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Predictors of Outcome in Pediatric Patient Age 1month to 5 Years in Severe Pneumonia Cases (N.S.C.B.M.C.H Tertiary Care Centre)

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Abstract: ***Background: Pneumonia is estimated to kill 410,000 children in India every year. In India, recent estimates in under-fives suggest that 13% of deaths and 24% of National Burden of Disease is due to pneumonia.[1]. Very few studies have evaluated the predictors of mortality in children with pneumonia in developing countries.[2,3,4] Hence, this study was planned to study predictors of mortality in children aged 1-59 months hospitalized with severe pneumonia. Objective: The objective of this study is to assess the factors (clinical and investigational) contributing to the mortality in Patients diagnosed with severe pneumonia. Material and Methods: The present observational longitudinal study was carried out in a tertiary care PICU in a govt. NSCB medical college Jabalpur over a period of 1 years (Ian 2019-December 2019). Children diagnosed as severe pneumonia[2] of either sex between age group 1-59 months admitted in a hospital were enrolled in the study. Demographic data, clinical details and laboratory parameters of the enrolled cases were recorded in a predesigned pretested proforma. They were followed till discharge or death. Results: Mortality was observed in 11 cases and of them 4 (36.4%) were males and 7 (63.6%) patients were females. However test of significance (chi square test) showed no significant association between outcome and gender (p=0.89).This study showed that among clinical parameters pulse rate, SpO2, were significantly raised (63.6%) and saturation was significantly <90 (72.7%) in children who succumbed to death (p<0.05). This study observed statistically highly significant association of outcome with PaO2, haematocrit, serum sodium, glucose and abnormal Xray findings (p<0.01).***

1. Introduction

Pneumonia is estimated to kill 410,000 children in India every year. In India, recent estimates in under-fives suggest that 13% of deaths and 24% of National Burden of Disease is due to pneumonia.[1] To reduce mortality, the World Health Organization (WHO) initiated the Acute Respiratory Infection (ARI) control program in 1983 which led to a decline in the infant mortality rate and under-fives mortality.[2] Case fatality rates in hospitalized children are reported to be between 8.7 and 47%.[3,4,5]

Although predictors of mortality were studied in developed countries, it cannot be used in developing countries due to differences in etiology and treatment resources available. Very few studies have evaluated the predictors of mortality in children with pneumonia in developing countries.[3,6,7] More studies are required to analyze the factors predicting mortality in hospitalized children.

Hence, this study was planned to study predictors of mortality in children aged 1-59 months hospitalized with severe pneumonia.

2. Objective

The objective of this study is to assess the factors (clinical and investigational) contributing to the mortality in Patients diagnosed with severe pneumonia.

3. Materials and Methods

The present observational longitudinal study was carried out in a tertiary care NICU un a govt. NSCB medical college Jabalpur. Duration of the study was 1 years (Ian 2019-December 2019). Ethical clearance was sought for from institutional ethical committee before start of the study. Children who were diagnosed as severe pneumonia[2] of either sex between age group 1-59 months admitted in a hospital were enrolled in the study.

For diagnosing the child as tachypneic or rapid respiration, the WHO guidelines followed that is: For age <2 months is respiratory rate >60/min; age 2-12 months is respiratory rate >50/min and age >1yr is respiratory rate >40/min. Children diagnosed and were followed up for outcome measurement till their discharge from the hospital or death.

Total 75 children were enrolled and as per WHO case definition were diagnosed as severe pneumonia. Demographic data, clinical details and laboratory parameters of the enrolled cases were recorded in a predesigned pretested proforma. Variables studied are age, sex, urban slum, any Co-morbidities present in the form of CNS ,CVS, Liver, Kidney Disease, neoplasm were noted .At admission altered mental status, Pulse rate, Temperature, SBP for sex and Age, SpO2 were noted. Following investigations were noted ABGA (pH, PaO2, hypoglycaemia at admission (random blood sugar level <50 mg/dl), Serum sodium, Hamatocrit and Chest X ray. They were treated with appropriate therapy and the outcome recorded was discharge or death. Statistical analysis was conducted using STATA version 10.0. Categorical variables were compared between deaths and discharges by performing Chi-square test. All tests were two sided and $P < 0.05$ is considered significant.

4. Results

Table 1 shows that total 75 children aged 1-59 months were enrolled. Mortality was observed in 11 cases and of them 4 (36.4%) were males and 7 (63.6%) patients were females.(figure1) However test of significance (chi square test) showed no significant association between outcome and gender (p=0.89).

