CODEN [USA]: IAJPBB ISSN: 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES

http://doi.org/10.5281/zenodo.4444375

Available online at: http://www.iajps.com *Research Article*

# A RESEARCH STUDY TO DETERMINE THE FUNDAMENTAL REOCCURRENCE REASONS OF INTERMITTENT PNEUMONIA AMONG CHILDREN

**[1]Dr Javaria Latif, [2]Dr Rafia Sana, [3]Dr Maryam Shakoor**

[1]House Officers, Allied Hospital Faisalabad.

**Article Received:** March 2019 **Accepted:** April 2019 **Published:** May 2019

**Abstract:**

***Background:*** *Respiratory tract diseases remain the commonest reason for pediatric horribleness and mortality especially in creating nations. A subgroup of these kids has repetitive pneumonia which might be the introduction of a basic progressively genuine fundamental or neighbourhood pathology.*

***Objective:*** *To determine the recurrence of basic reasons for intermittent pneumonia, among pediatric patients.*

***Patients and Methods:*** *This elucidating study was carried out at Sir Ganga Ram Hospital, Lahore (January 2017 to February 2018). Every one of the patients displayed to the division and analyzed as intermittent pneumonia were incorporated into the investigation.*

***Results:*** *Amid the investigation time of one year, intermittent pneumonia were analyzed in 292 patients. A hidden sickness could be distinguished in 282 (97%) while in 10 (3%) cases the basic reason couldn't be analyzed. Hidden sicknesses included neurodevelopmental handicap in 183 (63%) cases, repetitive bronchiolitis with desire pneumonia 30 (10%), inherent coronary illness 23 (8%), bronchiectasis 07 (2.3%), bronchial asthma 07 (2.3%), peculiarities of the respiratory framework 05 (1.7%), congenital fissure 05 (1.7%), gastroesophageal reflux ailment 04 (1.3%), down disorder without CHD 04 (1.3%), serious lack of healthy sustenance 03(1%), ciliary dyskinesia 03(1%), remote body 02 (0.6%), thalassemia 02 (0.6%) and wholesome rickets 02 (0.6%).*

***Conclusion:*** *Repetitive pneumonia is moderately normal in our nation as are intermittent respiratory tract contaminations. Regular fundamental ailments included neurodevelopmental inability, repetitive bronchiolitis with desire pneumonia, inherent coronary illness, Down syndrome, bronchiectasis, bronchial asthma, oddities of the respiratory framework and congenital fissure.*

**Key Words:** *Congenital heart defects, Neurodevelopmental disability, recurrent pneumonia, Aspiration pneumonia, Children.*

**Corresponding author:**

**Dr. Javaria Latif,**

*House Officers, Allied Hospital Faisalabad.*

QR code

*Please cite this article in press Javaria Latif et al.,* ***A Research Study to Determine the Fundamental Reoccurrence Reasons of Intermittent Pneumonia among Children.,*** *Indo Am. J. P. Sci, 2019; 06(05).*

## INTRODUCTION:

For the last numerous decades, respiratory tract diseases remain the main source of grimness and mortality in youngsters, particularly younger than 5 years [1]. On a normal, a youngster is probably going to have 6 to 10 respiratory track diseases for each year [1, 2]. Mostly these are amiable and self-restricting diseases; in any case, a few times the kid might have possibly hazardous contaminations like epiglottis, bacterial tracheitis, bronchiolitis and pneumonia. Among these, pneumonia is the commonest contamination and is the real enemy of fewer than five kids internationally. In spite of the fact that even a solitary scene of pneumonia can demonstrate lethal, in any case, it might happen over and again in certain youngsters making a troublesome indicative and helpful test for the clinician [3].

There are numerous causes and hazard factors in charge of a repeat of pneumonia. A considerable lot of these are kind and just overseen, for example, repetitive viral respiratory contaminations or bronchial asthma, nonetheless, in different cases there might be increasingly genuine fundamental pathology, for example, neurodevelopment handicap, innate heart d impacts, bronchiectasis, cystic fibrosis, immunodeficiency issue and inborn auxiliary peculiarities of the respiratory tract and so forth. Consequently, early and precise finding turns into a centrality to recognize the generally amiable from the more genuine fundamental reason, for ideal administration and along these lines to limit the danger of dynamic or irreversible lung disease [4].

