

Determining the Quality of Life for Children with High Blood Pressure

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Abstract: Background: High blood pressure represents a major factor that profoundly and widely affects the quality of children's lives, reducing their daily lives and their physical and mental health. **Objective:** This study was assessed and analysed clinical outcomes of the quality of life for children with high blood pressure. **Patients and methods:** This study recorded data on pediatric patients with high blood pressure, which included symptoms and comorbidities associated with the patients and side effects, which included (exposure to passive smoking, family history of high blood pressure, low birth weight, and diet), where rates of biochemical measurements were also determined. And blood pressure in patients in terms of systolic and diastolic blood pressure, recording rates of complications related to children, assessing rates of pain and quality of life in children, and identifying factors affecting children's quality of life in the long term. **Results:** Clinical data was recorded for pediatric patients, which showed that males were 70% higher than females, 30%. The percentage of children who had comorbidities was 40%, and the most common symptoms in children included dizziness, 43%, and chest pain, 55%. Headaches accounted for 60%; fatigue accounted for 74%; side effects affecting children represented by exposure to passive smoking accounted for 59 cases; family history of high blood pressure accounted for 50 cases, and a diet including a healthy diet accounted for 20%, and unhealthy foods accounted for 80 cases. %. Our subjects recorded mean blood pressure measurements of 152.23 ± 3.67 , diastolic blood pressure was 84.65 ± 2.15 in class 1 hypertension, while systolic blood pressure was 166.24 ± 1.93 and diastolic blood pressure was 93.82 ± 2.89 . This data determined complication rates, which included heart disease in 12 cases, stroke in 9 cases, and kidney failure in 7 cases. Quality of life rates determined physical function at 43.23 ± 2.35 , psychological function at 50.64 ± 4.78 , and school function at 56.74 ± 4.82 . **Conclusion:** High blood pressure is a dangerous indicator which causes an increased rate of health complications that may negatively affect the rate of quality of healthy life in children, which is attributed to poor health and well-being of the child in the long term.

Keywords: High blood pressure; Children; Heart disease; Kidney failure; Stroke; and Quality of life

INTRODUCTION

High blood pressure is a chronic pathology that represents one of the most frequent health problems in humanity and is mainly responsible for the high incidence of cardiovascular events diagnosed every year in the world [D'Alonzo, G. E. *et al.*, 1991]. High blood pressure at an early age is a commonly underdiagnosed pathology with its own particularities in terms of diagnosis, etiology, and control that differentiate it from older people. [Barst, R. J. *et al.*, 2012; Yung, D. *et al.*, 2004]

Its incidence in the world has increased in recent years due to environmental factors such as overweight, salt and alcohol intake, or a sedentary lifestyle [Siehr, S. L. *et al.*, 2013]. Research on blood pressure (BP) at an early age is becoming more frequent compared to that of adulthood, in the sense that a child with high blood pressure values is more likely to become a hypertensive child [Simonneau, G. *et al.*, 2013]. There are studies that show that even mild alterations in blood pressure in childhood result in high blood pressure with associated organ injury in adulthood [Del Cerro, M. J. *et al.*, 2011]. All this shows the importance of the correct diagnosis and therapeutic

approach to hypertension in childhood, in which pediatric specialists in primary health care play an important role. [Mullen, M. P. *et al.*, 2014]

In the child population, blood pressure is a very variable indicator since it shows normal values that vary according to sex and also develop constantly over the years with body growth [Varni, J. W. *et al.*, 2003]. Under normal conditions, systolic blood pressure rises rapidly during the first month of life, with this increase slowing down until the age of five [Harris, P. A. *et al.*, 2009]. Between this age and the onset of puberty, systolic and diastolic blood pressure (SBP and DBP) grow at an annual rate of 1-2 mmHg and 0.5-1 mmHg, respectively, with small differences between males and females [Varni, J. W. *et al.*, 2007]. At the ages between 13 and 18, blood pressure returns to present an increase in its figures, which are more frequent in males than in females, and reach higher blood pressure values as a result of their later pubertal development and greater body mass. [Jardine, J. *et al.*, 2014; Qadeer, R. A. *et al.*, 2018]