Table 1: Distribution according to outcome

Outcome	Frequency (n=75)	Percentage
Discharge	64	85.3
Death	11	14.7

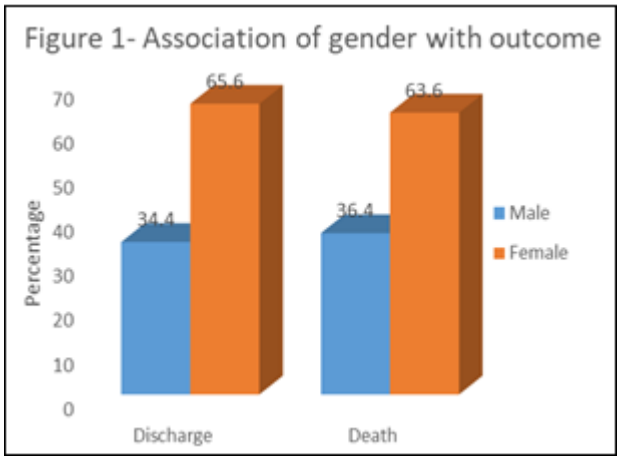

Table 2: Association of Co-morbidities with outcome

Clinical features		Discharge	Death	Total	P value
Neoplasm	Present	1 (1.6)	0 (0)	1 (1.3)	0.68
	Absent	63 (98.4)	11 (100)	74 (98.7)	
Liver illness	Present	9 (14.1)	1 (9.1)	10 (13.3)	0.65
	Absent	55 (85.9)	10 (90.9)	65 (86.7)	
CHD	Present	9 (14.1)	1 (9.1)	10 (13.3)	0.65
	Absent	55 (85.9)	10 (90.9)	65 (86.7)	
Renal Disease	Present	2 (3.1)	0 (0)	2 (2.7)	0.55
	Absent	62 (96.9)	11 (100)	73 (97.3)	
CNS disease	Present	21 (32.8)	4 (36.4)	25 (33.3)	0.82
	Absent	43 (67.2)	7 (63.6)	50 (66.7)	

In present study, about 33.3% children had CNS disease, 12% children presented with altered mental status, liver disease and CHD was observed in 13.3% cases each. Renal disease and neoplasm was present in 2.7% and 1.3% cases respectively. However, present study documented no statistically significant association between outcome and clinical features (p>0.05).

Table 3: Association between clinical findings and outcome

Examination		Discharge	Death	Total	P value
Altered mental status	Present	8 (12.5)	1 (9.1)	9 (12)	0.75
	Absent	56 (87.5)	10 (90.9)	66 (88)	
SBP for age and sex	Normal	63 (98.4)	10 (90.9)	73 (97.3)	0.15
	Abnormal	1 (1.6)	1 (9.1)	2 (2.7)	
Temperature	<100 F	32 (50)	3 (27.3)	35 (46.7)	0.16
	>100 F	32 (50)	8 (72.7)	40 (53.3)	
Pulse rate	Normal	47 (73.4)	4 (36.4)	51 (68)	0.015
	Raised	17 (26.6)	7 (63.6)	24 (32)	
SpO2	<90	2 (3.1)	8 (72.7)	10 (13.3)	0.001
	>90	62 (96.9)	3 (27.3)	65 (86.7)	

Above table reveal that pulse rate were significantly raised (63.6%) whereas saturation was significantly <90 (72.7%) in children who succumbed to death (p<0.05). However no such association of outcome was observed for SBP and temperature (p>0.05).

Table 4: Association between investigation findings and outcome

Investigations		Discharge	Death	Total	P value
PaO2	>60	64 (100)	0 (0)	64 (85.3)	0.001
	<60	0 (0)	11 (100)	11 (14.7)	
ABG pH	<7.3	8 (12.5)	2 (18.2)	10 (13.3)	0.61
	>7.3	56 (87.5)	9 (81.8)	65 (86.7)	
Hematocrit	<30	31 (48.4)	10 (90.9)	41 (54.7)	0.009
	>30	33 (51.6)	1 (9.1)	34 (45.3)	
Serum sodium	<130	1 (1.6)	2 (18.2)	3 (4)	0.009
	>130	63 (98.4)	9 (81.8)	72 (96)	
Glucose	<50 mg%	2 (3.1)	4 (36.4)	6 (8.)	0.001
	>50 mg%	62 (96.9)	7 (63.6)	69 (92)	
Chest X ray (Patch/ effusion)	Yes	18 (28.1)	10 (90.9)	28 (37.3)	0.001
	No	46 (71.9)	1 (9.1)	47 (62,7)	

PaO2 was < 60 in 100% cases in whom mortality was observed. Similarly, haematocrit was <30 in 90.9% cases with mortality. Whereas serum sodium and glucose levels were raised in 81.8% and 63.6% children respectively in whom mortality was observed. Chest Xray was suggestive of pleural effusion/ patch in 90.9% cases with mortality. The present study observed statistically highly significant association of outcome with PaO2, haematocrit, serum sodium, glucose and abnormal Xray findings (p<0.01).

