



## PROFILE OF HYPERTENSION IN CHILDREN AGED 3 TO 12 YEARS: EXPERIENCE FROM A TERTIARY CARE HOSPITAL IN NORTH EAST INDIA

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### ABSTRACT

**Objective:** To study the profile of hypertensive children admitted in a tertiary care hospital in the age group of 3 to 12 years.

**Method:** It is a Prospective type Study done over 1 year from June 2019 to May 2020 in the Department of Pediatrics, Silchar Medical College and Hospital (SMCH), a tertiary care Hospital in Assam, India. One twenty six children in the age group of 3 to 12 years meeting the inclusion criteria were admitted with hypertension.

**Results:** During the study period a total of 3214 patients were admitted in the Pediatric Department of Silchar Medical College and Hospital. Out of which 126 patients were found to be hypertensive (3.9%). The number of males were 81(65%) and females 45(56%). The most common affected group was school going children age group (6 to 12 years). 37(29.3%) cases presented with hypertensive emergency. 22(17%) cases presented with congestive cardiac failure and 15(11.9%) cases hypertensive encephalopathy. Renal Cause of hypertension was the leading cause of admission and glomerulonephritis was the leading renal cause (80%). The mortality was 4.7% (6 out of 126 patients) and was due to complication of Glomerulonephritis.

**Conclusion:** Hypertension is a common cause of hospitalization in children. Renal or renovascular etiology of hypertension is the most common cause of hypertension.

### KEYWORDS : Hypertension, Glomerulonephritis

#### INTRODUCTION

Systemic hypertension in children and infants is not an uncommon entity. In children, hypertension is usually asymptomatic but there is high incidence of associated target organ damage. There is also an association between childhood hypertension and early atherosclerosis in young adulthood. In children and adolescents, the prevalence of hypertension 1-15%<sup>1</sup>. Hypertension in children is often due to an underlying disease process (secondary hypertension). Meanwhile recent studies also show increasing prevalence trend of primary essential hypertension mostly in older school age children in parallel with obesity epidemic.

There are several studies on the prevalence and causes of childhood hypertension available in the country. The present study was being conducted to assess the profile of hypertensive children admitted in a tertiary care center at SMCH in Silchar, Assam.

#### AIMS AND OBJECTIVES

To study the profile of hypertensive children of age group 3 to 12 years admitted in a tertiary care hospital.

#### METHODS AND MATERIALS

According to the American Academy of Pediatrics clinical practice revised guidelines hypertension in children and adolescents is defined as systolic or diastolic blood pressure that is above 95th percentile for age, gender and height on three different occasions.

#### Staging:

Elevated blood pressure: Systolic or diastolic blood pressure between 90th and 95th percentile.

Stage 1 hypertension: Systolic or diastolic blood pressure values between 95th percentile and up to 12 mm above 95<sup>th</sup> percentile.

Stage 2 hypertension: Systolic or diastolic blood pressure above 95th percentile plus 12

Hypertensive emergency/complications: hypertensive emergency is a condition where very high blood pressure is accompanied by evidence of progressive organ or systemic damage.

#### Measurement Of Blood Pressure

The preferred method for blood pressure measurement is auscultation. Correct measurement of blood pressure in children requires use of a

cuff that is appropriate to the size of the child's upper right arm. This is the preferred arm because of the possibility of decreased pressures in the left arm caused by coarctation of the aorta. By convention, an appropriate cuff size is one with an inflatable bladder width that is at least 40 percent of the arm circumference at a point midway between the olecranon and the acromion. The cuff bladder length should cover 80 to 100 percent of the circumference of the arm. An oversized cuff can underestimate the blood pressure, whereas an undersized cuff can overestimate the measurement. Blood pressure was measured in a controlled environment after five minutes of rest in the seated position with the right arm supported at heart level. If the blood pressure is greater than the 90th percentile, the blood pressure was repeated twice at the same visit to test the validity of the reading

#### Study Subjects-

Children between 3 to 12 years admitted to our hospital from June 2019 to May 2020 with a diagnosis of hypertension

#### Study Area-

The study was conducted at Silchar Medical College and Hospital located in Silchar, Cachar Assam

#### Inclusion Criteria-

All children between 3 to 12 years presenting in our hospital with a diagnosis of hypertension

#### Exclusion Criteria-

children using steroids, amphetamines or sympathomimetics for more than 1 month duration, transient hypertension due to raised intracranial tension are excluded.

