



## Observational study of comparison for outcome, clinical and radiological profile of pneumonia among malnourished and normal nourished children of 6-59 month of age

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### Abstract

**Background:** *Pneumonia is a very common preventable and treatable disease in childhood. It still remains as the leading cause of under five childhood fatality representing an estimated 1.4 Million out of total 7.6 Million deaths in globe in 2010. The risk of fatal outcome is high when children with pneumonia having malnutrition as high as 15 times compared to those who did not have malnutrition.*

**Objective:** *To compare outcome, clinical and radiological profile of pneumonia among malnourished and well nourished children between 6 months to 59 months of age at G. G. Hospital Jamnagar.*

**Methodology:** *An observational study was conducted in G.G. Hospital, Jamnagar over a period of 12 months. Institutional Ethical clearance taken. After written consent taken from parents, total 100 patients taken in the age group 6 months to 59 months of pneumonia as per inclusion criteria. Anthropometric examination was carried out and patients divided into normal SAM and MAM categories as per WHO guidelines. Detailed history of the illness and clinical examination, blood and radiological investigations were carried out among malnourished (as per WHO criteria) and normal nourished children. Comparison of clinical and radiological profile and outcome analysed by statistical tests.*

**Results:** *Out of 100 patients of pneumonia, 62 (62%) were malnourished and 38 (38%) patients were normal nourished. Out of total 62 malnourished children, 20 (32.2%) have very severe pneumonia while out of 38 normal nourished children, only 4 (16.6%) have very severe pneumonia. P value is 0.047 which suggest that association between severity of pneumonia and malnutrition is significant. Death rate in malnourished children with pneumonia is 10 (17.5%) and in normal children with pneumonia 4 (11.1%). Cough was found in 99% of patients, fast breathing (99%), fever (95%), inability to feed (23%). Most common sign was tachypnea (99%), respiratory distress (37%) and hypoxia (34%). X-ray finding of bronchopneumonia (32%), Lobar and Interstitial pneumonia (19%), hilar lymphadenopathy (11%), Pleural effusion (9%) and 3% were with normal X-ray. Most common age group of presentation of pneumonia is 1 to 3 years (50%). Male to female ratio is 1.5:1. 59% patients from rural area and 85% of patients from lower socio economic class. 33% of cases were fully immunized as per their age.*

**Conclusion:** *As clinical features and radiological profile of pneumonia in malnourished children remain subtle so they are prone to develop more complications leading to poor outcome in comparison with well nourish children.*

## Introduction

Pneumonia is a very common disease in childhood. It still remains as the leading cause of global under-five childhood fatality<sup>(1,2)</sup> representing an estimated 1.4 million out of the total 7.6 million deaths in this population in 2010.<sup>3</sup> The risk of fatal outcome is high when children with pneumonia have the co-morbidity of malnutrition<sup>(4,5)</sup> and fatality could be as high as 15 times compared to those who did not have malnutrition<sup>(6)</sup>. Most of these pneumonia related fatal outcome in Children with malnourished children occur in the critical care wards of developing countries. However, clinical features of pneumonia in malnourished children often remain subtle<sup>(6,7)</sup>. As a consequences, health professionals, particularly in resource poor settings may be less confident in identifying clinical features for the diagnosis of pneumonia in such children and if the Children with malnutrition do not have any complication, they potentially offer only oral antibiotics following recent WHO recommendations<sup>(8)</sup>. The bacterial pathogens causing pneumonia in severely malnourished children are frequently different than those in better-nourished children<sup>(6, 9, 10)</sup>. Therefore, the delicate clinical signs and diverse etiology of pneumonia in Children with malnutrition may require first dose of parenteral antibiotics before their referral to tertiary hospitals with the objectives to reduce fatal outcome. However, this management approach might not be feasible at every health care facility in resource limited settings due to lack of fund. Despite advances in the development of vaccines against respiratory bacteria and in the prevention of risk factors for pneumonia in children, case management will continue to be a central strategy for preventing mortality.

