, overcrowding with pollution from biomass fuels with passive smoking in 1, low birth weight with lack of breast feeding with passive smoking in 1. (Figure 4)

The outcomes of Lower Respiratory Tract Infections include Clinical complications, mortality and time to resolution of symptoms.

In all the 120 patients there were no clinical complications and no cases of death i.e. no mortality was reported.

The patients who stayed for 1-5 days are 57 and were discharged with mild cough and no shortness of breath and remaining 63 patients who stayed for 6-10 days were discharged with mild cough and no shortness of breath. All the patients were discharged with necessary medication. (Figure 5).

In Lower Respiratory Tract Infections, the most commonly prescribed drugs for Pneumonia and Bronchiolitis were Ceftriaxone, Amikacin and syrup Ambroxol. For supportive therapy O₂ inhalation and Nebulization with salbutamol given. (Table 2).

DISCUSSION

The data was collected from 120 patients of PICU and pediatric ward of RIMS, Kadapa by using specially designed data collection forms. In our study occurrence of Lower Respiratory Tract Infections was more in males (70.84) when compared with females (29.16) which was similar to the study done by Alok Kumar M.K et al., where the incidence of LRTI patients were more in males (58%) outweighed females (42%)¹⁰.

In our present study, maximum numbers of patients were from age group of Infants (1 month-1year) which was similar to the study done by Alka C Kaware, et al., where the maximum number of patients was from age group 1-4 years¹¹.

Table 1. LRTI distribution in study population based on age group

S.NO	Disease	Age Group			Total
		Neonates (Birth-1month)	Infants (1month-1 year)	Children (1year-13 years)	
1	Pneumonia	1	75	29	105
2	Bronchiolitis	0	14	1	15
3	Bronchitis	0	0	0	0
4	Influenza	0	0	0	0
5	Whooping cough	0	0	0	0
	Total	1	89	30	120

Table 2. Management of LRTI

Management	Pneumonia	Bronchiolitis	Total
Most commonly prescribed drugs	Ceftriaxone	15	120
	Amikacin	15	117
	Syrup. Ambroxol	15	120
Supportive Therapy	O2 Inhalation	15	120
	Nebulisation with salbutamol	15	120