#### Study Period- 1 year

#### Study Design- It was a Prospective study

#### Sample Size- 126

#### RESULTS

During the study period conducted i.e. June 2019 to May 2020, a total of 3214 patients were admitted in the Pediatric department of Silchar Medical College and Hospital. Out of which 126 patients were found to be hypertensive (3.9%). The number of males were 81(65%) and females 45(56%). The most common affected group was school going

children age group (6 to 12 years). 37(29.3%) cases presented with hypertensive emergency. 22(17%) cases presented with congestive cardiac failure and 15(11.9%) cases hypertensive encephalopathy. 92% cases belonged to low socioeconomic status.

**Table1: Etiology Of Hypertension And Demographic Variables Of The Study Population**

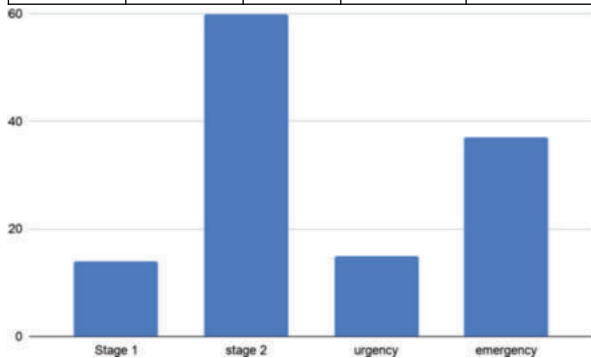
Age group	Preschool (3 to 5 yrs) N 23	School age (6 to 12 yrs) N 103	Total n=126(%)
Male	15	66	81(64.2%)
Female	8	37	45(35.7%)
Headache	5	76	81(64.2%)
Dizziness		52	52 (41.2)
Edema	25	92	117(92.8)
Oliguria	20	82	102(80.9)
Macroscopic hematuria	8	75	83(65.8)
Microscopic hematuria	10	86	96(76.1)
Nausea and vomiting	6	50	56(44.4)
CHF	3	19	22(17.4)
Altered sensorium/ Ence phalopathy	0	15	15(11.9)
Family history	0	5	5(3.9%)
Mortality	1	5	6(4.7%)

**Table 2: Etiologies Found In Hypertensive Children**

SI No	Causes	Preschool (3 to 5 years) 23	School Age (6 to 12) no 103	Total 126
1	Acute glomeruloneohritis	12	89	101
2	Obstructive uropathy	3	0	3
3	Reflux nephropathy	0	2	2
4	Chronic Kidney Disease	1	1	2
5	Nephrotic Syndrome	1	3	4
6	Systemic Lupus Erythematosis	0	4	4
7	Renal Artery Stenosis	1	2	3
8	Co-arctation of aorta	1	1	2
9	Essential hypertension	0	5	5

**Table 3 Stages Of Hypertension At The Time Of Presentation**

	Stage 1	Stage 2	Hypertensive urgency	Hypertensive Emergency
No of cases	14	60	15	37



**Table 4 Distribution Of Socioeconomic Status**

Low	Middle	High
115(92%)	9(7.1%)	2(1.5%)

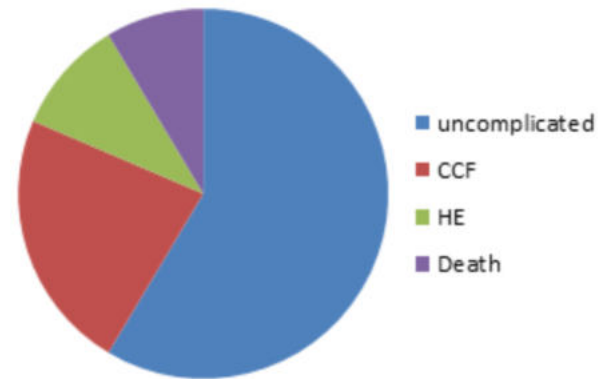
The BMI of the hypertensive children admitted were within normal range. Only 5 cases of essential hypertension were admitted out of which 4 were obese.

The mortality was 4.7% (6 cases) out of 126 patients and 16.2% among those presenting with complications. All 6 cases were of acute glomerulonephritis and presented in hypertensive emergencies at admission. They were admitted and treated in pediatric ICU setup. The mean age group of the cases died was 7 +/- 2.3 years and M:F ratio 2:1. The most common antihypertensive drug used was Amlodipine singly or in combination with Frusemide. In hypertensive emergencies infusion Labetalol was administered.