There are sure broad hazard factors which incline a kid to have intermittent respiratory tract contaminations. Lower respiratory tract contaminations are more typical in young men than young ladies for reasons that are not plainly comprehended [5]. The pinnacle occurrence is at 6 a year of age while a second pinnacle happens when the kid initially blends with huge quantities of youngsters at nursery or school; correspondingly, intense bronchiolitis happens only in the initial 2 years of life and 66% of youth passing because of respiratory diseases additionally happen in earliest stages [6]. Infants conceived rashly, and especially the individuals who create unending lung ailment of rashness after ventilation, often require emergency clinic affirmation for respiratory diseases in early stages and early long stretches of life [6, 7]. The immune-protective impact of bosom sustaining, just characteristic method for baby encouraging, against the event of respiratory contaminations is a reality that has been notable for the last numerous decades [7]. The occurrence of respiratory tract contaminations is more in industrialized than non-industrialized nations [8]. Large family measure and parental smoking expand the danger of every single respiratory sickness especially lower respiratory tract contaminations. Both maternal smokings amid pregnancy and postnatal inactive presentation incline the offspring of smokers to have repetitive respiratory diseases [8, 9]. In a couple of kids with intermittent chest diseases, there might be an imperfection in the unpredictable arrangement of safeguard which regularly shields the lungs from any threatening microbiological condition and all things considered serve to keep the section or to expel outside material from the lungs. These incorporate physical protections, for example, hacking, wheezing and mucociliary freedom, occupant cell safeguards, for example, pneumonic macrophages, and scope of nearby humeral or secretary components, for example, Lysozyme and lactoferrin [10 – 13]. More explicitly, in a nation like Pakistan, the higher predominance of macronutrient and micronutrient lacks, for example, iron, nutrient An and D, zinc and numerous others, which in either way, are at last connected with body resistance against diseases, might be one of the essential explanations behind higher event of intermittent pneumonia. Actually, a few of these insufficiencies may coincide and may collaborate with one another in the causation of repetitive diseases [14, 15]. Amazingly, notwithstanding being a moderately regular issue, there are not very many investigations on repetitive pneumonia, accessible in restorative writing. Neighbourhood information regarding this matter is significantly increasingly restricted. The goal of this examination was to decide the overall recurrence of different reasons for repetitive pneumonia in a tertiary consideration emergency clinic of southern Punjab.

## PATIENTS & METHODS:

This elucidating study was carried out at Sir Ganga Ram Hospital, Lahore (January 2017 to February 2018). Every one of the patients displayed to the office and analyzed as repetitive pneumonia was incorporated into the examination. Composed assent was taken from the guardians and the subject was endorsed by the institutional moral advisory group. Repetitive pneumonia was characterized as 2 scene of radiological affirmed pneumonia around the same time, or at least 03 scenes over whenever period with complete clinical and radiological goals in the middle of intense scenes [3]. Aspiration pneumonia was analyzed clinically by the nearness of history of hacking, chocking, choking, apnea, getting to be dyspnoeic/tachypnoeic/cyanotic amid encouraging

and fretfulness subsequent to bolstering, while at the same time sustaining was likewise observed [16]. The nearness of over the top slobbering or pooling of discharges in the oral hole was additionally considered as a hazard factor for goal. Radiological intermittent yearning pneumonia was analyzed by the contribution of the two lungs in all cases, nearness of hyperinflation of both lung fields alongside widespread, especially perihilar invades and solidification/breakdown, basically of right upper/centre projections. In all instances of suspected intermittent pneumonia definite history particularly with respect to grumblings of the respiratory and cardiovascular framework (fever, hack, over the top perspiring, dyspnoea, tachypnoea and wheezing and so forth), birth history, encouraging history, formative history and family ancestry was taken. Fastidious clinical examination including itemized examination of the oral hole, respiratory, cardiovascular and focal sensory system was completed. Formative and CNS examination was additionally rehashed after recuperation from pneumonia. Despite the fact that in more seasoned youngsters there was a delay in gross engine achievements yet in babies' extensor fit of neck and trunk muscles, exhibited by both ventral and dorsal suspension, was the most delicate sign for the finding of cerebral paralysis.

Examinations continued all patients were CBC and X-Ray chest while e b blood C/S, serum organic chemistry/electrolytes, ABGs, ECG, echocardiography, barium swallow, pneumonic capacity test, laryngoscopy, bronchoscopy, quantitative serum immunoglobulin (IgG, IgA and IgM) and CT check chest/cerebrum were done in specific cases. The information was entered and dissected in SPSS.

