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Assessment of headache in children with psychiatric symptoms

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Abstract

Background: This study aims to evaluate the relationship between headaches and psychiatric symptoms in a psychiatric clinic. *Methods:* We compared 102 children aged 8-16 years (31 girls, 30.4%) who presented to the child and adolescent psychiatry clinic (*study group*) with 100 children aged 8-16 years, (52 girls, 52%) who did not (*control group*). Headache was evaluated with the Headache-Attributed Restriction, Disability, Social Handicap, and Impaired Participation (HARDSHIP) Questionnaire. Psychiatric symptoms (depression, anxiety, sleep, attention, hyperactivity) were evaluated via standardized scales. *Results:* The study group had more headaches in the preceding year as well as the day before. Depression, anxiety and sleep problems were positively correlated with headache frequency in the preceding week in the study group, and in the study group, children with migraine had more depression, anxiety, and emotional problems. While the total quality of life (QoL) scores were not significantly different between groups, migraine decreased the QoL in both the study and control groups.
Conclusion: This study indicates that headache type and burden should be evaluated in psychiatric clinics as depression and anxiety are associated with headache, especially migraine.

Keywords: Headache, psychiatry, children, adolescent

INTRODUCTION

Recurrent headache is one of the most prevalent health issues in patients of all ages. According to the International Classification of Headache Disorders-3 (ICHD-3), headaches not associated with any other disorder or trauma are called *primary headaches*. Migraine and tension-type headache (TTH) are well-known primary headaches.[1] The prevalence of headaches in children, especially among preschool children, is difficult to establish because of their limited verbal skills and atypical clinical presentation.[2] In child and adolescent headache clinics, the prevalence of migraine is 26.0-54.2%, and the prevalence of TTH is 24.0-45.8%.[3,4] Primary headache affects health and quality of life in many aspects, such as reduced productivity, missed days at school, restrictions in daily living, and disruption in social and leisure activities. Emotional and mental impairments are also prevalent and diminish the quality of life.[5] All these adverse effects can lead to psychiatric disorders, especially depression and anxiety.[6] The relationship between chronic headache, depression and anxiety is well-documented.[7-10] Headache in children is also associated with neurodevelopmental disorders such as attention deficit hyperactivity disorder (ADHD) and autism spectrum disorder.[11,12] Some factors such as poor sleep quality are associated with headaches and psychiatric disorders.[13] Recognition of psychiatric comorbidities is important in managing headaches, and the converse is also true.

Studies on psychopathology in children with recurrent headaches have been performed mainly in school-based populations with questionnaires, or in pediatric neurology clinics. This study aims to determine the association between headaches and psychiatric symptoms in a child and adolescent psychiatric clinic. We hypothesized that children with psychiatric symptoms experienced more headaches than children without. We also hypothesized that depression and anxiety were associated with primary headaches in children with psychiatric symptoms.

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METHODS

Participants

Children and adolescents (8-16 years) presenting to the Hacettepe University Department of Child and Adolescent Psychiatry Clinic for the first time were invited to join the study, and 102 of them were enrolled in the *study group* (31 girls, 30.4%). The *control group* comprised volunteers of similar age who were classmates and neighbors of the study group who did not have any psychiatric complaints (n=100; 52 girls, 52%). Exclusion criteria for both groups were: the use of any medication, a prior diagnosis of primary headache disorder as well as any psychiatric or medical diagnosis (e.g. blindness, intellectual disability, autism spectrum disorder, psychotic disorders, epilepsy, hypertension) that made the subject unable to complete study questionnaires. Children whose main complaint was headache were referred to the pediatric neurology clinic. Written consent was taken from study participants and their parents. The Institutional Review Board at Hacettepe University approved the study (GO 20/645).

Scales

Sociodemographic form

This form was prepared by the researchers to record the sociodemographic characteristics, medical history of the participants' families, and presence of adverse childhood experiences (divorce, death of parent, accident etc.).