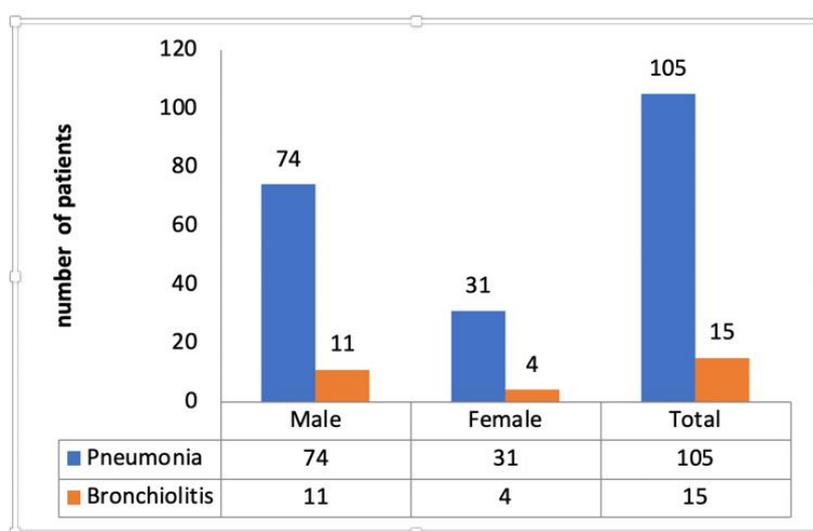


Figure 1: LRTI distribution in study population based on Gender

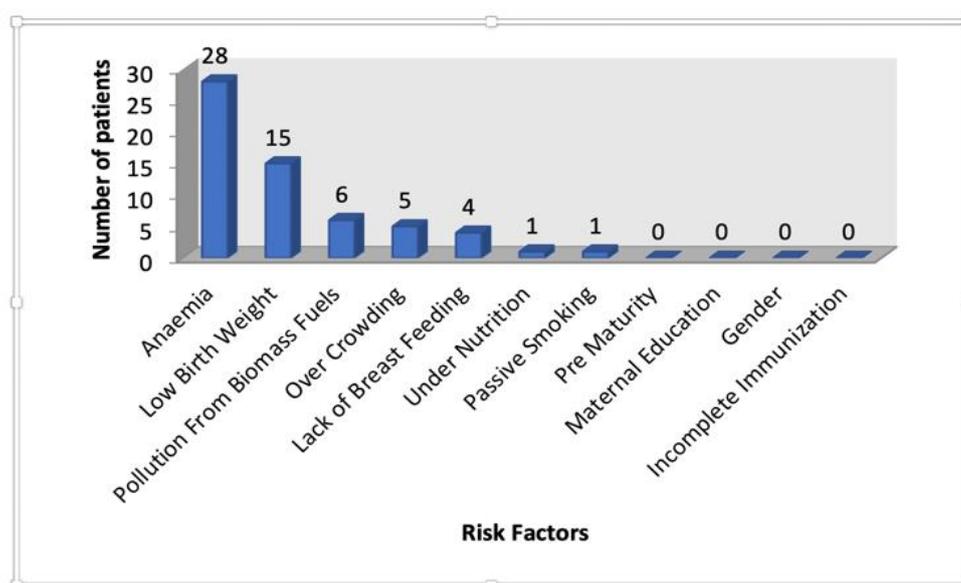


Figure 2. Single Risk Factor contributed to LRTI

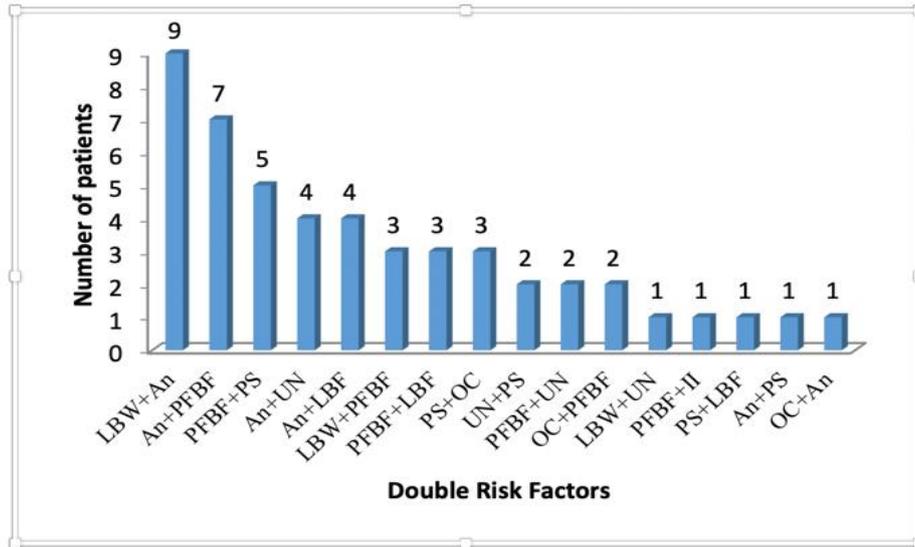


Figure 3. Double Risk Factors contributed to LRTI

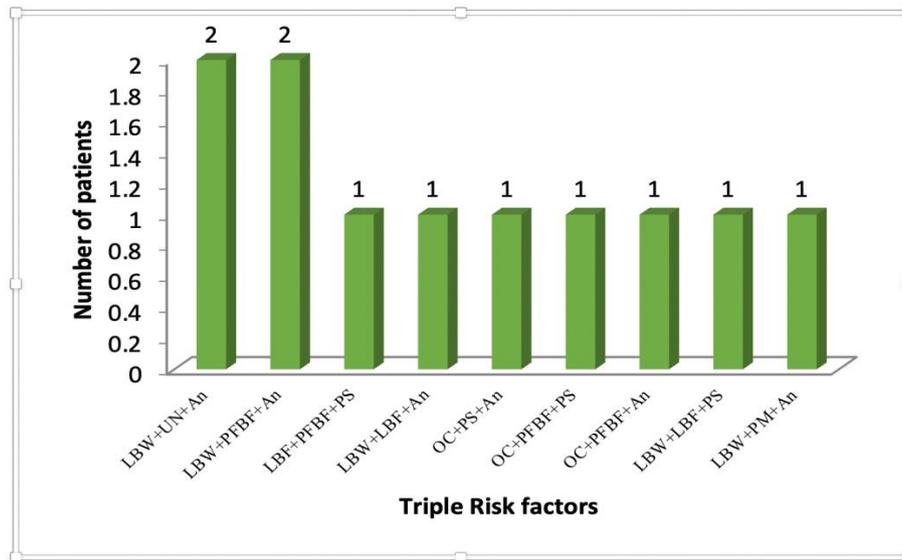


Figure 4. Triple risk factors contributed to LRTI

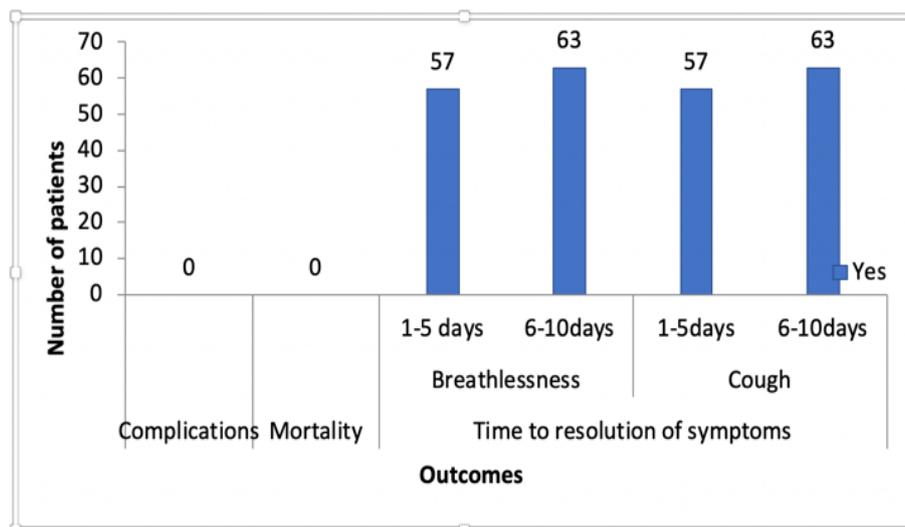


Figure 5. Outcomes of LRTI

The most commonly identified Lower Respiratory Tract Infections is Pneumonia (87.5), followed by Bronchiolitis (12.5) which was similar to the study done by Venkata Krishna Munagala et al., Bronchopneumonia was the commonest LRTI in our study with an incidence of 38.7% followed by Bronchiolitis (8.5%)¹².

We assessed the major risk factors of Lower Respiratory Tract Infections and they were Anemia, Low birth weight, Pollution from biomass fuels, Overcrowding, Breast Feeding which was similar to the study done by Kuldeep Temani, et al., illiterate mother, more than two under five children at home, overcrowding, LBW, partial immunization, lack of exclusive or short duration of exclusive breast feeding, use of biomass fuel, smoker in house, family history of cough and cold in last month, and kitchen attached to living room¹³.

According to Arijit Sen et al., Acute lower respiratory tract infection remains one of the major causes of morbidity and mortality in children and infants. But in our present study no such cases of mortality are reported¹⁴.

According to Chay OM et al., major severe complications noted were septicemia, apnoea, meningitis, and encephalopathy. But in our present study no such complications were noted¹⁵.

