



## FREQUENCY OF HYPONATREMIA IN COMMUNITY ACQUIRED PNEUMONIA.

Zeeshan Mehmood<sup>1</sup>, Farrukh Saeed<sup>2</sup>, Muhammad Asif Siddiqui<sup>3</sup>, Fazal Ur Rehman<sup>4</sup>, Farhan Zahoor<sup>5</sup>, Amna Iqtidar<sup>6</sup>

1. MBBS, FCPS  
Senior Registrar Pediatrics  
Services Hospital, Lahore.
2. MBBS, FCPS (Paeds)  
Assistant Professor  
Services Hospital, Lahore.
3. MBBS, FCPS (Pediatrics)  
Assistant Professor  
Services Hospital, Lahore.
4. MBBS, FCPS  
PGR Pediatric Medicine  
The Children's Hospital and  
The Institute of Child Health, Multan.
5. MBBS, FCPS (Peads)  
Assistant Professor  
Services Hospital, Lahore.
6. MBBS, FCPS  
Assistant Professor Pediatrics  
Services Hospital, Lahore.

### Correspondence Address:

Dr. Zeeshan Mehmood  
Senior registrar of Pediatrics  
Services hospital Lahore.  
mehmoodzeeshan245@gmail.com

### Article received on:

24/04/2019

### Accepted for publication:

25/10/2019

**ABSTRACT... Objectives:** Community acquired pneumonia (CAP) is frequent amongst pediatric population all over the world while hyponatremia is a common electrolyte abnormality in hospitalized patients that has been shown to be associated with considerable morbidity and mortality. We aimed to determine the frequency of hyponatremia in children with community acquired pneumonia (CAP). **Study Design:** Cross Sectional study. **Setting:** Pediatrics Department, Services Hospital, Lahore. **Period:** July 2018 to January 2019. **Material & Methods:** A total of 100 cases up to 2 years of age of either gender, diagnosed cases of CAP during the last 72 hours, were enrolled. Demographic profile, age and gender were recorded. Every child with CAP was evaluated for the presence of hyponatremia. Mean and standard deviation were calculated for age. Frequency and percentages were noted for categorical variable like gender and presence/absence of hyponatremia. **Results:** Out of 100 cases of CAP, 57 (57.0%) were male and 43(43.0%) female. There were 45 (45.0%) cases who were less than 1 year of age while 55 (55.0%) were between 1-2 years of age. Mean age was calculated as 1.55 years with standard deviation of 0.52 years. Frequency of hyponatremia in children with CAP was recorded in 24 (24.0%) whereas 76 (76.0%) had no findings of the morbidity. **Conclusion:** Frequency of hyponatremia was high (24.0%) among children with CAP. Every patient who present with CAP should be evaluated for hyponatremia.

**Key words:** Hyponatremia, Community Acquired Pneumonia, Morbidity.

**Article Citation:** Mehmood Z, Saeed F, Siddiqui MA, FazaL Ur Rehman, Iqtidar A. Frequency of hyponatremia in community acquired pneumonia. Professional Med J 2020; 27(8):1546-1549. DOI: 10.29309/TPMJ/2020.27.08.3567

## INTRODUCTION

Community-acquired pneumonia (CAP) is common among children all over the world, but its incidence and mortality rates are significantly higher in developing countries.<sup>1,2</sup> The estimated incidence of childhood hospitalization due to CAP is 8.7% of all cases of CAP in developing countries in comparison to 0.3% in the developed world.<sup>2</sup> Each year, approximately 1.6 million children die from pneumonia.<sup>3</sup> Viruses cause a significant percentage of CAP infections, especially in children younger than two years.<sup>4</sup>

Most of the respiratory diseases are thought to be viral infections. Respiratory syncytial virus, influenza A, and parainfluenza types 1 through 3 are the most common viral agents. Other viral pathogens include adenovirus, rhinovirus, influenza B, and enteroviruses. Human metapneumovirus has been identified

as a common cause of CAP in cases previously classified as virus-negative. The spectrum of illness caused by metapneumovirus is similar to that of respiratory syncytial virus. Mixed viral and bacterial infection accounts for nearly half of all CAP infections in children.<sup>5</sup>

CAP may result in a number of different renal and electrolyte complications. The measurement of serum electrolytes may be helpful in assessing the degree of dehydration in children with limited fluid intake and whether hyponatremia is present (as pneumonia may be complicated by syndrome of inappropriate antidiuretic hormone secretion (SIADH)).<sup>6</sup>

Regarding the frequency of hypnatremia in children with CAP, variable results are found in different studies.<sup>7</sup> Another study recorded these findings (i.e. hyponatremia) in 27.9% of the cases

with CAP.<sup>8</sup> Similarly another study recorded hyponatremia to be present in 45.4% of children with CAP.<sup>9</sup>

The rationale of the study was that no local literature is available to address this issue while international studies are showing a significant difference which needs to be verified in our local population so that the actual frequency of the hyponatremia in CAP may be determined which will be helpful for the pediatricians for timely prevention of complications of hyponatremia e.g. increased hospitalization stay, cerebral edema, seizures, coma and death in CAP.

**MATERIAL & METHODS**

This cross sectional study was conducted at the Department of Pediatrics, Services Hospital, Lahore, from July 2018 to January 2019

Approval from institutional ethical and research committee was acquired for this study.

A total of 100 diagnosed cases of CAP during the last 72 hours, were enrolled. All cases were up to 2 years of age. All cases who were already diagnosed of hyponatremia and/or having any previous history of hyponatremia were excluded from the study. Verbal consent was taken from parents or guardians of all the study cases.