Headache-Attributed Restriction, Disability, Social Handicap, and Impaired Participation (HARDSHIP)Questionnaire

This modular instrument assesses the burden of headache. It consists of 44 items, including two screening questions (one about lifetime headache history and one about headaches experienced in the preceding 12 months). It also includes questions about headache frequency in the preceding four weeks as well as on the day before. Headache questions cover the ICHD-3 beta diagnostic criteria, medication use, activity loss, headache-related burden (e.g., impact on emotions, self-support, participation in activities and school), and headache-related quality of life (HRQoL). Higher total scores indicate lower quality of life.[14,15] Participants in the study group were divided into two subgroups according to their answer to the screening question "Have you had a headache in the last 12 months?".

Children's Depression Inventory (CDI)

Children completed this inventory to assess depression symptoms. Higher scores indicate a higher level of depression.[16,17]

State/Trait Inventory for Children (SAI and TAI)

This self-reported inventory measures 'state' (specific to the time of the assessment) and 'trait' (general feeling) for anxiety. Higher scores indicate higher levels of anxiety.[18,19]

Strength and Difficulties Questionnaire (SDQ)

This questionnaire asks parents about their child's behaviors and feelings over the preceding 6 months. It has five subscales: emotional symptoms, conduct problems, hyperactivity/inattention, peer relationship problems, and prosocial behaviors. A total score is then calculated; higher scores indicate more significant problems.[20,21]

Conners' Parent Rating Scale-Revised Short Form (CPRS-RS)

Parents completed this scale to screen for ADHD symptoms. This scale consists of 3 subscales: inattention/cognitive problems, hyperactivity, and oppositional behaviors. Higher scores indicate more severe problems. [22,23]

Sleep Disturbances Scale for Children (SDSC)

This scale is completed by parents. It assesses a variety of behavioral patterns relating to children's sleep in the last 6 months: disorders of initiating and maintaining sleep (DIMS), sleep-disordered breathing (SDB), disorders of arousal (DA), sleep-wake transition disorders (SWTD), disorders of excessive somnolence (DOES), and sleep hyperhidrosis (SH). It also evaluates the total sleep time and latency of sleep. Higher scores indicate more sleep problems. [24,25]

Sleep Quality Scale (SQS) and *Sleep Variables Questionnaire (SVQ)*

These are self-reported questionnaires. SQS measures sleep quality (SQ), SVQ measures parental control (PC), total sleep time (TST) for school days, sleep efficiency (SE), and corrected midpoint of sleep on free days (MSF). Higher scores of SQ indicate worse sleep quality.[26,27]

Statistical analysis

Data were analyzed using the Statistical Program for Social Sciences (SPSS) program version 21.0. The normality of data distribution was evaluated with Kolmogorov-Smirnov or Shapiro-Wilks tests. Student's t-test was used when parametric test assumptions were met, and the Mann-Whitney U test was used when parametric test assumptions were not met. The difference in categorical variables between groups was analyzed by the chi-square test. An analysis of variance (ANOVA test) was performed when more than two groups were compared. The relationship between two continuous variables was investigated by Spearman's correlation analysis. The statistical significance level was determined as $p<0.05$.

RESULTS

General and medical characteristics of participants and their families

There was no significant difference in age (z=1.047, p=0.295), age of parents, socioeconomic status, and number of siblings between the study and control groups. There were more girls in the control group (n=52, 52%) than in the study group (n=31, 30.4%) (x^2=9.740, p=*0.002*). Twenty-five children (24.51%) were <12 years and 77 children (70.59%) were ≥12 years old in the study group. The corresponding figures were 17 (17%) and 83 (83%) in the control group, respectively (x^2=1.729, p=0.226). Single parenting was more prevalent in the study group (x^2=6.827, p=*0.033*). The number of mothers and fathers with a chronic illness was higher in the study group (x^2=6.787, p=*0.009*; x^2=14.110, p=*0.001,* respectively). Fathers were more likely to be diagnosed with a primary headache in the study group (x^2=2.757, p=0.047), but there was no difference in primary headache prevalence in the mothers (x^2=1.906, p=0.167). Children in the study group had more adverse childhood experiences than those in the control group (x^2=6.654, p=*0.010*).

