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Anxiety disorder of hypertensive children and burnout levels of their families

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ABSTRACT

Objective: Our study focused on assessing the anxiety levels of children and adolescents being monitored for hypertension (HTN), as well as the burnout levels experienced by their caregivers.

Material and Methods: The study included 67 patients, aged 12 and older, who were monitored for HTN as the study group, and 60 children and adolescents, matched for gender and age, without chronic illnesses, were selected from the pediatric outpatient clinic for routine check-ups to serve as the control group. The State Anxiety Inventory (STAI-1), Trait Anxiety Inventory (STAI-2), and Beck Anxiety Inventory (BAI) were applied to the children, while the Maslach Burnout Inventory (MBI) was applied to their parents.

Results: We found the mean STAI-1 scores of the study group lower than the control group (43.6±6.4 vs. 51.6±15.4; p <0.001). However, no difference was detected between these groups in terms of the STAI-2 scores (p= 0.140). The median BAI scores were higher in study group than control group (10.0 vs.6.5; p=0.010) but no significant difference have been found in terms of severity of anxiety (p=0.170). There was no difference in caregivers between the emotional exhaustion (MBI-EE) and personal accomplishment (MBI-PA) subscale scores of the MBI of the caregivers (p=0.280, p=0.340 respectively).

Conclusion: Our study revealed low anxiety levels among HTN patients and low burnout scores in their families. However, we believe that continuous psychiatric support for both patients and their families may be essential for managing chronic conditions, indicating the need for further research in this area regard.

Keywords: Anxiety, caregiver burden, children, hypertension

Introduction

Hypertension (HTN) in children is defined as systolic or diastolic blood pressure (BP) in three different measurements over the 95th percentile, by age, gender, and height (1). The frequency of HTN is approximately 2–4% among children (2). In our country, the prevalence of hypertension in children aged 6 to 15 years ranges from 8.5% to 15% (3). Although it is rarely seen compared to adults, it is a significant chronic disease due to its complications and lays the groundwork for atherosclerosis in adulthood (4).

Hypertension can further be classified by etiology: essential or primary HTN (where an underlying cause cannot be identified) and secondary HTN (where an organic cause is established) (5). Essential hypertension is rarely seen in infants and young children, but its prevalence increases significantly in adolescence. A good general rule to follow is that the likelihood of identifying a secondary cause of hypertension is inversely related to the age of the child and directly related to the degree of BP elevation (6, 7).

Anxiety is a normal reaction to the stress factors and uncertainties in life; however, because the frequency and severity of this condition affect the quality of life, it is considered a pathological condition (8). Anxiety causes psychological symptoms, such as tension, worrying, crying attacks, and fear, as well as physiological symptoms, like tachycardia, tachypnea, vomiting, insomnia, anorexia, and tremors (9).

Although there is no standard definition of burnout, it is

described as mental and physical exhaustion caused by work (10). Like work-related burnout, it has been shown that parenting can also cause burnout in individuals. It is found that parents can feel a lot of stress while taking care of their children (11).

This study aimed to investigate the effect of HTN on the anxiety levels of children and the burnout levels of their families. Children with HTN and their families were compared with children who did not have a chronic disease and their families. At the end of the study, we aimed to determine the anxiety levels of hypertensive children and the burnout levels of their families.

Materials and Methods

The State-Trait Anxiety Inventory (STAI) scale is designed for children aged 12 and older. Therefore, between July 2017 and July 2018, we identified 67 patients aged 12 and above who visited our Ankara Pediatrics Hematology Oncology Research and Training Hospital, Pediatric Nephrology Outpatient Clinic for hypertension, along with their parents, as the study group. For the control group, we selected 60 children aged 12 and older who visited the pediatric outpatient clinic without any known chronic illnesses, along with their parents included.

All patients with hypertension were evaluated with a 24-hour ambulatory blood pressure monitorization (ABPM). The appropriate-sized cuff was attached to the non-dominant arm, and measurements were made every 20 minutes during wakefulness and every 30 minutes during sleep (12). For ABPM, an Erkameter 24 ABPM (Bad Tölz, Germany) device was used. The mean systolic and diastolic blood pressure measurements of 24-hour, daytime, and night-time, as well as systolic and diastolic blood pressure loads, were evaluated. These evaluations were compared with the mean blood pressure measurements of healthy children by Soergel et al. (13) and coordinated by Wühl et al. (14).

The demographic information of all children was recorded. Age, gender, height, weight, age at diagnosis, antihypertensive medications, and duration of use were recorded for the study group, while age and gender were recorded for the control group. STAI forms TX 1–2 and BAI were given to all children in the study, and MBI was given to their parents.