The patient's lack of adherence to treatment is one of the most significant obstacles faced by clinical practice in the management and control of

hypertensive subjects [Uzark, K. *et al.*, 2013]. It has been determined that the first cause of non-compliance with antihypertensive treatment is forgetfulness of taking medication, followed by the absence of unpleasant symptoms in the early stages of the disease, and thirdly, holidays [Marino, B. S. *et al.*, 2016; Varni, J. W., 2016]. However, other relevant variables should be considered, such as the lack of motivation to obtain the drug, the possible negative impact of pharmacological medication on the integral functionalism and quality of life of the individual, and the low patient expectation of the outcome of the medication. Likewise, the economic impact of antihypertensive treatment on patients and their families can have a negative effect on adherence to treatment. [ePROVIDE™, 2018; Felder-Puig, R. *et al.*, 2008]

The systemic high blood pressure in the child lies in the rise of the systolic and/or diastolic blood pressure values above the 95th percentile for age and sex in at least three doses with an interval of six months [Kane, S. P., 2016]. Previously, there were no statistics on normal blood pressure in childhood, so normal blood pressure values in adults were used as references [Varni, J. W. *et al.*, 2006]. This new concept has caused an increase in the number of hypertensive people of pediatric age. The early diagnosis of asymptomatic hypertensive children is of great importance as a marker of hypertension risk during adulthood, which is why health actions have a preventive approach based mainly on the study of the predisposing factors of hypertension in the child. [Mukaka, M. M. *et al.*, 2012]

PATIENTS AND METHODS

We conducted a cross-sectional study of pediatric patients suffering from high blood pressure, which included 90 participating children whose ages ranged between 2 and 13 years. Clinical and demographic data included age, sex, comorbidities, ASA classification, and mothers' educational and economic level. As for pediatric diagnosis, this study discovered the most common

and apparent symptoms in children, which included headache, dizziness, blurred vision, chest pain, shortness of breath, fatigue, and others. Furthermore, we also diagnosed the rate of secondary parameters causing side effects, which included exposure to passive smoking, family history of high blood pressure, low birth weight, diet, which included both healthy and unhealthy, use of medications, and severity of high blood pressure, which included both systolic and diastolic blood pressure.

Regarding the biochemical results, we diagnosed pediatric patients and determined the biochemical parameters that tested all patients. The biochemical parameters included sodium (mmol/L), potassium (mmol/L), urea (mmol/L), creatinine (umol/L), albumin (g/L), total cholesterol, and calcium (mmol/L). Also, these data determined the clinical consequences of complications related to children with hypertension.

In addition, this study recorded clinical data for pediatric patients related to pain ratings using the VAS scale, which ranges from 0 to 10, where 0 represents the lowest pain score that is most comfortable for the child, and 10 represents the highest and most severe pain score for children. Also, these data determined the diagnostic and clinical results for pediatric patients, as the quality-of-life scale ranged between 0 and 100, where 0 represents the highest score for poor quality of life, and 100 represents the highest score for recovery and improvement in the patient's quality of life. We analyzed, designed, and distributed the pediatric clinical data and outcomes to all patients using SBSS, version 22. This study included and excluded child patients, as the exclusion data included both infant patients or patients who had chronic and serious diseases such as AIDS or cancer, while this study included data for patients whose ages ranged between 2 and 13 years and also patients who had heart, kidney, and diabetes diseases and had low blood pressure in weight.

RESULTS

Table 1: Demographic and clinical characteristics outcomes of children with high blood pressure

Characteristics	Number of patients [90]	Percentage [%]
Age, [days]		
2 – 5	18	20.0%
6 – 9	27	30.0%
10 - 13	45	50.0%
Sex		
Males	63	70.0%
Females	27	30.0%
Comorbidities		
Yes	36	40.0%
No	54	60.0%
HIV	36	40.0%
Diabetes	45	50.0%
Kidney diseases	18	20.0%
Obesity	54	60.0%
Cardiovascular diseases	27	30.0%
Others	9	10.0%
ASA, (%)		
I	15	16.67%
II	22	24.44%
III	43	47.78%
IV	10	11.11%
Maternal education		
Less than high school	9	10.0%
High school graduate	18	20.0%
College Graduate	63	70.0%
Income status, \$		
≤ 1000	63	70.0%
> 1000	27	30.0%

Our results showed that children (aged 10 – 13) years were the most prevalence, with 50%, followed by children with (6 – 9) was 30 %, where males were higher with 70% than females with 30%, with a rate of children who have comorbidities were 40% where the most common comorbidities factors were HIV with 40%,

diabetes with 50%, obesity with 60%, and cardiovascular diseases with 30%.

In Figure 1, we determined the most common symptoms which prevalence on children, which are dizziness was 43%, chest pain was 55%, headaches had 60%, and fatigue had 74%. All these indicators had prevalent in the children.