## RESULTS:

Amid the investigation time of one year, 14805 patients were conceded in the Pediatric unit. Of these, 4442 (30%) were neonatal and 10363 (70%) were post-neonatal confirmations. Repetitive pneumonia was analyzed in 292 patients who represented 1.97% and 2.81% of the aggregate and post-neonatal confirmations individually. Of these 176 (60.27%) were guys and 116 (39.73%) were females. A basic sickness could be distinguished in 282 (97%) while in 10(3%) cases the hidden reason couldn't be analyzed. Nearly in all instances of neurodevelopment incapacity, on radiography, there was the contribution of more than one lung projection. Among the kids with repetitive pneumonia having basic neurodevelopment incapacity, larger parts (92%) having cerebral paralysis; while, 65% of patients were underneath one year of age, 26% were 1-5 years old and 9% were over 5 years.

Among the patients with hidden reason innate heart surrenders, 9 out of 23 were having ventricular septal deformities. Among the patients with fundamental irregularities of the respiratory and gastrointestinal framework, 5 out of 10 had a congenital fissure, 2 had laryngomalacia/tracheomalacia and one had tracheoesophageal fistulas, inborn cystic adenomatoid mutation and pneumonic sequestration each.

**Table – I:** Frequency of underlying causes of recurrent pneumonia (292)

| **Cases** | **No. (%)** |
|---|---|
| Neurodevelopmental disability | 183(63%) |
| Recurrent bronchiolitis with aspiration pneumonia | 30(10%) |
| Congenital heart disease | 23(8%) |
| Bronchiectasis | 07(2.3%) |
| Bronchial asthma | 07(2.3%) |
| Anomalies of the respiratory system | 05(1.7%) |
| Cleft palate | 05(1.7%) |
| Gastroesophageal reflux disease | 04(1.3%) |
| Down syndrome without CHD | 04(1.3%) |
| Severe malnutrition | 03(1%) |
| Cilialliary dyskinesia | 03(1%) |
| Foreign body | 02(0.6%) |
| Thalassemia | 02(0.6%) |
| Nutritional rickets | 02(0.6%) |
| Immunodeficiency disorder | 01(0.3%) |
| Sickle cell anaemia | 01(0.3%) |
| Undiagnosed | 10(3%) |
| **Total** | **292** |

