

Analysis of Disorders Resulting from High Blood Pressure in Children

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Abstract: Background: hypertension is a severe increase in blood pressure with signs of target organ damage (mainly the brain, eyes, cardiovascular system, and kidneys). High blood pressure is rare in childhood, unlike in adulthood. **Aim:** This study aims to Analysis of disorders resulting from high blood pressure in children. **Patients and Methods:** An analytical study of disorders resulting from high blood pressure in children was recruited; 200 patients with high blood pressure were recruited and divided into two groups, including 100 boys and 100 girls. Where this study is applied in the different hospitals in Iraq, which extended from 1st October 2020 to 4th December 2021, this study included age, weight (kg), BP, SYMPTOMS, ETIOLOGIC (N, %), ATHEROSCLEROSIS. In addition, the 200 patients of the two groups, boys and girls, were examined in different hospitals in Iraq, and those who had HTN-C and Non-HTN-C. Estimation of outcomes of children patients was conducted based on R CORRELATION and SIG for both boys and girls. **Results and Discussion:** High blood pressure rates during infancy are more common than in childhood and stressful stages, as previously thought. High blood pressure is less common in children than in adults. Ages > 10. Most of the cases are boys and girls who are obese. Boys presented 14 (42.42%) and females 13 (43.33%) with a P-value of 0.0482. atherosclerosis was the most cause and effect on children, and it identified 39% for boys and 36% for girls with a p-value of 0.045. This study classified children into HTN-C and Non (HTN-C), where boys were more likely to have HTN-C than girls, as boys accounted for 76% HTN-C and Non (HTN-C) 24%, while females accounted for 65% HTN- C and 35% Non (HTN-C). The boy patients are more affected and harmful than the girl patients based on the r-correlation. It ranged for boys +0.73 and girls +0.53, but the Sig was 0.067 for boys and 0.055 for girls. **Conclusion:** that the factor of arterial hypertension affects children and adolescents in a large proportion compared to adults, which leads to damage to the liver, blood vessels, and blood vessels, as well as the heart. To follow up on this, this study discovered that high blood pressure may affect boys more than girls due to the previous factors, results, and causes.

Keywords: Blood pressure (BP); SBP/DBP; Obesity; TRAUMA; ATHEROSCLEROSIS; and FMD.

INTRODUCTION

Hypertension is a severe increase in blood pressure with signs of target organ damage (mainly the brain, eyes, cardiovascular system, and kidneys). High blood pressure is rare in childhood, unlike in adulthood. [Subcommittee on Screening and Management of High Blood Pressure in Children, 2017; Flynn, J.T. *et al.*, 2009]

Arterial hypertension (AHT) in children is an entity frequently under-diagnosed with its own characteristics in regard to prognosis, etiology, and management that differentiate it from adults [Chandar, J. *et al.*, 2012]. More and more studies correlate childhood blood pressure (BP) with puberty, meaning that a child with higher blood pressure numbers has a greater risk of becoming hypertonic. Despite this, prevention of high blood pressure and subsequent cardiovascular problems must begin in early childhood. [Lee, Y. *et al.*, 2018; Gupta-Malhotra, M. *et al.*, 2015]

Pediatric hypertension is a blood pressure of 95 percent or higher in children of the same age, sex, and height as the child. There is no simple target range for defining high blood pressure in all children, as what is considered normal changes as the child grows [Wyszyńska, T. *et al.*, 1992]. However, high blood pressure in adolescents is the same as in adults when the pressure reading is greater than or equal to 80/130 mmHg [Tullus, K. *et al.*, 2008]. The younger the child, the more likely it is that high blood pressure is caused by a specific, known medical condition. Older children may develop high blood pressure for the same reasons as adults, including being overweight, having a poor diet, and lack of exercise. [Martin, L.G. *et al.*, 2002; Pasquini, M. *et al.*, 2015]

High blood pressure in younger children is often associated with other health conditions, such as heart defects, kidney disease, genetic conditions, or hormonal disorders [Lim, A.M. *et al.*, 2020].