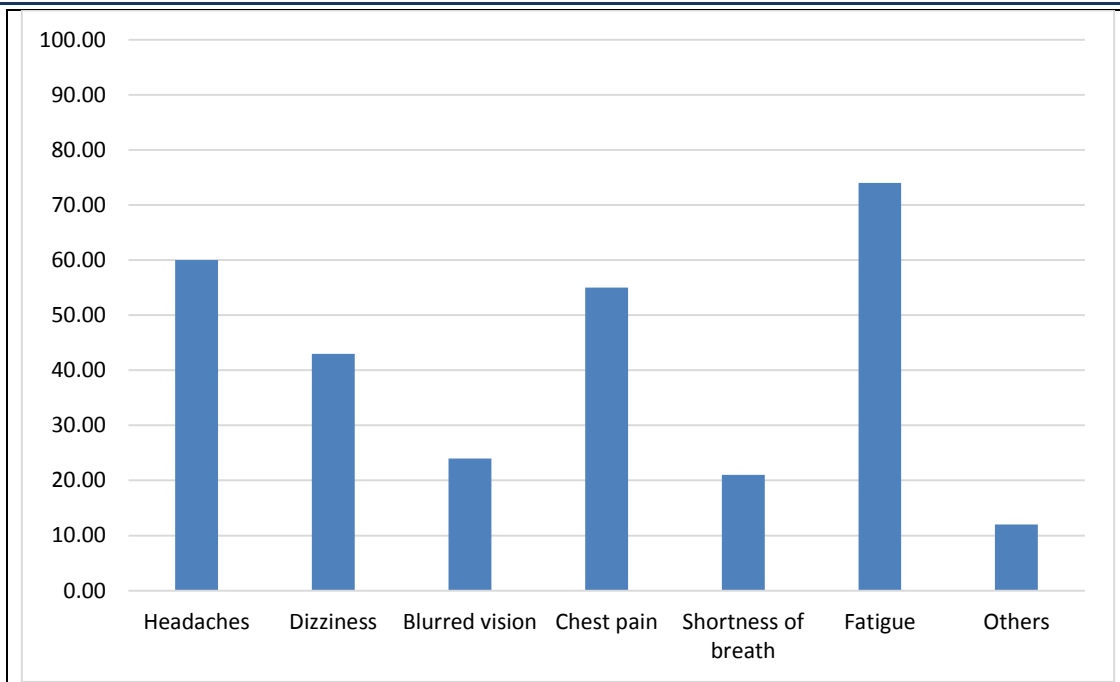


Figure 1: Determining the common symptoms of children with high blood pressure

Table 2: Identifying clinical outcomes of children with high blood pressure

Variables	Number of patients [90]	Percentage [%]
Exposure to second-hand smoke		
Yes	59	65.56%
No	31	34.44%
Family history of high blood pressure		
Yes	50	55.56%
No	40	44.44%
Low Birth Weight		
Yes	36	40.0%
No	54	60.0%
Diet system		
Health	18	20.0%
Unhealthy	72	80.0%
Use of medications		
Yes	9	10.0%
No	81	90.0%
Severity of high blood pressure		
Class I		
Systolic blood pressure (SBP)	152.23 ± 3.67	
Diastolic blood pressure (DBP)	84.65 ± 2.15	
Class II		
Systolic blood pressure (SBP)	166.24 ± 1.93	
Diastolic blood pressure (DBP)	93.82 ± 2.89	

We defined clinical outcomes of side effects who effect on children which presented each of exposure to second-hand smoke got 59 cases, family history of high blood pressure got 50 cases, diet system included healthy with 20% and

unhealthy with 80%, where systolic blood pressure was 152.23 ± 3.67 and diastolic blood pressure was 84.65 ± 2.15 in class I of high blood pressure, while systolic blood pressure was 166.24 ± 1.93 and diastolic blood pressure was 93.82 ± 2.89.