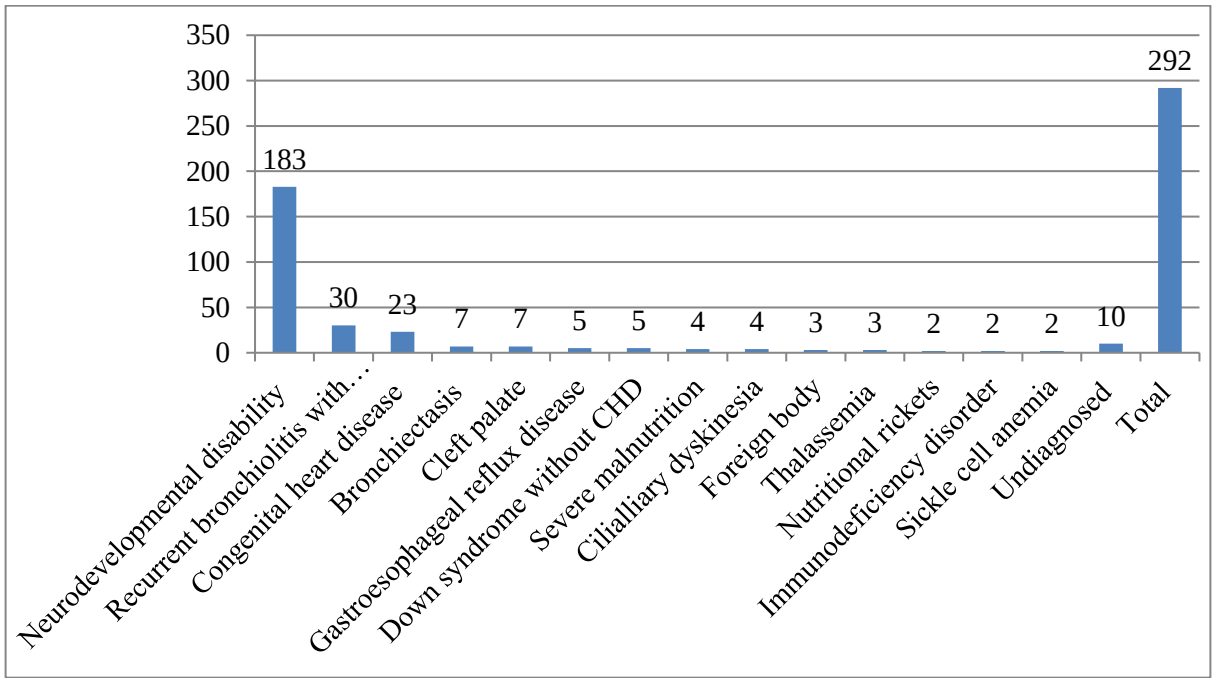



**Table – II:** Number of cases of recurrent pneumonia with the type of underlying neurodevelopmental disability (183)

| **Neurodevelopmental disability** | **No. (%)** |
|---|---|
| Cerebral palsy | 168(92%) |
| Neurodegenerative brain disease | 06(3.2%) |
| Werdnig Hoffman disease | 05(2.7%) |
| Undiagnosed neuromuscular diseases | 04(2.1%) |

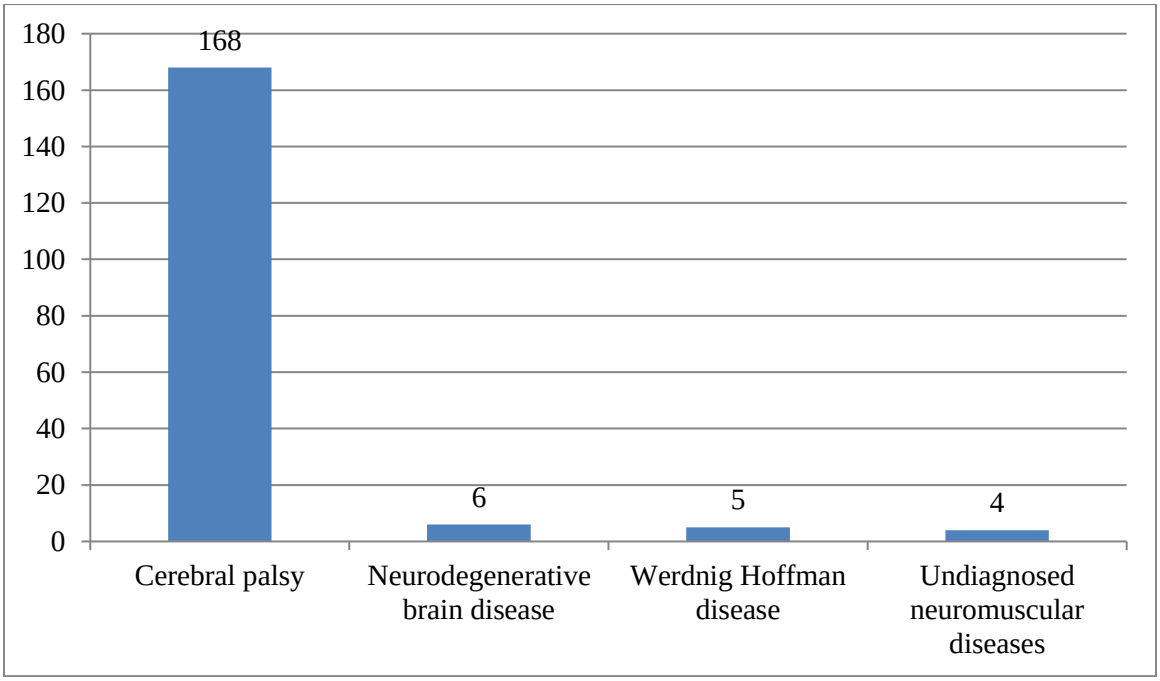
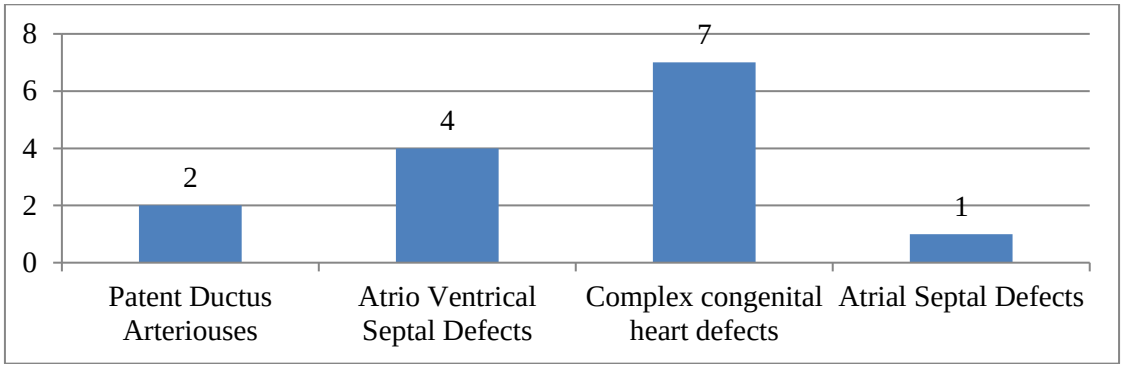