Quality of life according to the HARDSHIP questionnaire

The number of children who had a headache in the preceding year was higher in the study group than in the control group (n=73, 74.5% and n=58, 58%, respectively, p=*0.014*). Children in the study group also experienced more headaches in the preceding week (1.44±1.61 vs, 0.95±1.18 days in the control group, z=-2.029, p=*0.045*). 31.4% (n=22) of children in the study group experienced headaches the day prior, compared to 15% (n=9) of children in the control group (x^2=3.940, p=*0.047*). The study group experienced more headaches than the control group. and had a non-significant trend towards more migraines (Table 1).

When all participants in the control and study groups were compared, no difference was found in HRQoL scores (34.63±9.38 vs. 34.62±12.67 respectively, F=6.790, p=0.995). In the control group, children with migraine had higher HRQoL scores (i.e., a worse quality of life) (38.33±10.83) than children without headaches (32.5±7.62) (p=*0.041*). HRQoL scores in controls with TTH (34.32±9.46) did not differ significantly from scores in children without headaches (p=0.667) and children with migraine (p=0.216). There was no statistically significant difference in HRQoL scores between children with migraine in the study (38.33 ± 10.83) and children with migraine in the control (38.73 ± 9.85) groups (t=-0.150, p=0.882).

Within the study group, children with migraine scored significantly higher on HRQoL compared to children without headache and children with TTH (38.57 ± 10.17, 31.40 ± 11.36, and 34.04 ± 10.86 respectively, F=7.110, p=0.001).

Results of scales

The total scores of all scales used (CDI, STAI, CPTR-SR, SDQ, SDSC, and SQS-SVQ) were higher in the study group (p<*0.05*) compared to the control group. The number of days with headaches experienced in the preceding week was

Table 1: Headache diagnosis by group

	Study group	Control Group	x^2	p-value
No headache (n, %)	25 (24.5%)	38 (38%)		
Migraine (n, %)	38 (37.3%)	25 (25%)	5.398	0.067
TTH (n, %)	39 (38.2%)	37 (37%)		
All headaches (migraine and TTH)	77 (75.5%)	62 (62%)	0.39*	*0.048**

TTH= Tension-type headache, *Sum of migraine and TTH compared with 'No headache'

positively correlated with most of the scales in the study group. (Table 2)

Comparison of subgroups in the study group

The children with psychiatric symptoms who constituted the study group were divided into subgroups according to their headache diagnosis: children without headache, children with migraine and children with TTH. CDI scores were significantly higher in children with migraine than in children without headache and in children with TTH. SAI and TAI were significantly higher in children with migraine than in children without headache. The hyperactivity/inattention subscale of SDQ was significantly higher in children with TTH than in children with migraine. The emotional problems subscale was higher in children with migraine than children without headaches. (Table 3)

The study group was divided into two subgroups according to whether they experienced headaches in the preceding year. 74.5% of participants (n=73) had experienced headaches (n=20 girls, 27.4%). Scores for depression (median= 12 (4-24) vs 16 (2-42), U=521.5, z=-2.991, p=0.003) as well as anxiety trait (median= 34 (20-51) vs 41 (23-56), U=414.5, z=-2.881, p=0.003) and state (median= 30 (21-47) vs 36 (25-58), U=364.5, z=-3.384, p=0.001) were significantly higher in the subgroup with headaches in the preceding year.

