



# Evaluation of Quality of Life and Anxiety Disorder in Children and Adolescents with Primary Headache

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## Abstract

**Aim:** To investigate the effect of coexistence of primary headache with depression, anxiety, and anxiety disorder on patients' quality of life and the variability of this effect according to the types of primary headache in children and adolescents with primary headache.

**Methods:** A total of 61 patients [29 migraines, 32 tension-type headaches (TTH) patients] and 31 healthy controls were included in the study. Multiple measures including the Screen for Child Anxiety-Related Disorders, the Children's Depression Inventory (CDI), the Pediatric Quality of Life Inventory, and the Visual Analogue Scale were administered to each participant on a voluntary basis for the establishment of the diagnosis.

**Results:** Mean age was 12.0±2.3 years in migraine patients, 13±4.3 years in TTH patients, and 12.4±2.1 years in the control group. The mean anxiety score was 32.0±3.1, 16.0±2.5, and 8.0±1.3, respectively. The anxiety scores were significantly higher in the patient groups compared to the control group ( $p<0.001$ ) and were higher in migraine patients compared to TTH patients and the control subjects ( $p<0.001$ ). The mean CDI scores of migraine and TTH patients were 22.0±2.7 and 26.0±4.3, respectively ( $p=0.439$ ). In the control group, this score was 10.0±4.0 and it was significantly lower than those of patient groups ( $p=0.002$ ). Mean quality of life score was 59.31±13.5 in migraine patients, 62.08±21.2 in TTH patients, and 86.83±31.7 in the control subjects. Quality of life scores were significantly lower in the patient groups compared to the control group ( $p<0.001$ ).

**Conclusion:** The coexistence of headache with depression and anxiety disorders leads to negative effects on both physical and psychological quality of life of children and adolescents with headache.

**Keywords:** Primary headache, child, adolescent, anxiety disorder, quality of life

## Introduction

The prevalence of headache in childhood and adolescence increases with age and reaches adult values towards the end of adolescence (1). Tension-type headache (TTH) and migraine are the most common types of headache in children and adolescents (2,3). Headache is a common disease leading to serious effects on the quality of life in childhood and adolescence. Moreover, headache has been reported to be common among school-age children and to be one of the most common reasons for referral to the emergency departments in this age group (4). In such patients, the uncertainty of the prognosis of the pain and regular use of medication at a young age cause future anxiety. In turn, increased anxiety and mood

disorders such as depression cause children to refrain from social activities and reduce their school performance (3,4).

In this study, we aimed to investigate the effect of coexistence of primary headache with depression, anxiety, and anxiety disorder on patients' quality of life and the variability of this effect according to the types of primary headache in children and adolescents that were followed up with a diagnosis of primary headache in our hospital.

## Methods

The retrospective study included patients aged 8-18 years who presented to our Neurology clinic between January 1, 2017 and November 1, 2019 with the complaint of headache and were diagnosed as having primary headache according to the International Classification

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**Received:** 06.08.2020 **Accepted:** 22.02.2021

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The Medical Bulletin of Haseki published by Galenos Yayinevi.

of Headache 3<sup>rd</sup> edition (5). Multiple measures including the Screen for Child Anxiety-Related Disorders (SCARED), the Children's Depression Inventory (CDI), the Pediatric Quality of Life Inventory (PedsQL), and Visual Analogue Scale (VAS) were administered to each participant on a voluntary basis for the establishment of the diagnosis. A control group of 31 healthy children and adolescents of similar age groups and sociodemographic characteristics was also included in the study on a voluntary basis. All the tests and scales were administered to both groups by the same physician. Patients diagnosed with primary headache and migraine were assigned into Group I, patients diagnosed with TTH were assigned into Group II, and the control subjects were assigned into Group III. All the participants were continuing their school education. Children that could not fill out the questionnaire form due to the presence of severe mental retardation or a serious psychiatric disease such as severe depression, those with secondary causes of headache, illiterate children, and children whose legal guardian did not provide a consent form were excluded from the study. Headache characteristics (severity, number of attacks per month, comorbidities) and sociodemographic characteristics (age, gender, income level of the family, number of siblings, and educational level) were recorded in the form prepared by the researchers.

### Measures

The SCARED: SCARED is a 41-item inventory consisting of five subscales: separation anxiety, social phobia, generalized anxiety, panic/somatic, and school phobia. Each item is scored on a scale from 0 to 2: "0" not true or hardly ever true, "1" sometimes true, and "2" true or often true. SCARED measures the symptoms experienced in the last three months (6).