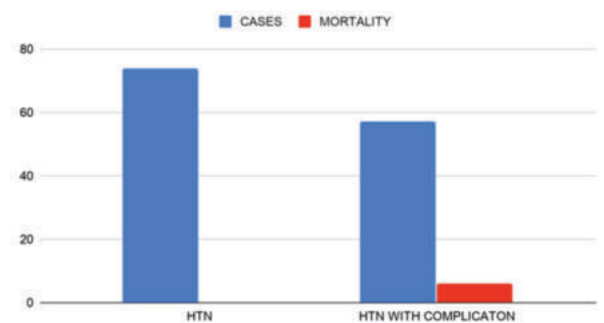
**Table 5: Complications And Mortality**

Total Cases	COMPLICATIONS		Death
	CCF	Hypertensive Encephalopathy	
126	22(17.1%)	15(11.9%)	6(4.7%)

## Complication and Mortality



### CASES and MORTALITY



## DISCUSSION

Sustained hypertension in children can almost always be related to a definite cause(3). However, in population-based epidemiological studies, prevalence of hypertension reflects obesity(10).

In our Study we examined the etiology of 126 hypertensive children where maximum(96%) cases had an underlying etiology and only 4 % cases were detected to have essential Hypertension. Renal or renal vascular cause of hypertension was the leading cause of admission .Our finding were similar to the other hospital based studies done in India(2,3).In a study done by Duwarah et al in NEIGRIHMS evaluated 4445 children out of which 86(1.93%) children had sustained hypertension where as in our study we have found a prevalence of 3.95% among hospitalized children.

In a study by Pankaj Hari et al including 246 hospitalised children the etiology was determined in 98.4% patients while 4 children were diagnosed as essential hypertension.Coarctation of aorta was the commonest etiological disease for hypertension in infancy. Beyond one year of age chronic glomerulo-nephritis was the commonest cause of sustained hypertension(49.2%). Obstructive uropathy(15.8%), reflux nephropathy(12.2%) and renovascular hypertension(5.7%) were other significant causes of hypertension beyond infancy

Similarly in a study done by Sourabh Gohain et al the prevalence of hypertension was 1.9% (n=86) out of total 4445 patients admitted in their hospital. 41.86% were boys and 58.13 were girls. 50% cases belonged to the age group of 11-15 years. The most common cause was renal (75.6%) primarily Acute glomerulonephritis and renovascular (17.9%). BMI was normal in 36 cases while 11 cases were above 95th percentile.

In a study by Kota SK et al, a total of 135 patients were selected (male:female 103:32), with mean age of 0.4 ± 2.1 years (range: six months to 17 years). The Common age group affected was the adolescents group (42.9%). The most common clinical feature at presentation was dizziness (30.3%), followed by headache and chest discomfort (22.9%). Transient hypertension was detected in 34 patients (25.2%), and was most common in the adolescent age group, whereas sustained hypertension was noticed in 101 patients (74.8%) and was the most common in the school age group (36/45, 80%).

Forty-two patients (31.1%) presented with hypertensive crisis. Nine patients were considered to have essential hypertension.

The chief causes included chronic glomerulonephritis in 56 (41.5%), endocrine disorders in 21 (15.5%), obstructive uropathy in 16 (11.8%), reflux nephropathy in 12 (8.8%) and renovascular disease in 5 (3.7%). Takayasu's disease was the most common cause of renovascular hypertension. Coarctation of aorta was the most common cause of hypertension in infancy, being present in 40% of the cases.

In a study by Manu Raj et al ,(4) Hypertension was seen in significantly higher percentages among overweight children when compared with normal children (17.34% v. 10.1%). This relationship has been reported by other studies as well.

Rosner et al (9) pooled data from 8 large epidemiological studies. Irrespective of race, gender, the odds of elevated blood pressure increased for both sexes increases with increasing levels of BMI.

## CONCLUSION

Hypertension is not very rare amongst the study population who attended the hospital. Many cases presented to us with severe hypertension and end organ damage and mortality was high in these cases (16.2%). Most children with sustained hypertension were found to have an underlying etiology. Glomerulonephritis is still the leading cause hypertension in this part of India.

This present study was conducted in admitted patients of a tertiary referral centre where most cases are symptomatic or severe hypertension so our findings may thus, not represent the prevalence and etiology of sustained hypertension in the population.

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**Conflict Of Interest:** None

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