In our present study, the patients who stayed for 1-5 days are 57 and were discharged with mild cough and no shortness of breath, and remaining 63 patients who stayed for 6-10 days were discharged with mild cough and no shortness of breath

According to Ahmed SM et al., the beta lactam/beta lactamase inhibitors (piperacillin/tazobactam) and the aminoglycosides (amikacin) were effective among the parenteral antibacterials. But in our present study the most commonly prescribed drugs for Pneumonia and Bronchiolitis were Ceftriaxone, Amikacin and syrup Ambroxol¹⁶.

CONCLUSION

The present study concludes that male children were having high rate of lower respiratory tract infections when compared to females and maximum age group affected was infants (1 month-1 year). Commonly affected Lower respiratory tract infections were Pneumonia followed by Bronchiolitis. The most commonly seen risk factors were anemia followed by low birth weight, pollution from biomass fuels, overcrowding, lack of breast feeding, under nutrition etc. Most commonly prescribed drugs for the management of Lower respiratory tract infections were ceftriaxone, Amikacin along with supportive therapy like O₂ inhalation, nebulization with salbutamol and maintenance of IV fluids. To conclude, our study clearly highlighted various risk factors, incidence of various Lower respiratory tract infections, complications and mortality if any and management of various Lower respiratory tract infections.

ABBREVIATIONS

LBW: Low Birth Weight, **LBF:** Lack of Breast Feeding, **An:** Anaemia, **PFBF:** Pollution from Biomass Fuels, **OC:** Overcrowding, **PS:** Passive smoking, **II:** Incomplete Immunization, **UN:** Under nutrition

ACKNOWLEDGEMENTS

We acknowledge the Dr. K. Masroor Ahamed MD, Department of Pediatrics and nurses in RIMS, Kadapa for giving us support while the study performed.