The CDI: CDI is a self-report measure assessing self-reported symptoms of depression in children and adolescents aged 7-17 years. The inventory consists of 27 multiple-choice questions with three options each. CDI measures the frequency and severity of depressive symptoms in the last two weeks. Higher scores indicate greater depressive symptoms. The reliability and validity of the Turkish version of CDI were performed by Oy (7), who determined the pathological cutoff point as 19.

The PedsQL: PedsQL is a 23-item generic health status instrument used for assessing five domains of health (physical functioning, emotional functioning, psychosocial functioning, social functioning, and school functioning) in children and adolescents aged 2-18 years. Each item is reverse-scored and converted to a 0-100 scale: "100" Never, "75" Almost Never, "50" Sometimes, "25" Often, "0" Almost Always (8,9).

Visual Analogue Scale: VAS is used for assessing the severity of pain on a 0-10 scale.

The study was approved by our local ethics committee (Date: January 7, 2020; No: 400). For the control subjects aged under 18 years, an informed consent was obtained from their legal guardians.

### Statistical Analysis

Data were analyzed using SPSS for Windows version 17.0 (Chicago, IL, USA). Normal distribution of data was assessed using Kolmogorov-Smirnov and Shapiro-Wilk tests. Continuous variables were expressed as mean  $\pm$  standard deviation (SD) and median (minimum-maximum) and categorical variables were expressed as frequencies (n). Categorical variables were compared using chi-square test and Fisher's Exact test. Independent continuous variables were compared using the Mann-Whitney U test. Three or more continuous variables were compared using One-way ANOVA test for data with normal distribution and using Kruskal-Wallis test for data with non-normal distribution. Correlations between continuous variables with normal distribution were analyzed using the Pearson correlation coefficient. A p-value of  $<0.05$  was considered significant.

### Results

The study included 61 patients (37 girls and 24 boys) and 31 healthy controls (18 girls and 13 boys). The mean age was  $12.5 \pm 3.3$  years in the patients and was  $10.0 \pm 4.5$  years in the control subjects ( $p > 0.05$ ). In the patients, mean age was  $11.8 \pm 1.3$  years in girls and  $13.2 \pm 0.9$  years in boys. In the control subjects, the mean age was  $11.0 \pm 2.4$  years in girls and  $13.2 \pm 2.6$  in boys. No significant difference was found between patients and control subjects with regard to gender distribution ( $p > 0.05$ ).

Patients were divided into two groups: Group I, migraine (n=29) and Group II, TTH (n=32). Group I included 19 and Group II included 18 girls ( $p = 0.204$  and  $p = 0.473$ , respectively). In group I, the mean age was  $10.3 \pm 2.5$  years in girls and  $12.1 \pm 1.4$  years in boys. In group II, mean age was  $9.8 \pm 3.1$  years in girls and  $13.7 \pm 2.5$  years in boys ( $p = 0.172$  and  $p = 0.286$ , respectively). Mean disease duration was  $2.9 \pm 1.6$  (median, 2.0) years in Group I and  $3.0 \pm 1.3$  (median 2.0) years in Group II ( $p = 0.285$ ) (Table 1).

The most common triggering factors for headache were stress (68.8%; 42/61) and sleep disturbance (49.1%; 30/61), followed by menstrual period, physical activity, and trauma (Figure 1).

No patient had a history of cigarette smoking or alcohol/substance abuse. Moreover, 87% of the patients were living with their family members (parents and siblings), 7% of them were single child of the family, 71% of them had only one sibling, and 82% of the mothers were housewives. No significant difference was found

between the patients and control subjects with regard to sociodemographic characteristics ( $p=0.593$ ).

The mean SCARED score was  $32.0\pm 3.1$  in Group I,  $16.0\pm 2.5$  in Group II, and  $8.0\pm 1.3$  in Group III and these scores were significantly higher in patient groups than in the control group ( $p=0.001$ ). Additionally, the SCARED scores in Group I were significantly higher than those in Group II and III ( $p<0.001$ ) (Table 2).

The mean CDI score was  $22.0\pm 2.7$  in Group I and  $26.0\pm 4.3$  in Group II and no significant difference was found ( $p=0.439$ ). In contrast, the mean CDI score in the control group was  $10.0\pm 4.0$  and it was significantly lower than those of patient groups ( $p=0.002$ ) (Table 2).