**Table – III:** Types of Congenital heart defects leading to recurrent pneumonia (23)

| | |
|---|---|
| Ventricular Septal Defects | 09 |
| Patent Ductus Arteries | 02 |
| Atrio Ventricular Septal Defects | 04 |
| Complex congenital heart defects | 07 |
| Atrial Septal Defects | 01 |




**DISCUSSION:**

The occurrence for pneumonia in creating nations may go up to 10 for every 100 kids for every year [17 – 19]. A sub gathering of these kids has rehashed scenes of pneumonia which regularly results from insufficiencies in the neighbourhood aspiratory/foundational have barriers or from the fundamental issue that alter the lung defence [20].

In our investigation, neurodevelopment inability was the commonest reason for intermittent pneumonia, present in 183 (63%) patients. The mean age at analysis was 09 months. Abdullah F et al announced 114 (48%) cases 3 while Rakesh L et al detailed 10.5% cases in another study [21]. The aetiology of respiratory entanglements in youngsters with neurodevelopment incapacity is multi-factorial; actually, a few of these elements exist together and may interface with one another to bargain the personal satisfaction in these officially disabled kids. These elements incorporate intermittent goal, ineffectively working mucociliary quickening agent, incapable hack reflex, frail musculature, absence of activity/physical movement, lack of healthy sustenance and repetitive diseases other than a respiratory framework to which these people are prone [22, 23]. Direct goal happens straightforwardly from the oral pit including feed/nourishment materials (fluids and solids) and oral and upper respiratory emissions in to bring down aviation routes because of neuromuscular in-coordination and deficient defensive reflexes. In aberrant desire, the refluxate of gastroesophageal reflux is breathed in lower airways.

Intermittent bronchiolitis with repetitive goal prompting pneumonia represented 30 (10%) cases with a mean age of 06 months at finding. In spite of the fact that not great recorded in writing, nonetheless, in our experience, tachypnea/dyspnea prompting yearning of milk and other fluid feeds because of the disappointment of "turn-taking" among gulping and breathing, requiring medical clinic affirmation, is presumably, the commonest complexity of bronchiolitis. This may prompt optional bacterial pneumonia. A repeat of bronchiolitis is normal in certain youngsters in the initial 2 years of life. The rate of asthma is by all accounts higher for youngsters hospitalized for bronchiolitis as newborn children, yet it is as yet misty whether this is easygoing or if kids inclined to asthma is bound to be hospitalized with bronchiolitis [24].

Inherent heart surrenders were available in 23 (8%) patients. Among these, 5 were instances of Down syndrome. The mean age at finding was 13 months. Abdullah F et al revealed 22 (9.2%) cases his investigation [3]. Cardiac and pneumonic pathophysiologies are firmly related. Direct pneumonic intricacies of CHD are either by basic effect on the aviation routes prompting atelectasis with auxiliary disease, irregular pathophysiological instruments prompting expanded lung liquid, desire of feeds due to tachypnea and lack of healthy sustenance coming about because of the seriousness of the hidden conditions, anorexia, diminished admission, rehashed CCFs and incessant contaminations [25].