Older children, especially children who are overweight, are more likely to develop primary hypertension. This type of high blood pressure occurs on its own without an underlying cause. [Agrawal, H. *et al.*, 2018]

High blood pressure usually does not cause symptoms. However, signs and symptoms that may signal a high blood pressure emergency (hypertension episode) include headache, seizures, vomiting, chest pain, heavy heartbeat (palpitations), and shortness of breath. [Sandmann, W. *et al.*, 2014]

Children with high blood pressure should continue with them as adults unless it is treated. If your child's high blood pressure continues into adulthood, your child may be at risk for stroke, heart attack, heart failure, and kidney disease. [Zhu, G. *et al.*, 2014]

Hypertensive emergencies are relatively rare in children, observed in approximately 2 cases per 10,000. Diagnosis is based on the measurement of blood pressure and tests for target organ damage, including ECG, urinalysis, and measurement of blood urea nitrogen and creatinine. Treatment is the immediate lowering of blood pressure, usually with intravenous medication. [Wu, H.P. *et al.*, 2012]

In addition, we know that even mild alterations of blood pressure at early ages of life translate into HTA with pubertal-associated organic lesion. All of these lays bare the significance of a healthy mother for both diagnostic and therapeutic AHT in infancy, where the critical role of the primary care pediatrician's personality is played. [Zhou, B. *et al.*, 2021]

Arterial hypertension is one of the most common chronic diseases common in western society. Prevalence ranges in our country from 20-30% in the general population, even increasing to 60-70% in people over 65 years old. The importance of AHT lies in the direct relationship of this syndrome with the presence of cardiovascular and cerebrovascular diseases [Forouzanfar, M.H. *et al.*, 2017]. Diseases of the circulatory system are the number one cause of death in industrialized countries. Of these, AHT is perhaps the most predictive of risk. Presumably, it is estimated that more than 40% of these deaths are directly caused by the presence of hypertension. [Schutte, A.E. *et al.*, 2021]

The prevalence of high blood pressure in England ranges from 1 to 7% of all emergency cases treated in an ambulance or hospital. A study conducted in the United States reported the prevalence of hypertensive crises as 2% of the total attendance in a 6-month period at the out-of-hospital emergency point of a rural health center [Schutte, A.E. *et al.*, 2021]. This study aims to Analysis of disorders resulting from high blood pressure in children

PATIENTS AND METHOD

An analytical study of disorders resulting from high blood pressure in children was recruited; 200 patients with high blood pressure were recruited and divided into two groups, including 100 boys and 100 girls. Where this study is applied in the different hospitals in Iraq, which extended from 1st October 2020 to 4th December 2021, this study included age, weight (kg), BP, SYMPTOMS, ETIOLOGIC (N, %), ATHEROSCLEROSIS as shown in Table 1.

In addition, the 200 patients of the two groups, boys and girls, were examined in different hospitals in Iraq, and those who had HTN-C and Non-HTN-C were identified, as shown in Figure 1. Evaluation of hypertension in children by SBP/DBP was also done based on the definition of hypertension in the case of Normal, Middle, Hypertension have St-1 or St-2, and Isolated systolic hypertension, as can be seen in Table 2.

This study carried out Estimations of Damages for renovascular hypertension due to Hypertension in children, which included the following parameters, Cerebral hemorrhage, Hypertensive encephalopathy, Retinopathy, and Left ventricular hypertrophy, as it was performed on affected patients for both males and females as can be seen in Figure 2. This study the study conducted a logistic regression analysis that affected parameters of children patients' analysis, which included convulsion, headache, atherosclerosis, shortness of breath, isolated systolic hypertension, and BP, as shown in Table 3. Estimation of outcomes of children patients was conducted based on R CORRELATION and SIG for both boys and girls.

To protect the rights, safety, and health of the patients taking part in this study, ethical and scientific criteria that are based on globally accepted norms have been taken into consideration when collecting patient demographic data and information. Additionally honored were the patient's autonomy, their agreement to supply the

needed information, and the privacy of their personal information.

this study to use the methodologies and methodological processes.

Permission and consent were obtained from the implementing authorities for the aim of creating

RESULTS

Table 1: Characteristics demographic results of Children patients

Variables	Boys (100)	Girls (100)	P-value
Age			
2-5	22%	20%	0.047
6-9	34%	30%	0.042
10-13	44%	50%	0.0211
Obesity			
For 2-5	9 (27.27%)	6 (20%)	0.0418
For 6-9	10 (30.3%)	11 (36.7%)	0.0437
For 10-13	14 (42.42%)	13 (43.33%)	0.0482
Bp			
SBP	60%	55%	0.045
DBP	40%	45%	0.045
Symptoms			
Convulsion	12%	17%	0.0418
Headache	19%	15%	0.043
Seizures	15%	20%	0.0433
Shortness of breath	21%	22%	0.0471
Chest pain	33%	26%	0.0375
Etiologic (n, %)			
Trauma	32%	30%	0.047
Atherosclerosis	39%	36%	0.045
FMD	29%	34%	0.042
Atherosclerosis			
Yes	70%	60%	0.046
No	30%	40%	0.045
Family history			
Yes	40%	33%	0.8
No	60%	67%	0.66