State-Trait Anxiety Inventory is an inventory used to measure the state and trait anxiety levels (15). It consists of two forms, STAI form TX-1 and STAI form TX-2, with 20 statements each. STAI form TX-1 inventory measures the subjective anxiety an individual feels due to stressful situations. STAI form TX-2 inventory measures the individual's predisposition to experiencing anxiety. This is the tendency of a person to perceive or interpret a situation as stressful.

The Beck Anxiety Inventory (BAI) is a self-assessment inventory developed by Beck et al. (16) and used to determine the frequency of anxiety symptoms experienced by individuals. It consists of 21 items, scored between 0–3; "none" is 0 points, "mild" 1 point, "moderate" 2 points, and "severe" is 3 points. The points are tallied after 21 items are marked, with 0–7 points indicating no anxiety, 8–15 indicating mild anxiety, 16–25 indicating moderate anxiety, and 26–63 points indicating severe anxiety symptoms.

The Maslach Burnout Inventory (MBI) is today's most widely accepted burnout description (17). It is comprised of 22 total items, and its results are evaluated in three dimensions. There are nine items in the "emotional exhaustion" (EE) dimension, eight items in the "personal accomplishment" (PA) dimension, and five items in the "depersonalization" dimension. Although it was expected that the MBI, originally designed to measure job burnout, could also assess parental burnout, validation studies found that the depersonalization subscale was not appropriate for this purpose. However, the emotional exhaustion and personal accomplishment subscales were deemed usable for assessing parental burnout (18). In national and international studies, it was deemed appropriate to evaluate the inventory for parents in two dimensions, which are personal accomplishment and emotional exhaustion (18-20). Individuals may score 0–52 points for the emotional exhaustion dimension and 0–32 points for the personal accomplishment dimension. High scores are interpreted in the same direction in the emotional exhaustion dimension regarding parental burnout and the opposite direction in the personal accomplishment dimension.

Statistical analysis

Statistical Package for Social Sciences (SPSS), version 22.0 for Windows (SPSS Inc. Chicago, USA) computer package program was used for statistical analysis of the research data. In the descriptive statistics section, categorical variables were presented as numbers and percentages, and continuous variables were presented as mean and standard deviation and median (minimum-maximum value). The conformity of continuous variables to normal distribution was evaluated using visual (histogram and probability graphs) and analytical methods (Kolmogorov-Smirnov/Shapiro-Wilk tests). Independent sample t-test was used for the comparison analysis between the two groups for the data of continuous variables that were found to be normally distributed between the groups as a result of the normality analysis. For the data that did not fit the normal distribution, the Mann-Whitney U test was used for the comparison analysis between two groups. Pearson chi-square test were used in the comparison analysis for categorical variables between independent groups. The relationship between independent predictors that did not fit the normal distribution was evaluated by Spearman correlation analysis. The absolute value of the correlation coefficient (rho) $r \leq 0.30$ indicates a weak relationship, 0.30-0.50 indicates a moderate relationship and $r \geq 0.50$ indicates a strong relationship (21). Statistical significance level was accepted as $p<0.050$.

Results

The general characteristics of the study group

In the study group of 67 patients, 45 (67.2%) were male, while 22 (32.8%) were female. The median age of the patients was 16.5 (IQR; 3.3), and the median age at diagnosis was 14.3 (IQR; 4) years. The mean follow-up period due to HTN of the study group in our hospital was 26.6±22.4) months. Thirty-

two (47.8%) patients were obese, and the median body mass index (BMI) was 25.7 (IQR; 7.5) kg/m². A total of eight patients (11.9%) required follow-ups for secondary hypertension. Of the 67 patients in the study group, 11 (16.4%) did not receive medical treatment, and blood pressure was monitored with lifestyle changes. There were 34 (50.7%) patients using one drug, 17 (25.4%) using two drugs, two (3%) using three drugs, and three (4.5%) using four drugs. The mean duration of the first line medical treatment was found to be 25.9± 21.5 months.

Comparison of the inventory scores:

The study group's mean STAI-1 score was lower than control group's score (43.6±6.4 vs. 51.6±15.4; p <0.001) (Table I). When the STAI-2 scores were compared, no significant difference was found between the two groups (p=0.140).

The study group's median BAI score was significantly higher than the control group (p = 0.012) (Table I). However, no difference was found when the anxiety levels (none, mild, moderate, severe) of the study and control groups were compared (p=0.170). There was no difference in the MBI-EE and MBI-PA median scores between the parents of the two groups (p=0.282, p=0.340) (Table I).