Mean PedsQL score was  $59.31\pm 13.5$ ,  $62.08\pm 21.2$ , and  $86.83\pm 31.7$  in Group I, II, and III, respectively. The mean PedsQL scores in the patient groups were significantly lower than that of the control group ( $p<0.001$ ). Similarly, the mean scores for the physical, emotional, school, and psychosocial subscales were also significantly lower in the patient groups than in the control group ( $p<0.001$ ). However, although the mean PedsQL score was lower in Group I than in Group II, no significant difference was established ( $p=0.791$ ) (Table 3).

The PedsQL scores were further analyzed by dividing the patients in terms of the number of attacks per month regardless of the types of headaches. Accordingly, the mean PedsQL score was  $76.12\pm 10.2$  in 18 patients with 1-3 attacks/month,  $66.00\pm 9.0$  in 7 patients with 7 attacks/

month, and  $58.42\pm 8.3$  in 22 patients with  $\geq 8$  attacks/month. The PedsQL scores of patients with  $\geq 8$  attacks/month were significantly lower than those of other patients and control subjects ( $p<0.001$ ). However, no significant difference was found between patients with 1-3 and 4-7 attacks/month with regard to PedsQL scores ( $p>0.05$ ). It was also revealed that as the number of attacks per month increased, the PedsQL scores decreased, though insignificantly.

The mean VAS score was significantly higher in Group I compared to Group II ( $9.0\pm 1.0$  vs.  $6.0\pm 1.0$ ) ( $p=0.003$ ). (Table 3.4). On the other hand, a negative correlation was found between the PedsQL and VAS scores ( $p<0.001$ ,  $r=-0.68235$ ) and a positive correlation was found between the SCARED and VAS scores ( $p<0.001$ ;  $r=0.54821$ ).

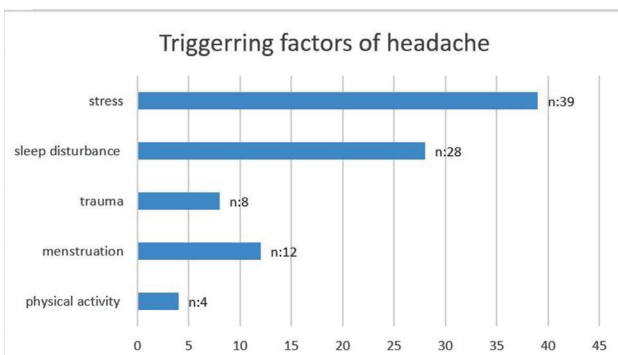
### Discussion

The findings indicated that children and adolescents with headache had significantly higher anxiety and depression scores and lower quality of life scores compared

**Table 1. Demographic and headache characteristics**

	Migraine (n=29)	Tension-type headache (n=32)	p
Gender (Female/Male) (n) (%)	19 (65.5%) 10 (34.5%)	18 (56.2%) 14 (43.8%)	0.242
Mean age (years) $\pm$ SD	$12.0\pm 2.3$	$13.0\pm 4.3$	0.196
Mean disease duration (years) $\pm$ SD	$2.9\pm 1.6$	$3.0\pm 1.3$	0.285

SD: Standard deviation



**Figure 1.** Triggering factors for headache

**Table 2. Depression, anxiety, and pain scores**

Measures	Migraine (n=29)	Tension-type headache (n=32)	Control (n=31)	p*
CDI	$22.0\pm 2.7$	$26.0\pm 4.3$	$10.0\pm 4.0$	0.002
SCARED	$32.0\pm 3.1$	$16.0\pm 2.5$	$8.0\pm 1.3$	0.001
VAS (during attack)	$9.0\pm 1.0$	$6.0\pm 1.0$	-	0.003

\*Between patient groups and control group; SCARED: The Screen for Child Anxiety-Related Disorders, CDI: The Children's Depression Inventory, VAS: Visual Analogue Scale

**Table 3. Quality of life scores**

PedsQL subscales	Migraine (n=29)	Tension-type headache (n=32)	Control (n=31)
Physical	$55.80\pm 9.5$	$59.13\pm 16.4$	$89.10\pm 12.6$
Emotional	$61.32\pm 10.9$	$63.53\pm 11.2$	$85.23\pm 31.2$
Social	$60.93\pm 11.6$	$65.17\pm 8.1$	$86.13\pm 10.6$
School	$59.72\pm 14.4$	$62.02\pm 12.3$	$81.36\pm 27.1$
Psychosocial	$60.6\pm 15.7$	$64.11\pm 14.2$	$84.44\pm 17.5$
Total score	$59.31\pm 13.5$	$62.08\pm 21.2$	$86.83\pm 31.7$

PedsQL: The Pediatric Quality of Life Inventory

**Table 4. VAS scores in patient groups**

	Migraine (n=29)	Tension-type headache (n=32)	
Maximum VAS score (during attack)	$6\pm 1.0$	$9\pm 1.0$	$p=0.003$ $r=72946$
Mean VAS score (during attack)	$5.5\pm 2.0$	$8\pm 1.9$	$p<0.001$ $r=80152$

VAS: Visual Analogue Scale,  $p<0.05$

to control subjects. Additionally, the quality of life scores were significantly lower in migraine patients compared to TTH patients and control subjects. It was revealed that as the number of attacks per month and the severity of headache increased, the quality of life scores decreased.