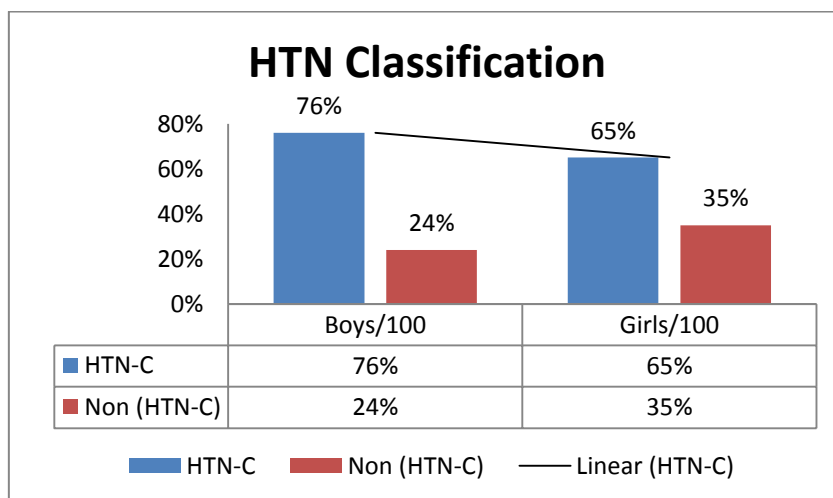


Fig 1: Classification of HTN for children’s patients

Table 2: outcomes of the patient according to BP (mmHg)

	Patient	Control	P-value
SBP	170.55±20.1	133.4±15.5	0.001
DBP	120.3±4.9	80±7.8	0.003

Table 3: Evaluation of the quality of life in children with high blood pressure (by Mean±SD)

Variable	Patient	Control	P-value
Psychosocial health	72.9 (4.5)	76 (12.4)	0.4
Physical functioning	72.66 (8.19)	80.9 (10.8)	0.05
Emotional functioning	71.66 (11.1)	75.5 (11.3)	0.02
School functioning	66 (6.6)	88 (10.2)	0.001

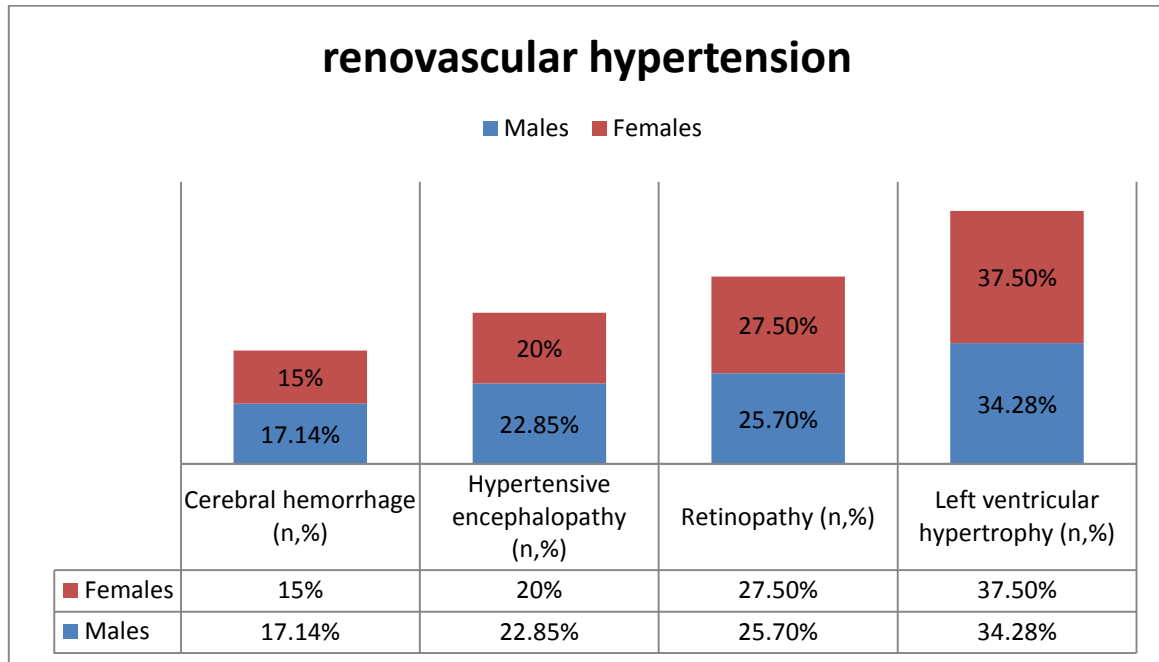


Fig 2: Estimations of damages for renovascular hypertension due to Hypertension in children