Table 3: Conducting Biochemical profile test for children with high blood pressure

Biochemical profile	(Mean ± SD)
Sodium (mmol/L)	134.35 ± 10.23
Potassium (mmol/L)	6.78 ± 1.32
Urea (mmol/L)	8.52 ± 2.95
Creatinine (umol/L)	106.43 ± 21.89
Albumin (g/L)	23.56 ± 6.86
Total cholesterol	12.31 ± 4.75
Calcium (mmol/L)	2.45 ± 0.38

Table 4: Enrolling clinical outcomes of complications related to children with high blood pressure

Complications	Number of patients [90]	Percentage [%]
Heart disease	12	13.33%
Kidney failure	7	7.78%
Vision problems	5	5.56%
Cognitive issues	4	4.44%
Stroke	9	10.0%
Total	37	41.11%

Our findings were enrolled clinical outcomes of complications, where the rate of complications included 37 cases, where the most common

complications were heart disease, which included 12 cases, stroke got 9 cases, and kidney failure had 7 cases

Table 5: Measure the degree of pain for children with high blood pressure

Follow-up (Time)	Pain score
1 Day	7.65 ± 1.03
3 Day	7.94 ± 0.98
6 Day	8.65 ± 0.56
8 Day	9.02 ± 0.22
10 Day	9.201 ± 0.247

Table 6: Assessment of quality of life for children with high blood pressure

Items	Quality of life score
Physical function	43.23 ± 2.35
Psychological function	50.64 ± 4.78
Emotional function	57.61 ± 5.38
Social function	67.89 ± 3.85
School function	56.74 ± 4.82

This study was assessed the quality of life associated with children, where the worst factors who enrolled lower quality of life were physical

function with 43.23 ± 2.35, psychological function with 50.64 ± 4.78, and school function with 56.74 ± 4.82.

Table 7: Logistics regression analysis of risk factors affect on children with high blood pressure

Risk factors	Or	CI % 95
Systolic blood pressure (SBP)	3.27	0.76 ± 5.86
Diastolic blood pressure (DBP)	2.85	1.85 ± 6.43
Heart disease	1.01	0.22 ± 1.83
Kidney failure	1.12	0.35 ± 2.54
Stroke	2.88	2.05 ± 4.87
Exposure to second-hand smoke	4.77	2.66 ± 9.94
Family history of high blood pressure	5.72	2.43 ± 11.80
Low Birth Weight	6.55	3.73 ± 9.85
Diet system	5.67	3.24 ± 12.64
Use of medications	6.89	2.63 ± 12.27
Kidney diseases	8.51	4.92 ± 22.55

Cardiovascular diseases	5.68	3.84 ± 7.19
HIV	2.46	1.13 ± 5.63
Total cholesterol	4.33	2.82 ± 7.28

We determined the risk factors who caused and effected on quality of life for children's patients, which include each of heart disease, total cholesterol, HIV, low Birth Weight, family history of high blood pressure, and cardiovascular diseases.

DISCUSSION

Recent research has reached a consensus that hypertension, often referred to as high blood pressure, may have a substantial influence on the overall well-being of children. If left unaddressed, this condition can give rise to many severe health consequences that can adversely affect both their physical and mental health. [Chaudhry, Z. *et al.*, 2012]

A study conducted in the United States observed that elevated blood pressure is associated with an elevated likelihood of organ impairment, encompassing the heart, kidneys, as well as blood vessels. This, in turn, can give rise to various complications, including heart disease, stroke, as well as kidney failure, where these complications had a substantial effect on the general well-being and health of children as well. As some studies found that youngsters afflicted with hypertension may encounter emotions of worry, stress, or despair as a result of the repercussions of their ailment on their everyday existence. [Uzark, K. *et al.*, 2003]

Another study indicated that a substantial proportion of adolescents who have hypertension can require substantial modifications to their lifestyle, which include adherence to a prescribed dietary regimen, medication use, or the reduction of sodium consumption [Eiser, C]. The implementation of these modifications was presented some difficulties and potentially limit the child's engagement on specific activities or social gatherings, where the presence of high blood pressure had a social ramification in children which can experience a sense of distinction or seclusion from their peers as a result of their medical condition. [Uzark, K. *et al.*, 2001]

Some studies also shown that high blood pressure was presented in children can have a significant influence in terms of overall well-being, encompassing their physical health, emotional state, lifestyle decisions, and social engagements, where collaboration between parents and

healthcare practitioners was crucial in the treatment of hypertension in children, which it contributed to enhance all of overall well-being and mitigating the risk of further difficulties. [Trapanotto, M. *et al.*, 2009; Jović, M. *et al.*, 2009]

CONCLUSION

Our current study has shown that high blood pressure is a negative factor that greatly impairs the rate of quality of life in health, which increases the severity of the spread of complications in children, most notably heart disease, stroke, and kidney failure, which is attributed to a sharp decline in the rate of quality of life in children and general health in terms of both the physical, emotional, and psychological aspects.

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