DISCUSSION

This study investigates the relationship between headaches and psychiatric symptoms in subjects

Table 2: Correlation between the number of days with headache and scores on scales

Scales	Number of days with headache in the preceding week	
	r_s	p-value
CDI	0.381	*<0.01*
STAI		
SAI	0.369	*<0.01*
TAI	0.376	*<0.01*
CPRS-RS		
Inattention/Cognitive problems	-0.021	>0.05
Hyperactivity	0.006	>0.05
Oppositional behaviors	0.114	>0.05
Total	0.020	>0.05
SDQ		
Emotional symptoms	0.426	*<0.01*
Conduct problems	0.183	*<0.05*
Hyperactivity/inattention	0.186	>0.05
Peer problems	0.208	*<0.05*
Prosocial behaviors	-0.103	>0.05
Total	0.353	*<0.01*
SDSC		
DIMS	0.125	*<0.05*
SDB	-0.198	*<0.05*
DA	0.024	>0.05
SWTD	-0.046	>0.05
DOES	0.205	*<0.05*
SH	-0.113	>0.05
Total	0.008	>0.05
SQS-SVQ		
SQ	0.309	*<0.010*

CDI= Children's Depression Inventory; STAI= State/Trait Anxiety Inventory; CPRS-RS= Conners' Parent Rating Scale-Revised Short Form; SDQ= Strenght and Difficulties Questionnaire; SDSC= Sleep Disturbances Scale for Children; SQS-SVQ= Sleep Quality Scale-Sleep Variables Questionnaire; DIMS= Disorders of Initiating and Maintaining of the Sleep; SDB= Sleep-Disordered Breathing; DA= Disorders of Arousal; SWTD= Sleep-wake transition disorders; DOES= Disorders of Excessive Somnolence; SH= Sleep Hyperhydrosis

Table 3: Comparison of scores according to headache diagnosis in the study group

	No headache n= 25	Migraine n= 38	TTH n= 39	Statistics	
				F	p-value
CDI	12.52 ± 9.80	21.67 ± 10.37	14.31 ± 7.74	8.806	*<0.001*
STAI					
SAI	32.43 ± 8.38	38.94 ± 8.38	35.09 ± 7.56	4.496	*0.01*
TAI	37.04 ± 8.92	42.36 ± 7.70	38.44 ± 7.92	3.341	*0.04*
CPTR-RS	25.86 ± 22.07	24.77 ± 19.95	32.68 ± 21.90	0.789	0.46
SDQ					
Emotional symptoms	2.58 ± 2.29	4.68 ± 2.95	3.44 ± 2.78	3.696	*0.02*
Hyperactivity/inattention	4.14 ± 2.29	5.41 ± 2.46	4.0 ± 1.92	3.774	*0.03*
Total	12.0 ± 6.53	16.0 ± 5.63	12.77 ± 5.47	3.170	*0.04*
SDSC	40.75 ± 11.47	46.91 ± 19.76	40.90 ± 9.42	1.054	0.36
SQS-SVQ	13.33 ± 3.23	14.90 ± 3.25	13.50 ± 3.0	1.637	0.20
HRQoL					
Total	31.40 ± 11.36	38.57 ± 10.17	34.04 ± 10.86	7.110	*0.001*

CDI= Children's Depression Inventory; STAI= State/Trait Anxiety Inventory; CPRS-RS= Conners' Parent Rating Scale-Revised Short Form; SDQ= Strenght and Difficulties Questionnaire; SDSC= Sleep Disturbances Scale for Children; SQS-SVQ= Sleep Quality Scale-Sleep Variables Questionnaire; HRQoL= Headache Related Quality of Life

presenting to a psychiatric clinic. Children in the study group experienced more depression, anxiety, and sleep problems than those in the control group. Parents of children in the study group reported more behavioral and emotional problems as well as ADHD symptoms than parents of children in the control group. There were more adverse childhood experiences in the study group than in the control group. These results are predictable because the study group comprises children presenting to a psychiatric clinic.