The rationales for this stress are

1. Etiologic diagnosis of pneumonia in infant and children is very difficult due to non-availability to sputum, lung puncture can't practice at all levels and rapid diagnostic techniques have not yet proved their

unequivocal reliability in paediatric age group.

2. Clinical, simple blood counts and radiography do not differentiate very definitely between pneumonia of viral and bacterial origins.
3. Even in developed countries with all facilities an etiologic can be established only in less than one quarter of hospitalized children.

Early recognition of malnutrition, respiratory difficulty and prompt treatment with culture sensitive antibiotics may prove very useful in reducing the morbidity and the mortality of pneumonia related deaths in children with severe acute malnutrition.

## Material and Method

An observational study was conducted in the Department of Pediatrics, Medical College & G.G. Hospital, Jamnagar over a period of 12 months. Institutional Ethical Clearance taken. After consent as format attached, total number of 100 patients in the age group 6 months to 59 months were included in this study who had presented with clinical features of mainly lower respiratory tract infection. Detailed history of the illness and examination was conducted according to a questionnaire prepared for the purpose of study. Patients in age group from 6 to 59 months having symptoms of pneumonia clinically and pneumonia identify on routine chest x-ray were included in study with the exclusion criteria of children below 6 months and above 59 months and parents/guardians not willing to enroll the child. A study proforma was designed where detailed history including symptoms, past history, family & immunization history with demographic data - age and sex, a physical examination including anthropometry and presence or absence of various clinical symptoms and signs mainly tachypnea, respiratory distress, oxygen saturation, central cyanosis, nasal flaring, inability to feed and auscultatory signs like wheeze, rhonchi & crepitations was recorded.

## Result

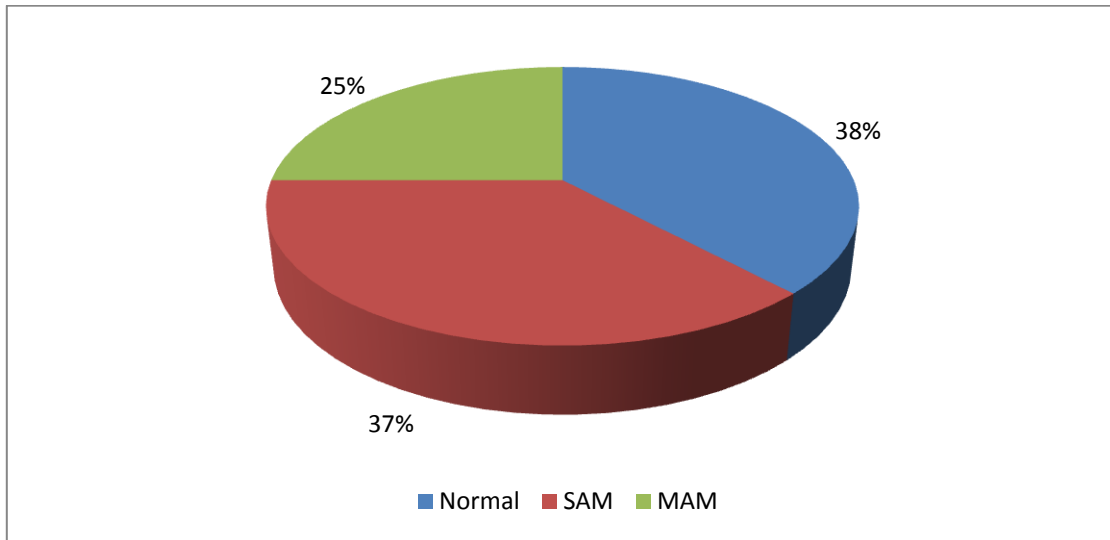
During the one year period of study, total 100 patients were enrolled who were suffering from community acquired pneumonia. Present study shown that severity of pneumonia is more in malnourished children. Out of total 62 malnourished children, 20 (32.2%) were having very severe pneumonia while out of 38 normal children only 4 (10.5%) were having very severe pneumonia. P value is 0.047 which showed that association of between severity of pneumonia and malnutrition is significant. Expire rate is more in malnourished children with pneumonia (17.5%) rather than normal children with pneumonia (11.1%). The most common age group of presentation of pneumonia was from 1 -3 years followed by 6 months to 1 year and then 3 years-5 years. The overall male to female ratio was 1.5: 1. Majority of the patients (59%) were coming from rural and tribal areas. Only 33% of the cases were immunized for their age. 85% of patients were from lower socio-economic status. On logistic regression analysis, lower socio-economic class, rural area and unimmunised/partially immunized children remained as significant independent risk factors for pneumonia. Pneumonia was diagnosed by the presence of cough or difficult breathing and fast breathing. Severe pneumonia was diagnosed by lower chest wall in drawing and very severe pneumonia was diagnosed by danger signs such as refusal to feed, cyanosis, lethargy, convulsions etc. Cough (dry/wet) was the predominant symptom found in 99% of patients, followed by fast breathing (99%) and fever (95%). Less common symptoms were inability to feed (23%). The most common sign was tachypnoea, present in 99% of the patients followed by respiratory distress (37%) and hypoxia (34%). All patients presented with anemia. 18% of the patients had severe anemia. Moderate anemia was noted in 46% and mild anemia in 36%. Nutritional and socio-economic factors were responsible for anemia in present study. The present study showed leukocytosis in