Literature indicates that migraine patients are accompanied by more psychopathological symptoms than healthy individuals (10-13). In a previous prospective study, Fearon and Hotopf (14) reported that childhood headache is a risk factor for psychiatric diseases in adolescence. In a study conducted in Turkey, Senturk et al. (11) reported that the anxiety scores were significantly higher and the quality of life scores were significantly lower in children with migraine (n=30) and TTH (n=31) compared to the control subjects. In the same study, unlike in our study, no significant difference was found between the two patient groups with regard to anxiety and quality of life scores (11). Akca et al. (13) reported that the continuous anxiety levels were higher in children with migraine and also noted that the children with migraine who had higher anxiety levels had a more severe pain and more frequent attacks. Another study investigated the prevalence of pediatric headache and reported that the scores of each subscale of the quality of life scale were negatively affected by the presence of headache (15). Strine et al. (16) evaluated children with frequent or severe headache and reported that these children had a higher prevalence of emotional and behavioral disorders, inattention-hyperactivity, and peer problems. However, the authors did not investigate the relationship between these conditions and headache types (16). Studies conducted with children and adolescents show that children with headache have a higher prevalence of mental disorders and that this phenomenon could be associated with the anxiety caused by the untimely onset of the pain, the difficulty it creates, withdrawal from social activities due to pain, and falling behind at school and games. In addition to the stress and anxiety caused by pain, the problems and mood disorders mentioned above are likely to affect patients' quality of life. Moreover, all the studies conducted on this subject, in a similar way to our study, suggest that this issue should be taken into consideration in children and adolescents with headache (17-21).

Studies investigating headache types and patients' anxiety levels and quality of life have reported controversial findings. Some studies found no significant difference between migraine and TTH patients, while the others found higher anxiety levels and lower quality of life scores in migraine patients compared to TTH patients. Nevertheless, we consider that in such patients, the severity of the headache and the frequency of attacks

are more important issues to be addressed. In a study conducted in Turkey, Yilmaz and Alemdar (4) evaluated 100 children and adolescents who presented to the pediatric emergency department with the complaint of headache and reported that school stress was the most common triggering factor for migraine. Another study reported that general anxiety disorders, obsessive-compulsive disorder, panic disorder, and depression were the most common risk factors for the chronification of headache, particularly migraine (22). In a 2018 review, Ozge et al. (23) evaluated the disease burden and comorbidities in chronic migraine patients and suggested that the hypothalamic-pituitary-adrenal axis disorders, hormonal changes, serotonergic dysfunction, and psychogenic factors may play a role in the coexistence of migraine and anxiety disorder. In our study, the severity of pain and anxiety levels was higher in migraine patients compared to TTH patients. These findings implicate that in migraine patients, the increased severity of pain leads to increased anxiety levels. On the other hand, a positive correlation was found between anxiety levels and VAS scores and the anxiety levels were significantly higher in children who experienced 8 or more attacks in a month, which is a warning number of attacks in terms of chronicity.

### Study Limitation

Our study was limited since it had a small patient population and had a cross-sectional design. In cross-sectional studies, the assessment of anxiety levels leads to difficulties that vary according to the time of assessment and the mood of the person at the time of assessment. To minimize this limitation, we used scales whose validity and reliability had been approved in Turkish population.

### Conclusion

The coexistence of headache with depression and anxiety disorders leads to negative effects on both physical and psychological quality of life of children and adolescents with headache. Both the studies in the literature and our study indicated that prompt diagnosis of accompanying mood disorders in children and adolescents with headache is highly important to allow for effective treatment in the early stage and prevention of chronicity in the late stage.

### Authorship Contributions

Concept: R.G.G.C., M.O., Design: R.G.G.C., M.O., Data Collection or Processing: R.G.G.C., M.O., Analysis or Interpretation: R.G.G.C., M.O., Literature Search: R.G.G.C., M.O., Writing: R.G.G.C., M.O.

**Conflict of Interest:** No conflict of interest was declared by the authors.

**Financial Disclosure:** The authors declared that this study received no financial support.

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