Headache prevalence

Consistent with our first hypothesis, children with psychiatric symptoms experienced more headaches than children without psychiatric symptoms. The prevalence of headaches in the preceding year is up to 88% in population-based studies. Since there are methodological differences between studies, prevalence results vary widely in the literature.[28] We found that children with psychiatric symptoms experienced more headaches in the preceding year, week, and day than those in the control group. These results are in agreement with the literature indicating a relationship between psychiatric problems and headaches in youth.[8] Serotonergic and dopaminergic dysfunction as well as personal traits are involved in the pathogenesis of both headaches and psychiatric disorders.[29] Also, somatic symptoms in children are related to many psychosocial factors such as depression, anxiety, and social disadvantage.[6] There were more parents with chronic illness and more fathers with primary headaches in the study group than in the control group. Studies describe increased somatization in children whose parents have psychosomatic and neurological disease.[6] Studies have been performed mainly on mothers, but our data suggest that paternal associations should be investigated further. Our study found no differences between the study and control groups with the HARDSHIP questionnaire with respect to the diagnosis and severity of headaches experienced. Types of headaches based on ICHD-3 beta diagnostic criteria also did not differ significantly between the study and control groups. The burden of headache is defined as headache the day before in HARDSHIP[15], and this was greater in the study group.

The effect of headache

In this study, depression and anxiety were found to be the most strongly associated with headaches among children with psychiatric symptoms. Conversely, in our study, headache and/or psychiatric symptoms had no effect on school work, friendships, and the quality of life in both the control and study groups. This was an unexpected finding as depression and anxiety scores in the study group were high, and parents of the study group indicated more emotional and

peer problems in subjects than parents in the control group. Scales alone are not adequate to diagnose a psychiatric disorder, and subjects may have under- or overestimated the severity of their symptoms. The HRQoL questions in HARDSHIP were not specific to headaches. Furthermore, this study was carried out between 2020 and 2021 when schools were mostly closed due to the Covid-19 pandemic, and this situation could have negatively affected every child's quality of life.

In our study, the quality of life of children with migraine in both the study and control groups was worse than those without migraines. One study has found that migraine decreases the quality of life in children, and that this decrease is more marked when there is concurrent psychopathology.[30] However, the concurrence of psychopathology with migraine did not further reduce the quality of life in our study. Many studies on the quality of life in migraine have compared migraineurs with other primary headaches or chronic illnesses.[5] To the our knowledge, the effect of primary headaches on the quality of life of children with psychiatric symptoms has not been investigated. Quality of life questions in HARDSHIP examine functionality in daily life, regardless of disorders or symptoms. Our results may reflect a dysfunction in daily life caused by headache and/or psychiatric symptoms. On the other hand, migraine worsened the quality of life in both the study and the control groups. This finding underscores the importance of recognizing the burden of migraine in children, particularly those with depression and anxiety.

Headache and psychiatric symptoms

In the study group, depression, anxiety, and emotional problems were higher in children with migraine, which concurs with previous studies.[29,31] The findings in this study related to the presence of headaches in the preceding year and the days with headaches during the last week were coexistent with the hypothesis of a bidirectional relationship between headaches, depression, and anxiety in the literature.[8,29,31] Many risk factors for headache (e.g., dysfunctional family, emotional abuse, being bullied) are also risk factors for depression,[32] and we found more stressful events in the study group than in the control group. The scores of the subgroups of the study group did not differ with respect to other scales. Some studies have suggested a link between ADHD and headache,[11] while some have not.[33] Our results are in accord with the latter. The presence of days with headaches in the preceding week correlated with emotional, behavioural, and peer problems. These results are consistent with previous studies, where impairment in psychosocial adjustment was associated with the frequency of headache attacks.[33]

In the Diagnostic and Statistical Manual of Mental Disorders-5th edition (DSM-5), headache is one of the stress-related psychophysiological symptoms in depression, anxiety disorder, sleep-wake disorders, and somatic symptom disorder.[35] We did not investigate the other somatic symptoms. In our study, the headache was reported by the child, and psychopathological symptoms were reported by parents. Children with psychosomatic symptoms may have difficulty understanding their emotions and coping strategies. For this reason, besides the child, the parents should also be asked about the adequacy of the child's psychosocial adjustment. Psychiatric comorbidity is a prognostic factor in pediatric headaches.[36]

In this study, sleep problems (initiating and maintaining sleep, sleep-related breathing, excessive somnolence) correlated with headaches. It has been found that sleep issues and headache increase the risk for each other.[37] Due to the study's cross-sectional design and psychiatric symptoms in children, no inference could be made about the causal link between headache and sleep. Besides being a symptom of a psychiatric or sleep disorder, sleep problems increase the severity of psychopathology and suicide risk.[38] It is warranted to recognize and treat sleep problems because they are one of the precipitating factors in headaches and psychiatric disorders.