Bronchiectasis was available in 7 (2.3%) cases. The

previous history of measles and treatment of tuberculosis was available in 2 cases each while in 3 cases no inclining variable could be distinguished. Bronchial asthma was available in 7 (2.3%) patients. These were clinically analyzed as having bronchial asthma due to the reported different scenes of reversible aviation route impediment receptive to hostile to asthma treatment. Pneumonic capacity tests likewise bolstered the analysis wherever connected. Alternate examinations were typical. The mean age at analysis was 4.5 years. Rakesh L et al in an Indian investigation detailed 26% instances of bronchial asthma in charge of intermittent pneumonia, which is high when contrasted with our examination [21].

Congenital fissure 5 (1.7%) cases were the following normal reason for repetitive pneumonia. Intermittent desire because of auxiliary imperfections and disabled coordination is a very notable complexity of congenital fissure. In our examination, the other two segments of Pierre Robin disorder, micrognathia and glossoptosis were additionally present in all cases. It is to be noticed that within the sight of micrognathia and glossoptosis, the odds of desire are expanded complex [26].

Inherent inconsistencies of the respiratory framework were available in 5(1.7%) patients. These were Laryngomalacia/tracheomalacia in 2 cases and one instance of tracheoesophageal fistulas, intrinsic cystic adenomatoid distortion and pneumonic sequestration each. Here the clinical piece of information to the determination was early mean age at the conclusion (5 months) and repeat of pneumonia at a similar area. The number of cases was very less when contrasted with the examination directed by Abdullah F, et al, who revealed 18 instances of repetitive pneumonia because of the intrinsic anomalous or respiratory framework [3]. Gastroesophageal reflux sickness was available in 4 (1.3%) cases with intermittent pneumonia. In these patients it is accounted for there was an eminent relationship between bolstering, ensuing retching prompting respiratory indications [27]. All these kids were neurologically ordinary on history and clinical examination. The mean age at determination was 7 months. Four (1.3%) instances of repetitive pneumonia had Down disorder without CHD. The kids with Down's disorder are multiple times bound to build up a disease contrasted and the all-inclusive community, especially, pneumonia [28, 29]. Primary ciliary dyskinesia represented 3(1%) cases with intermittent pneumonia. The analysis was basically clinical based on the nearness of situs inversus and repetitive contaminations of the respiratory tract. The mean age at the conclusion was 2 years. As the symptomatic trial of mucociliary freedom, for example, the saccharin test and nasal nitric oxide test 30 are not accessible in our setup; we may have missed a couple of instances of essential ciliary dyskinesia.

Extreme hunger was available in 03 (1%) cases. In these cases, the various etiological examinations were unremarkable acknowledge the nearness of extreme lack of healthy sustenance. In extreme lack of healthy sustenance, the rate of a wide range of diseases is high when all is said in done and pneumonia specifically. In these kids the pneumonia is progressively lethal as well as its clinical finding is troublesome as WHO-prescribed clinical signs seem to be (age explicit quick breathing and chest divider in the illustration) less delicate as indicators of radiographic pneumonia [14, 15]. The nearness of the remote body in the lungs was analyzed in 2 (0.6%) instances of intermittent pneumonia. Despite the fact that the historical backdrop of remote body inward breath was absent, notwithstanding, the nearness of intermittent pneumonia including a similar flap of the correct lung required unbending bronchoscopy and outside the body was recuperated from the correct centre projection of lung in the two cases. 5% instances of repetitive pneumonia were expected the nearness of outside body in the lungs in an Indian investigation [21]. The mean age at finding was 13 months and is justifiably very right since little children are found of placing everything into the mouth which now and then may stream down the aviation routes. Two (0.6%) instances of intermittent pneumonia were having thalassemia. In these cases, the various examinations were unremarkable. Forthcoming examinations in Thailand uncovered that patients with thalassemia had increasingly visit scenes of both gentle and serious contaminations [31]. The nearness of liquid over-burden when all is said in done and an over-burden aspiratory course specifically because of perpetual weakness may incline a thalassemic youngster to have repetitive pneumonia [32].

Wholesome rickets was available in 2 (0.6%) instances of repetitive pneumonia. Biochemical and radiological profile affirmed the conclusion of rickets. In an Ethiopian investigation, rickets was available in 210 of 500 instances of pneumonia contrasted and 20 of 500 controls (chances proportion 22.11) [33]. A comparative imperative perception of the relationship between healthful rickets and youth pneumonia was likewise made in another investigation additionally led in Ethiopia [34]. Sickle cell iron deficiency was available in 1

(0.3%) instance of intermittent pneumonia. It has for quite some time been perceived that youngsters with homozygous sickle cell iron deficiency are at expanded hazard for pneumonia with respect to other kids, even with penicillin prophylaxis treatment [35 – 37].