The MBI scores of the parents were compared, the median scores of the emotional exhaustion in male patients' parents were higher than those of the parents of the female patients (p =0.040) (Table II). As in the relationship between age and inventory scores, the STAI-1 score increases for both the study and control groups as the age decreases, while the BAI score increases as the age increases for all children (Table III). No differences were observed when comparing organ damage and STAI-1 (p=0.820), STAI-2 (p=0.990), BAI (p=0.430) scores in the study group. When assessing the patients' obesity and STAI-1 (p=0.470), STAI-2 (p=0.970), BAI (p=0.390) scores, no differences were found.

There was no difference between the follow-up periods (compared ≤12 months and >12 months) and STAI-1 (p=0.810), STAI-2 (p=0.830), BAI (p=0.610) scores of the patients and their parents' MBI-EE (p=0.240) and MBI-PA (p=0.900) scores .

The inventory scores of the study group using antihypertensive drugs were compared with the control group, we found the STAI-1 scores were higher in the control group (p=0.010). On the other hand, when the BAI scores were compared, the scores of patients using antihypertensive drugs were higher than the control group (p=0.009) (Table IV).

Table I: Comparison of inventory scores between the study and control groups (n=127)

	Control group	Study group	p
Number of patients	60	67	-
STAI-1 Score*	51.6±15.4	43.6±6.4	<0.001
STAI-2 Score*	49.4±11.4	46.9±7.1	0.140
BAI Score†	6.5 (0–39.0)	10.0 (0–4.0)	0.010
BAI State‡			
No anxiety	32 (53.3)	26 (38.8)	
Mild	18 (30.0)	19 (28.4)	0.170¶
Moderate	6 (10.0)	15 (22.4)	
Severe	4 (6.7)	7 (10.4)	
MBI-EE†	7.0 (0–2.0)	8.00 (0–47.00)	0.280
MBI-PA†	24.0 (1.0–32.0)	25.0 (1.0–36.0)	0.340

:** *mean±SD (Independent Sample T-test),* **†:** *median(min-max) (Mann–Whitney U test),* **‡:** *n(%) (Pearson Chi-Square test),* ***MBI-EE: *Maslach Emotional Exhaustion Score,* ***MBI-PA:*** *Maslach Personal Accomplishment Score*

Table II: Comparison of inventory scores by gender in the study group (n=67)

	Male	Female	p
Number of patients*	45 (67.2)	22 (32.8)	-
STAI-1 Score†	44.27±6.15	42.32±6.92	0.350
STAI-2 Score†	46.56±7.14	47.73±6.92	0.520
BAI Score‡	10.00(0–44.00)	10.00(0–33.00)	0.840
BAI State*			
No anxiety	18 (40.0)	8 (36.4)	
Mild	13 (28.9)	6 (27.3)	0.940
Moderate	10 (22.2)	5 (22.7)	
Severe	4 (8.9)	3 (13.6)	
MBI-EE‡	11.00(0–47.00)	5.00(0–20.00)	0.040
MBI-PA‡	25.00(1.00–35.00)	23.50(6.00–36.00)	0.920

:** *n(%) (Pearson Chi-Square test,)* **†:** *mean± SD (Independent Sample test) ,* **‡:** *median(min-max) (Mann–Whitney U test),* ***MBI-EE: *Maslach Emotional Exhaustion Score,* ***MBI-PA:*** *Maslach Personal Accomplishment Score,* ***BAI:*** *Beck Anxiety Inventory,* ***STAI-1:*** *The State Anxiety Inventory,* ***STAI-2:*** *Trait Anxiety Inventory*

Table III: Comparison of inventory scores by age in the study and control groups

	Age Total n=127		Age No HT n=60		Age Yes HT n=67	
	r	p	r	p	r	p
STAI-1 Score	-0.257	0.003	-0.319	0.010	-0.184	0.130
STAI-2 Score	-0.172	0.050	-0.232	0.070	-0.088	0.470
BAI Score	0.180	0.040	0.201	0.120	0.126	0.300
MBI-EE Score	-0.032	0.720	-0.084	0.520	-0.019	0.870
MBI-PA Score	-0.093	0.290	-0.037	0.770	-0.113	0.360

r: *rho,Spearman Correlation Coefficient,* ***MBI-EE:*** *Maslach Emotional Exhaustion Score,* ***MBI-PA:*** *Maslach Personal Accomplishment Score,* ***BAI:*** *Beck Anxiety Inventory,* ***STAI-1:*** *The State Anxiety Inventory,* ***STAI-2:*** *Trait Anxiety Inventory*

Discussion

In our study, we hypotized that HTN patients would have higher anxiety levels, and their families would have higher burnout scores. However, we found the mean STAI-1 scores of the study group lower than the control group, the median BAI scores were higher in study group and there was no difference in caregivers between the emotional burnout (MBI-EE) and personal success (MBI-PA) subscale scores of the MBI of the caregivers.