Limitations and conclusion

There are some limitations of our study. First, we compared the groups with different psychometric scales. Scales alone are not enough to diagnose psychiatric conditions with sufficient certainty such that treatment can be started. Second, the cross-sectional design of the study does not allow a comprehensive understanding of cause-and-effect relationships between headache and psychiatric symptoms. Lastly, although the participants in groups were matched for age and sociodemographic level, there could be a difference between preadolescents and adolescents. Additionally, when evaluating the results of this study, gender differences between groups should also be considered.

In conclusion, this study underlines the strong relationship between migraine and mental health, especially depression and anxiety. In addition,

headache frequency is linked to psychosocial impairment and sleep disturbances. These findings emphasize the importance of recognizing the burden of headaches in psychiatry.

DISCLOSURE

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REFERENCES

1. Araki N, Takeshima T, Ando N, *et al*. Clinical practice guideline for chronic headache 2013. *Neurol Clin Neurosci* 2019;7(5):231-59. DOI: 10.1111/ncn3.12322
2. Guidetti V, Faedda N. From 0 to 18: how headache changes over time. *Neurol Sci* 2017;38(1):103-6. DOI: 10.1007/s10072-017-2865-1
3. Genizi J, Bugdnoskya V, Aboud A, *et al*. Migraine and tension-type headache among children and adolescents: application of International Headache Society criteria in a clinical setting. *J Child Neurol* 2021;36(8):618-24. DOI: 10.1177/0883073820988417
4. Hassan ARA, Palani A, James S, Manokaran RK, Arunprasath TS. Primary headache in children aged between 6 and 18 years — Causes and associated factors. *Indian J Pediatr* 2022;87(7):724. DOI: 10.1007/s12098-022-04112-4
5. Abu Bakar N, Tanprawate S, Lambru G, *et al*. Quality of life in primary headache disorders= a review. *Cephalalgia* 2016;36(1):67-91. DOI: 10.1177/0333102415580099
6. Guidetti V, Faedda N, Siniatchkin M. Migraine in childhood: Biobehavioural or psychosomatic disorder? *J Headache Pain* 2016;17:82. DOI: 10.1186/s10194-016-0675-0
7. Mazzone L, Vitiello B, Incorpora G, Mazzone D. Behavioural and temperamental characteristics of children and adolescents suffering from primary headache. *Cephalalgia* 2006;26(2):194-201. DOI: 10.1111/j.1468-2982.2005.01015.x
8. Blaauw BA, Dyb G, Hagen K, *et al*. The relationship of anxiety, depression, and behavioral problems with recurrent headache in late adolescence–a Young-HUNT follow-up study. *J Headache Pain* 2015;16(1):1-7. DOI: 10.1186/1129-2377-16-10
9. Torres, Torres-Ferrus M, Vila-Sala C, *et al*. Headache, comorbidities, and lifestyle in an adolescent population (The TEENs Study). *Cephalalgia* 2019;39:91-9. DOI: 10.1177/03333102418777509
10. Ziplow J. The psychiatric comorbidities of migraine in children and adolescents. *Curr Pain Headache Rep* 2021;25:69. DOI: 10.1007/s11916-021-00983-y
11. Paolino MC, Ferretti A, Villa MP, Parisi P. Headache and ADHD in pediatric age: possible physiopathological links. *Curr Pain Headache Rep* 2015;19(7):1-6. DOI: 10.1007/s11916-015-0494-z
12. Vetri L. Autism and migraine: An unexplored association? *Brain Sci* 2020;10(9): 615. DOI: 10.3390/brainsci10090615