5. Discussion

Decreasing pneumonia deaths will significantly contribute to achieving Millennium Development Goal of reducing under 5-years mortality. This study was conducted to identify the clinical and laboratory variables associated with deaths in hospitalized children aged 1-59 months with diagnosis of severe pneumonia.

In present study, about 33.3% children had CNS disease, 12% children presented with altered mental status, liver disease and CHD was observed in 13.3% cases each. Renal disease and neoplasm was present in 2.7% and 1.3% cases respectively. However, present study documented no statistically significant association between outcome and clinical features (p>0.05).

Above table reveal that pulse rate were significantly raised (63.6%) whereas saturation was significantly <90 (72.7%) in children who succumbed to death (p<0.05). However no such association of outcome was observed for SBP and temperature (p>0.05).

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Hypoglycaemia was found as independent predictor of mortality. Previous study has reported association of hypoglycaemia with death in children and adults hospitalised for pneumonia. Spontaneous hypoglycaemia has numerous causes like severe systemic illness, severe malnutrition, medications, and malignancy.

We found overall CFR of 14% compared to 3.9% for all-cause mortality in this age group. CFR of childhood pneumonia in various Indian studies ranges from 8.9% to 47%[3,4,5,6] and 3.4% to 12% in other developing countries.[8,9,10] This can be due to differences in etiology, immunization and treatment resources available.

Limitation of the study was that we could not find out the etiology of pneumonia. The study may have referral bias since many enrolled cases were referred from peripheral centres and findings cannot be generalized. Strength of the study was the study period of 1 year preventing the effect of epidemic outbreak. There is a need to carry out extensive multi-centric studies involving both rural and urban areas to identify the predictors of mortality.

6. Conclusions

Mortality was observed in 11 cases and of them 4 (36.4%) were males and 7 (63.6%) patients were females. However test of significance (chi square test) showed no significant association between outcome and gender (p=0.89).This study documented no statistically significant association between outcome and a co morbidities (p>0.05).

Above table reveal that pulse rate were significantly raised (63.6%) whereas saturation was significantly <90 (72.7%) in children who succumbed to death (p<0.05). This study observed statistically highly significant association of outcome with PaO2, haematocrit, serum sodium, glucose and abnormal Xray findings (p<0.01).

Footnotes

Source of Support: Nil

Conflict of Interest: None declared.

References

[1] Smith KR. National burden of disease in India from indoor air pollution. Proc Natl Acad Sci U S A. 2000;97:13286–93.
[2] Management of the child with a serious infection or severe malnutrition. Guidelines for care at the first referral level in developing countries. World Health Organization. 2000. cited 2015 July 1. Available from: http://whqlibdoc.who.int/hq/2000/WHO_FCH_CAH_00.1.pdf .
[3] Sehgal V, Sethi GR, Sachdev HP, Satyanarayana L. Predictors of mortality in subjects hospitalized with acute lower respiratory tract infections. Indian Pediatr. 1997;34:213–9.
[4] Agrawal PB, Shendumikar N, Shastri NJ. Host factors and pneumonia in hospitalized children. J Indian Med Assoc. 1995;93:271–2.
[5] Roy P, Sen PK, Das KB, Chakraborty AK. Acute respiratory infections in children admitted in a hospital of Calcutta. Indian J Public Health. 1991;35:67–70.
[6] Tiewsoh K, Lodha R, Pandey RM, Broor S, Kalaivani M, Kabra SK. Factors determining the outcome of children hospitalized with severe pneumonia. BMC Pediatr. 2009;9:15.
[7] Djelantik IG, Gessner BD, Sutanto A, Steinhoff M, Linehan M, Moulton LH, et al. Case fatality proportions and predictive factors for mortality among children hospitalized with severe pneumonia in a rural developing country setting. J Trop Pediatr. 2003;49:327–32.
[8] Banajeh SM, al-Sunbali NN, al-Sanohani SH. Clinical characteristics and outcome of children aged under 5 years hospitalized with severe pneumonia in Yemen. Ann Trop Paediatr. 1997;17:321–6.
[9] Mortensen EM, Garcia S, Leykum L, Nakashima B, Restrepo MI, Anzueto A. Association of hypoglycemia with mortality for subjects hospitalized with pneumonia. Am J Med Sci. 2010;339:239–43.
[10] Suwanjutha S, Ruandkanchanasetr S, Chantarojanasini T, Ttotrakitya S. Risk factors associated with morbidity and mortality of pneumonia in children under 5 years. Southeast Asian J Trop Med Public Health. 1994; 25:60–6.