CAP was labeled as tachypnea (respiratory rate > 50 breaths per minute in < 1 year of age case, and respiratory rate > 40 breaths per minute in > 1 year of age), fever (temperatre > 37°C), chest in-drawing (assessed clinically) and inability to feed orally. Hyponatremia was considered if serum sodium concentration was recorded as less than 136 mg/dl at the time of admission of children with CAP. It was assessed through 5cc venous blood sent to the hospital laboratory with the help of paramedical staff.

Demographic profile, age and gender were recorded for all the study participants. The data was analyzed through SPSS version 16. Mean and sd was calculated for age, duration of hospitalization. Frequency and percentage was calculated for categorical variable i.e. gender and

presence/absence of hyponatremia.

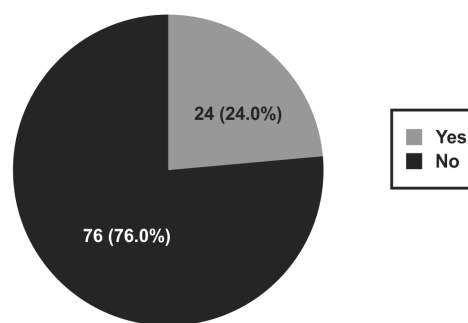
**RESULTS**

Out of 100 cases, there were 57 (57.0%) male and 43 (43.0%) female. There were 45 (45.0%) cases who were less than 1 year of age while 55 (55.0%) were between 1-2 years of age. Mean age amongst cases was noted as 1.55 years with standard deviation of 0.52 years. There were 63 (63.0%) cases who belonged to rural area of residence while 37 (37.0%) belonged to urban area of residence. Mean duration of hospitalization was recorded as 4.57 days with a standard deviation of 1.48 days.

Frequency of hyponatremia in children with CAP was recorded in 24 (24.0%) whereas 76 (76.0%) had no findings of hyponatremia.

Characteristics		Number (%)
Gender	Male	57 (57.0%)
	Female	43 (43.0%)
Age	< 1 year	45 (45.0%)
	1 to 2 years	55 (55.0%)
Area of Residence	Rural	63 (63.0%)
	Urban	37 (37.0%)
Duration of Hospital stay	< 5 days	68 (68.0%)
	> 5 days	32 (32.0%)

**Table-I. Characteristics of study cases (n=100)**



**Figure-1. Frequency of hyponatremia in children with CAP (n=100)**

**DISCUSSION**

The current study was planned with the view that no local literature is available to address this issue while international studies are showing a significant difference which needs another study to be conducted in our local population

so that the actual frequency of the morbidity may be determined which may be helpful for the pediatricians for timely prevention of complications of hyponatremia e.g. increased hospitalization stay, cerebral edema, seizures, coma and death in community acquired pneumonia.

We compared our results with the previous study done by Wrotek A and others evaluated the relation between hyponatremia and community-acquired pneumonia (CAP) in children and recorded in 33.3% of the cases.<sup>10</sup> Another study recorded these findings (i.e. hyponatremia) in 27.9% of the cases (with CAP).<sup>8</sup> The findings of our study are in agreement with the above studies, while another study recorded it in 45.4% of children with community acquired pneumonia.<sup>11</sup> These findings are higher than our results.

In children with CAP, Don M, et al<sup>9</sup> was of the view that mild hyponatremia is more commonly seen. Raised levels of atrial natriuretic peptide (ANP) have been documented to contribute as ANP adjusts various physiological parameters including diuresis and natriuresis. Raised levels of ANP have been associated with hypoxia that may go on to contribute to pulmonary vasoconstriction as well as right-heart overload.<sup>12,13</sup>

Severe hyponatremia is not common in children having CAP, but being the limitation of this study, we did not analyze severity of hyponatremia. Gerigk M and coworkers<sup>14</sup> found that antidiuretic hormone (ADH) may originate hyponatremia which in turn could cause a non osmotic, cardiovascular mechanism in cases affected by CAP.

Hyponatremia is known to be the commonest electrolyte derangement found in children who are hospitalized. Hyponatremia has also been associated with poor outcomes in pediatric population affected with pneumonia.<sup>15</sup> A combination of hyponatremia and CAP has been noted to contribute to prolonged duration of hospital admissions as well having poor prognosis.<sup>7</sup> Frequency of hyponatremia was found to be 28% in children with CAP at the time of admission in a study conducted by

Zilberberg MD and colleagues.<sup>15</sup> However, we aimed only to record the current frequency of Hyponatremia in our setting, which may be helpful for the pediatricians for timely prevention of complications of hyponatremia e.g. increased hospitalization stay, cerebral edema, seizures, coma and death in CAP. Further studies involving bigger sample size and multiple centers will further verify the findings of this and previously conducted studies.

## CONCLUSION

Frequency of hyponatremia was high (24.0%) among children with CAP. Every patient who present with CAP should be evaluated for hyponatremia. However, it is also required that every setup should have their surveillance in order to know the frequency of the problem.






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### AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	Zeeshan Mehmood	Methodology, Data collection, Review of Literature review.	
2	Farrukh Saeed	Supervision, Methodology, Discussion.	
3	M. Asif Siddiqui	Methodology, Discussion.	
4	Fazal Ur Rehman	Data analysis, Drafting.	
5	Farhan Zahoor	Study design, Discussion Literature Review.	
6	Amna Iqtidar	Literature review, Proof reading	