46%, leucopenia in 11%, polymorphic predominance in 42% of the patients. They had very little significance in diagnosis and management of CAP. The present study showed that majority of the patients presented with roentgenographic findings of bronchopneumonia (32%) followed by lobar pneumonia and interstitial pneumonia in 19% of cases. Associated hilar lymphadenopathy was seen in 11% of cases. Pleural effusion and empyema were in 9%. No abnormality was detected in 3% of the patients. Hypoxia was more common in very severe pneumonia (87.5%). There was a significant association of Spo<sub>2</sub> at admission with the severity of pneumonia. Hence SpO<sub>2</sub> monitoring is useful in diagnosing very severe pneumonia and severe pneumonia. In clinical signs, the clinical predictors of severe pneumonia were respiratory distress (chest in drawing and nasal flaring) and cyanosis. There is a significant association between breathing difficulty / chest in drawing, refusal to feed, cyanosis and hypoxia with severity of pneumonia. Out of the total indoor patients, in 53% of cases direct second line drugs were started based on severity and complications of Pneumonia like pleural effusion, empyema, lung abscess etc.

**Table -1**

Total	100%
Normal	38%
SAM	37%
MAM	25%

Out of 62 malnourished children : 37 are severely malnourished and 25 are moderately malnourished.



**Table – 2** Severity of Pneumonia in Normal and Malnourished Children

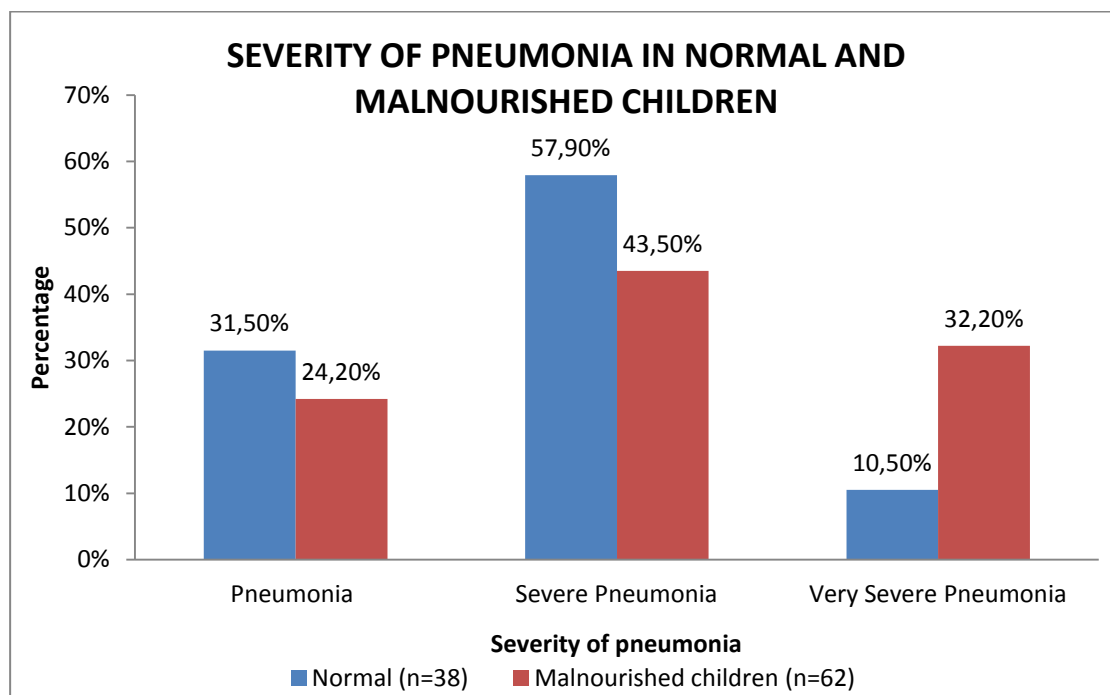
Severity of pneumonia	Normal (n=38)	Malnourished children (n=62)	Total
Pneumonia	12 (31.5%)	15 (24.2%)	27 (27%)
Severe Pneumonia	22 (57.9%)	27 (43.5%)	49 (49%)
Very Severe Pneumonia	4 (10.5%)	20 (32.2%)	24 (24%)
Total	38 (100%)	62 (100%)	100 (100%)

	X <sup>2</sup> value	P value
Chi-square test	6.101	0.047

Present study shown that severity of pneumonia is more in malnourished children.