REFERENCES

1. NICE. Respiratory tract infections – antibiotic prescribing. Prescribing of antibiotics for self-limiting respiratory tract infections in adults and children in primary care. NICE Clin Guidel 69 [serial on the Internet]. 2008 July [cited 2020 Sep 17];69:1–240. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK53632/>
2. European Lung Foundation - ELF [homepage on the Internet]. Acute lower respiratory infections. [cited 2020 Sep 17]. Available from: <https://www.europeanlung.org/en/lung-disease-and-information/lung-diseases/acute-lower-respiratory-infections>
3. Jones B, Dean N, Wunderink R, Sockrider M, Kulkarni H, Dela Cruz C. What is pneumonia? American journal of respiratory and critical care medicine. 2016 Jan 1;193(1): P1-P2. Available from: <https://doi.org/10.1164/rccm.1931P1>
4. PKIDS.org [homepage on the Internet]. Causes of lower respiratory tract infections. [cited 2018 December 27]. Available at <http://www.pkids.org/diseases/pneumonia.html>.
5. Tamara Wagner. Bronchiolitis, Pediatrics in Review 2009; 30(10):386-95.
6. Medicinenet.com [homepage on the Internet]. Definition of bronchitis. [Updated 2016 July 27; cited 2020 September 16]. Available from: <https://www.medicinenet.com/bronchitis-acute/article.htm#>
7. Encyclopedia Britannica [homepage on the Internet]. Influenza. [Updated 2020 March 25; cited 2020 September 16]. Available from: <https://www.britannica.com/science/influenza>
8. Jackson S, Mathews KH, Pulanić D, Falconer R, Rudan I, Campbell H, et al. Risk factors for severe acute lower respiratory infections in children - a systematic review and meta-analysis. Croatian Medical Journal. 2013;54(2):110–21.
9. Medical news today [homepage on the Internet]. Treatment of bronchitis. [Updated 2019 November; cited 2020 September 16]. Available from: <https://www.medicalnewstoday.com/articles/8888.php>
10. M. K. AK, Badakali A V., Mirji G, Vanaki RN, Pol R. Clinical profile and outcome of acute lower respiratory tract infection in children aged between 2 months to 5 years. International Journal of Contemporary Pediatrics 2016;4(1):105-9.
11. Kaware AC, Kamble NH, Manguliker SK. Study of risk factors of acute respiratory infections in children admitted in a tertiary care hospital of Southern Maharashtra. International Journal of Community Medicine and Public Health 2017 ;4(9):3129-34.
12. Munagala VK, Uma Mahesh RM, Kandati J, Ponugoti M. Clinical study of lower respiratory tract infections in children attending a tertiary care hospital. International Journal of Contemporary Pediatrics 2017;4(5):1733-38.
13. Temani K, Mayenger A, Bairwa AL. Assessment of prevalence of acute respiratory tract infection and risk factors in under five children in anganwadi of kota city. Indian journal of child health 2016;3(03):234–7.
14. Arijit Sen, Khare P.M. Clinical profile & outcomes of Acute lower respiratory tract infection in children aged between 2 months to 5 years. International journal of scientific research 2016;5(11):43-44.

15. Chay OM, Hiew J, Tan CK, Foo AL, Lim KW, Cheng HK. Complications of severe lower respiratory tract infections in Singapore children. *Journal of Singapore pediatric society*, 1992;34(2-2):26-9.
16. Ahmed SM, Jakribettu RP, Meletath SK, B A, Vpa S. Lower Respiratory Tract Infections (LTRIs): An Insight into the Prevalence and the Antibiogram of the Gram Negative, Respiratory, Bacterial Agents. *Journal of Clinical and Diagnostic Research* 2013;7(2):253-6.

Cite this article as:

Yogi Eshwar Kumar P *et al.* A prospective study on assessment of risk factors and management of lower respiratory tract infections in paediatrics. *Int. Res. J. Pharm.* 2020;11(10):4-9.
<http://dx.doi.org/10.7897/2230-8407.111082>

Source of support: Nil, Conflict of interest: None Declared

Disclaimer: IRJP is solely owned by Moksha Publishing House - A non-profit publishing house, dedicated to publishing quality research, while every effort has been taken to verify the accuracy of the content published in our Journal. IRJP cannot accept any responsibility or liability for the site content and articles published. The views expressed in articles by our contributing authors are not necessarily those of IRJP editor or editorial board members.