Table 3: Logistic Evaluation of affected parameters of children patients' analysis

Parameters	Boys (N=100)	Girls (N=100)	P-value
Convulsion	0.82 (0.6-1.2)	0.67 (0.6-1.0)	0.044
Headache	1.2 (0.89-1.3)	1.4 (0.6-1.6)	0.045
Atherosclerosis	1.21 (0.97-1.61)	1.43 (1.0-1.7)	0.039
Shortness of breath	2.23 (1.9-6.4)	1.8 (1.5-2.5)	0.0256
Isolated systolic hypertension	1.36 (1.1-2.5)	1.4 (1.24-1.7)	0.041
Bp	5.5 (2.1-7.9)	1.3 1 (0.8-1.9)	0.042

Table 4: correlation of results negative children's patients

Variable	Outcomes of children	Boys	Girls
R correlation	1/0	+0.73	+0.53
Sig	--	0.067	0.055
N		200	

DISCUSSION

This study was organized as an analytical study conducted for children with high blood pressure, where 200 patients were recruited in different hospitals in Iraq 2020-2021 for boys and girls. [Yang, L. et al., 2020]. Table 1 was presented as

representing the demographic study, as it included age, weight (kg), blood pressure, symptom, Etiologic, and atherosclerosis, where German studies confirmed that it is the obesity factor that causes severe disorders in children's high blood levels, and this is what our study conducted where

collected 200 samples with Ages between 2 -13 ages and Most of the cases are boys and girls who are obese [Theodore, R.F. *et al.*, 2015]. High blood pressure and obesity are, in turn, diseases and risk factors for cardiovascular disease and atherosclerosis. Early detection and appropriate behavior once the diagnosis is made during childhood can alter the course of the disease and prevent early complications.

This study found 6.1% of AHT and 4.2% of hypertension among the children studied, representing 10.3% of the children with blood pressure above normal, figures that coincide with another recent study of 986 children aged Between 5 and 12 years old. Of the three elementary schools in Plaza Municipality, in which 6% of AHT was detected, and 6.8% of hypertension was detected, 14 which would indicate a slight increase in the prevalence of AHT, if considered higher than 3 to 5%, a number found in studies previous.

English studies and other studies still in progress have shown that the presence of arterial hypertension is a risk factor that is increasingly observed in younger ages [Urbina, E.M. *et al.*, 2019]. This study classified children into HTN-C and Non (HTN-C), where boys were more likely to have HTN-C than girls, as boys accounted for 76% HTN-C and Non (HTN-C) 24%, while females accounted for 65% HTN- C and 35% Non (HTN-C) as can be seen in Figure 1. An evaluation was provided for patients with high blood pressure, and it was classified into Normal, Middle, Hypertension have St-1 or St-2, and Isolated systolic hypertension) with a P-VALUE of 0.047, as presented in Table 2.

High blood pressure is less common in children than in adults, with an estimated 1-3% of children suffering from high blood pressure. A larger proportion of children have secondary, correctable causes of high blood pressure than adults [Urbina, E.M. *et al.*, 2019]. In Figure 2, the results related to damages for renovascular hypertension due to Hypertension in children were shown, which included the following parameters Cerebral hemorrhage, Hypertensive encephalopathy, Retinopathy, left ventricular hypertrophy, where left ventricular hypertrophy was damaged, and the percentage of boys was 34.28% and females 37.50%. New US research has shown that high blood pressure is another risk factor for blood vessels at young ages [Ding, L. *et al.*, 2022].

The logistic regression analysis for sick children in table 4 showed that two factors, isolated systolic hypertension and atherosclerosis, were more effective for children 1.21 (0.97-1.61) and 1.43 (1.0-1.7) with a p-value of 0.039. However, the negative outcomes for the sick children were evaluated based on the r-correlation and the sig for the 200 patients, as it was shown that the boy patients are more affected and harmful than the girl patients based on the r-correlation. It ranged for boys +0.73 and girls +0.53, but the Sig was 0.067 for boys and 0.055 for girls.

CONCLUSION

In some children, high blood pressure may be a sign of an underlying disease, such as renal parenchymal disease, while in others, high blood pressure may represent the early onset of primary hypertension or secondary to obesity and metabolic syndrome. In this review, a descriptive analytical study was presented about arterial hypertension in children, which included boys and girls. After discussion and analysis, this study concluded that the factor of arterial hypertension affects children and adolescents in a large proportion compared to adults, which leads to damage to the liver, blood vessels, and blood vessels, as well as the heart. To follow up on this, this study discovered that high blood pressure may affect boys more than girls due to the previous factors, results, and causes.

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