Hypertension is a chronic disease and requires long-term treatment and follow-up. Patients need to take medication every day, follow a special diet, and exercise regularly.

Table IV: Comparison of the study group using antihypertensive drugs and control group's inventory scores (n=116).

	Control group	Study group	p
Number of patients	60 (64.2)	56 (35.8)	-
STAI-1 Score*	51.6±15.4	43.5±6.7	0.010
STAI-2 Score*	49.4±11.4	47.6±7.1	0.280
Beck Anxiety Score†	6.5 (0–39.0)	10.50 (0–44.0)	0.009
Beck Anxiety State‡			
No anxiety	32 (53.3)	22 (39.3)	
Mild	18 (30.0)	14 (25.0)	0.120
Moderate	6 (10.0)	14 (25.0)	
Severe	4 (6.7)	6 (10.7)	
MBI-EB†	7.0 (0–24.0)	9.0 (0–47.0)	0.160
MBI-PS†	24.0 (1.0–32.0)	25.5 (1.0–36.0)	0.350

: mean±SD (Independent Sample T-test), †: median (min-max) (Mann–Whitney U test), ‡: n(%) (Pearson Chi-Square Test), **MBI-EE: Maslach Emotional Exhaustion Score, **MBI-PA:** Maslach Personal Accomplishment Score, **BAI:** Beck Anxiety Inventory, **STAI-1:** The State Anxiety Inventory, **STAI-2:** Trait Anxiety Inventory*

Therefore, it is speculated that hypertension may increase the level of anxiety in children. Studies conducted with a similar hypothesis to ours, comparing the anxiety levels of patients with chronic diseases, showed that the anxiety levels of healthy children were significantly higher than in the study group (22-24). Conversely, various studies show that children with chronic diseases have higher anxiety scores than healthy children (25,26). The low STAI-2 scores found in our study compared to the control group may be due to the fact that children are able to adapt more quickly and easily than adults to changes in social life or health conditions. Acute changes in health conditions and first-time hospitalization may increase anxiety in children. Still, the fact that children do not have difficulty adapting to changes that follow a certain order over time may explain the results of our study. Thus, the STAI-1 inventory scores were higher in the control group. The reason for the high anxiety levels of this group may be that children with acute illness do not know where they will be examined or who they will encounter in terms of health personnel. They may also have uncertainty about whether an invasive procedure will be applied. Therefore, selecting healthy individuals without acute or chronic illnesses for the control group in future studies may facilitate a more objective interpretation of the psychological effects of chronic illnesses on children and their families. Also, the STAI-1, a measure of state anxiety, may be interpreted as a finding that is expected to be low in children monitored for hypertension during clinical check-ups. This observation aligns with expectations, considering that similar protocols are consistently employed and healthcare professionals remain unchanged across examinations. Conversely, elevated scores on the BAI, a self-assessment instrument for personal anxiety levels experienced by patients, suggest that hypertensive individuals may endure ongoing anxiety in their daily lives attributable to their chronic condition. Nonetheless, further comprehensive and objective research is requisite to substantiate these preliminary findings.

A meta-analysis examining the anxiety levels of children with chronic disease emphasized that the disease state spreading over a long time might create adaptation to the condition and regression of anxiety symptoms (27). The development of trust between children with chronic disease and healthcare professionals over time and the fact that the patients and their families are informed about the course of the disease may reduce anxiety. Another reason for the low anxiety levels of patients and their families could be the familiarity with hypertension, a common chronic disease found in 31% of adults in our country. A study conducted on the anxiety and depression levels of cancer patients under the age of 18 and their families found that 28.3% of the patients and 46.2% of the families had moderate to severe anxiety levels after cancer treatment (28). The low mortality rate of hypertension compared with the high mortality rate of diseases, such as malignancy, may be another reason for patients' low anxiety levels.

In our study, no significant difference was found between genders in inventory scores. The anxiety levels of children with chronic diseases were studied in Jordan, and it was reported that there was no significant difference between the inventory scores of the genders as in our study (23). Other studies found that girls are more anxious than boys (29,30). Our study group was made up of adolescents, an age where anxiety levels related to social media are already elevated, which might account for no differences observed between genders (31).