In 10 (3.4%) cases, regardless of thorough etiological assessment accessible in our foundation, no fundamental reason could be distinguished. In kids with repetitive pneumonia age and area of pneumonia, repeat might be essential pieces of information in finding fundamental sickness. In an initial couple of long stretches of life, auxiliary or practical abnormalities of the aviation route normally present as rehashed pneumonia of a similar lung projection. In the early stages, gastro oesophagal reflux may present as intermittent pneumonia. In early stages and early youth neurodevelopment handicap, intermittent bronchiolitis with desire pneumonia, innate heart surrenders, Down syndrome and lack of healthy sustenance (both full scale and small scale) add to repetitive pneumonia. In early youth bronchial asthma while in the center to late adolescence bronchiectasis is the primary driver for repetitive pneumonia. Nearly in all instances of neurodevelopment inability, on radiography, there was the contribution of more than one lung projection. The other regular discoveries were the nearness of hyperinflation of both lung fields alongside widespread, especially perihilar penetrates and union/breakdown, for the most part of right upper/centre projections.

The immediate exhibit of desire into aviation routes was impractical on account of the non-accessibility of Video fluoroscopic gulping thinks about (VFSS), so the proof of goal was roundabout for example clinical in addition to radiological. Additionally, because of various budgetary and geological imperatives, certain tests like perspiration chloride test and complete immunological workup couldn't be performed, subsequently, we may have missed a couple of fundamental reasons for intermittent pneumonia. While then again, the radiological analysis of pneumonia in our examination is helpless to predisposition, as separation among atelectasis and combination isn't constantly conceivable from x-beam chest, the finding of pneumonia may have been overestimated.

## CONCLUSION:

Repetitive pneumonia is generally basic in our nation as are intermittent respiratory tract contaminations. Age and area of pneumonia repeat might be critical pieces of information in finding basic ailment. We have attempted to investigate the basic reasons for repetitive pneumonia. Nonetheless, we recommend for more examinations regarding the matter at asset rich tertiary consideration focuses.

## REFERENCES:


1. Karadag B, James AJ, Gultekin E, et al. Nasal and lower airway nitric oxide levels in children with primary ciliary dyskinesia. Eur Respir J. 1999; 13: 1402-5.
2. Wanachiwanawin W. Infections in E-beta Thalassemia. J Pediatr Hematol Oncol. 2009; Nov-Dec; 22 (6): 581-7.
3. Bianca Maria Ricerca, Arturo Di Girolamo, Deborah Rund. Mediterranean Journal of Hematology and infectious disease. 2009;1(1): 113-115.
4. Muhe L, Lulseged S, Mason KE, et al. Case-control study of the role of nutritional rickets in the risk of developing pneumonia in Ethiopian children. Lancet. 1997; 349: 1801-4.
5. Alan Smyth, Nigel Broderick. Rickets and childhood pneumonia. The Lancet. 1997;350(9080).
6. Barrett-Connor E. Pneumonia and pulmonary infarction in sickle cell anemia. JAMA. 1973; 224: 997-1000.
7. Poncz M, Kane E, Gill FM. Acute chest syndrome in sickle cell disease: etiology and clinical correlates. J Pediatr. 1985; 107: 861-866.
8. De Ceulaer K, McMullen KW, Maude GH, et al. Pneumonia in young children with homozygous sickle cell disease: risk and clinical features. Eur J Pediatr. 1985; 14: 255-258.
9. Denny FW. Acute lower respiratory tract infections. In: Taussig LM, Landau LI. (eds) Pediatric Respiratory Medicine. St Louis, MO: Mosby, 1999; 556-72
10. Beaudry M, Dufour R, Marcoux S. Relation between infant feeding and infections during the first six months of life. J Pediatr. 1995; 126(2): 191-7
11. Li JSM, Peat JK, Xuan W, et al. Meta-analysis on the association between ETS exposure and the prevalence of lower respiratory tract infection in early childhood. Pediatr Pulmonol. 1999; 27: 513-7
12. Couriel JM. Passive smoking and the health of children. Thorax 1994; 49: 731-4
13. Chilvers MA, O'Callaghan C. Local mucociliary defence mechanisms. Pediatr Respir Rev. 2000; 1:27-34
14. Larsen G. Host defence systems of the lung. In: Taussig LM, Landau LI. (eds) Pediatric Respiratory Medicine. St Louis, MO: Mosby.