Out of total 62 malnourished children, 20 (32.2%) were having very severe pneumonia while out of 38 normal children only 4 (10.5%) were having

very severe pneumonia. We applied Chi-Square test, our P value is 0.047 which showed that association of between severity of pneumonia and malnutrition is significant.



**Table – 3** Outcome of Pneumonia in Normal and Malnourished Children

	Normal (n=38)	Malnourished (n=62)	Total (n=100)
Discharge	32 (88.8%)	47 (82.5%)	79 (79%)
Expired	4 (11.11%)	10 (17.5%)	14 (14%)
Total	36 (100%)	57 (100%)	93 (100%)

**Note :** 7 patients took DAMA and did not complete the treatment.

	Value	P-Value
Chi-square test	0.398	0.029

We applied chi-square test and our P value come to be 0.029, which showed the association between outcome of pneumonia and malnutrition is significant. Out of 62 malnourished children with pneumonia, 10 (17.5%) expired while 47 (82.5%) discharged. Out of total 38 normal children with pneumonia, 4(11.11%) expired and 32 (88.8%) discharged.

### Recommendation

Community acquired pneumonia in severe acute malnourished children is a common occurrence. Because of low immunity and low inflammatory response in malnourished paediatric patients, clinical features remain silent and clinical signs remain subtle. Early recognition of presence of pneumonia clinically and radiologically, will reduce mortality and morbidity. So training of peripheral health workers for their skill improvement will be helpful for early detection and prompt referral to reduce mortality in patients of pneumonia with malnutrition. With improvement in nutritional and immunization status by implementation of guidelines among health care providers and effective health education and awareness in community, may give fast recovery and decrease the stay of hospitalization and mortality due to pneumonia. Though more such studies are required to be done to put into policy making.

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