In our study we found that the STAI-1 scores increased with younger age. The STAI-1 assesses the subjective anxiety a person experiences in stressful situations. Young children may experience greater anxiety regarding potential invasive procedures in the hospital, leading to higher anxiety levels compared to older children.

On the other hand, the analysis of the study and control groups revealed a weak correlation between age and BAI scores, increasing with age. Similar to our study, a study conducted with Tibetan children found that moderate and severe anxiety levels were higher in late adolescents than in early adolescents (32). When the literature is examined, it has been determined that although there are various inventories used to measure anxiety levels in children with chronic diseases, it is not possible to compare according to age, disease type and gender due to the lack of specific methods that can be used widely (9). For this reason, more extensive and varied studies are needed to develop a standard methodology on the psychosocial status of chronically ill children.

Similar to our study results, the anxiety levels of obese hypertensive patients were examined, and no relationship between obesity and anxiety could be found (33). Another study conducted with 3021 patients between the ages of 14–24 in Germany found no relation between body mass index and mental disease or psychopathologies (34). The fact that psychological symptoms of obese patients were found to be lower in previous studies reveals the need for more studies in this field.

Our study found that the burnout inventory scores of the mothers of male patients were higher than those of the mothers of the females. With its patriarchal structure, our society may perceive the disease state as a critical defect in boys, thus affecting their parents' anxiety levels. Boys are more extroverted, while girls are more withdrawn. Anxiety

symptoms are more prominent in girls, while antisocial behaviors such as acrimony and running away from school are more prominent in boys. Combating these difficulties can make hypertensive boys' families more exhausted. Although there is a limited number of studies on this subject in the literature, a positive correlation was found between the depression scores of the children and their mothers in a study of type 1 diabetes patients and their families in terms of psychosocial aspects (35).

There was no significant relationship between the anxiety levels of the study group and target organ damage caused by hypertension, such as retinopathy, left ventricular hypertrophy, and nephropathy. The patients attending the center where the study was conducted have low socioeconomic status and limited parental education. These factors may contribute to reduced anxiety levels and pose challenges in comprehending the severity and progression of the disease. Consequently, future research should consider selecting patient and control groups from diverse socioeconomic backgrounds to enable the inclusion of this variable analyses

One of the hypotheses we established when starting our study was that the duration of follow-up and the number of medications used could affect anxiety levels in children. However, in the data obtained, it was determined that this did not affect the children's anxiety levels. In a study conducted with children with type 1 diabetes, another common chronic disease, neither the duration of diagnosis nor the insulin dose used was related to the children's anxiety levels (35). The fact that children adapt to changes in their lives more easily compared with adults may explain this situation, but more studies are needed to examine children with chronic diseases and their psychosocial aspects.

Limitations

Our study has some limitations. First, selecting the children as the control group for our study when seen at the pediatric outpatient clinic may have led to the children's high instances of anxiety scores. In studies like ours, choosing the control group among healthy children without acute or chronic diseases may result in different outcomes. Second, examining the socioeconomic levels of the individuals and families included in the study will contribute to the investigation of whether their anxiety and burnout levels are affected by their socioeconomic situation. Third, the sample size was set at 67 patients and 60 control group members, owing to the availability of data and the accessibility of participants, specifically 67 hypertensive patients and their respective families during the study period at our center. Nevertheless, investigations incorporating larger cohorts of patients, control groups, and their families may provide more comprehensive insights results. Despite all these limitations, we believe that our study will contribute to the scientific literature and inspire future studies, as it is one of the few studies evaluating the anxiety of children being monitored for hypertension and the exhaustion of their families.

Conclusion

Hypertension is a chronic disease of childhood, which may be expected to cause some psychiatric symptoms and diseases for parents. However, contrary to expectations, children can tolerate chronic disease more easily than adults. We speculate tracking the parents of children with chronic diseases, which are difficult to care for and can cause burnout and informing them in detail about the condition and its course can provide better care and support during the illness process. Further studies should be conducted to examine the psychosocial comorbidities of chronic diseases and support the mental health of children and their families. The follow-up and treatment of patients and their families during and after the illness is important, both physically and mentally.

Ethics committee approval

This study was conducted in accordance with the Helsinki Declaration Principles. The study was approved by Ankara Pediatrics Hematology Oncology Research and Training Hospital (03/07/2017, reference number: 2017-112).

Contribution of the authors

S.Ö.T. wrote the main manuscript text. All authors contributed data and reviewed the manuscript.

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Conflict of interest

The authors declare that there is no conflict of interest.

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