1999; 57-75
15. Gerritsen J. Host defences of the respiratory system. Pediatr Respir Rev 2000; 1: 128-34
16. Wilmott RW, Khurana-Hershey G, Stark JM. Current concepts in pulmonary host defence mechanisms in children. Curr Opin Pediatr. 2000; 12: 18790
17. Chishti MJ, Tebruegg M, La Vincente S, et al. Pneumonia in severely malnourished children in developing countries mortality risk, aetiology and validity of WHO clinical signs: a systematic review. Trop Med Int Health. 2009 Oct; 14 (10): 1173-89.
18. Wafula EM, Ngamau DW, Onyango FE, et al. X-ray diagnosable pneumonia in children with severe malnutrition at Kenyatta National Hospital. East Afr Med J. 1998 Oct; 75(10): 657-71
19. Parvathi Mohan. Aspiration in infants and children, Pediatrics in Review. 2002; 23(1): 330 -331
20. Kramer MS, Roberts-Brauer R, Williams RL. Bias and overcall in interpreting chest radiographs in young febrile children. Paediatrics. 1992; 90: 11-13
21. Selwyn BJ on behalf of the Coordinated Data Group of the BOSTID Researchers. The epidemiology of acute respiratory tract infections in young children: comparison of findings from several developing countries. Rev Infect Dis. 1990; 12 (Suppl 8): S870-S888
22. Pio A, Leowski J, Ten Dam HG. The magnitude of the problems of acute respiratory infections. In Douglas and M. Kerby-Eaton E, eds. Acute respiratory infections in childhood: Proceedings of an International Workshop.Sydney, Australia, August 1984, University of Adelaide, pp 3-17.
23. Regelmann WE. Diagnosing the cause of recurrent and persistent pneumonia in children. Pediatr Ann. 1993; 61: 561- 568
24. Rakesh Lodha, Madhavi Puranik, Uma Chandra Mouli Natchu. Persistent Pneumonia in Children Indian Pediatrics. 2003; 40:967-970.
25. P C Seddon, Y Khan. Respiratory problems in children with Neurological impairment. Archives of Disease in Childhood. 2003; 88(1): 75-58
26. Parvathi Mohan. Aspiration in infants and children, Pediatrics in Review. 2002; 23(9): 330 -331.
27. Karenj Marcdante, Robert M. Kliegman, Hal B. Jenson, et al. Behrman. Bronchiolitis. Nelson Essential of Pediatrics, 6th edition. 397-98.
28. F. Healy, B.D. Hanna, R. Zinman Pulmonary Complications of Congenital Heart Disease, Paediatric Respiratory Reviews. 2012;(13):10-15
29. Behrman RE, Kliegman MK, Jenson HB. Chronic recurrent aspiration, Nelson Text Book of Pediatrics: 2008, 18th edition, vol 2, 1790-1792.
30. Guill MS. Respiratory manifestations of gastro-oesophageal reflux in children. Journal of Asthma 1995; 32: 173-89.
31. G. Ram, J. Chinen. Infections and immunodeficiency in Down syndrome. Clinical E Experimental immunology2011; 164: 9-16.
32. Beatrijs L.P. Bloemers, A. Marceline van Furth, et al. Down Syndrome: A Novel Risk Factor f or Respiratory Syncytial Virus Bronchiolitis A Prospective Birth-Cohort Study. Paediatrics. 2007; 120(4):1076-1081.
33. Couriel JM. Lower respiratory tract infections in childhood. In: Ellis M. (ed) Infections of the Respiratory Tract. Cambridge: Cambridge University Press, 1998; 406-27
34. Woroniecka M, Ballow M. Office evaluation of children with recurrent infection. Pediatr Clin North Am. 2000; 47(6): 1211-24
35. Abdullah F, Owayed AF, Campbell DM, et al. Underlying causes of recurrent pneumonia in children. Arch Pediatr Adolesc Med. 2000; 154(2): 190-4.
36. Rubin BK. Evaluation of the child with recurrent chest infections. Pediatr Infect Dis J. 1985; 4: 889-8
37. Heath PT. Epidemiology and bacteriology of bacterial pneumonia. Pediatr Respir Rev 2000; 1: 47-52.