13. Yalinay Dikmen P, Yavuz BG, Aydinlar EI. The relationships between migraine, depression, anxiety, stress, and sleep disturbances. *Acta Neurol Bel* 2015;115:117-22. DOI: 10.1007/s13760-014-0312-0
14. Steiner TJ, Gururaj G, Andrée C, *et al*. Diagnosis, prevalence estimation and burden measurement in population surveys of headache: Presenting the HARDSHIP questionnaire. *J Headache Pain* 2014;15(1): 3. DOI: 10.1186/1129-2377-15-3
15. Wöber-Bingöl Ç, Wöber C, Uluduz D, *et al*. The global burden of headache in children and adolescents — Developing a questionnaire and methodology for a global study. *J Headache Pain* 2014;15(1):86. DOI: 10.1186/1129-2377-15-3
16. Kovacs M. The Children's Depression, Inventory (CDI). *Psychopharmacol Bull* 1985;21:995-8.
17. Oy B. Children's Depression Inventory: a study of reliability and validity. *Turk Psikiyatr Derg* 1991;2:137-40.
18. Spielberger C, Edwards C, Lushene R, Montuori J, Platzek D. Preliminary test manual for the State-Trait Anxiety Inventory for children. Palo Alto, CA Consulting Psychologists Press 1973.
19. Özusta HŞ. Adaptation to State-Trait Anxiety Inventory for Children: Validity and reliability study. *Turk J Psychol* 1995;10(34):32-44.
20. Goodman R. The Strengths and Difficulties Questionnaire: A research note. *J Child Psychol Psychiatry* 1997;38:581-6. DOI: 10.1111/j.1469-7610.1997.tb01545.x
21. Eremsoy C, Karanci A, Kazak Berument S. Güçler ve Güçlükler Anketinin (The Strengths and Difficulties Questionnaire, SDQ) Türk Örneklem için Psikometrik Özellikleri. Poster Presentation XIV Turkish National Psychology Congress; Ankara; 2006.
22. Conners CK, Sitarenios G, Parker JD, Epstein JN. The revised Conners' Parent Rating Scale (CPRS-R): factor structure, reliability, and criterion validity. *J Abnorm Child Psychol* 1998;26:257-68. DOI: 10.1023/a:1022602400621
23. Kaner S, Buyukozturk S, Iseri E. Conners parent rating scale-revised short: Turkish standardization study. *Arch Neuropsychiatry* 2013;50(2):100-10. DOI: 10.4274/npa.y6219
24. Bruni O, Ottaviano S, Guidetti V, *et al*. The Sleep Disturbance Scale for Children (SDSC) Construction and validation of an instrument to evaluate sleep disturbances in childhood and adolescence. *J Sleep Res* 1996;5(4);251-61. DOI: 10.1111/j.1365-2869.1996.00251.x.
25. Ağca S, Görker I, Turan FN, Öztürk, L. Validity, and reliability of the Turkish version of Sleep Disturbance Scale for Children. *Sleep Med* 2021;84:56-62. DOI: 10.1111/j.1365-2869.1996.00251.x
26. Meijer AM, Van den Wittenboer GLH. The joint contribution of sleep, intelligence, and motivation to school performance. *Pers Indiv Differ* 2004;37:95-106. DOI: 10.1016/j.paid.2003.08.002
27. Önder İ, Masal E, Demirhan E, Horzum MB, Beşoluk Ş. Psychometric properties of sleep quality scale and sleep variables questionnaire in Turkish student sample. *Int J Psychol Educ Stud* 2016;3(3):9-21. DOI: 10.17220/ijpes.2016.03.002

28. Nieswand V, Richter M, Gossrau G. (2020). Epidemiology of headache in children and adolescents — another type of pandemia. *Curr Pain Headache Rep* 2020;24(10):62. DOI: 10.1007/s11916-020-00892-6
29. Gazerani P. Migraine and mood in children. *Behav Sci* 2021;11(4):52. DOI: 10.3390/bs11040052
30. Öztop DB, Taşdelen Bİ, PoyrazoğLu HG, *et al*. Assessment of psychopathology and quality of life in children and adolescents with migraine. *J Child Neurol* 2016;31(7):837-42. DOI: 10.1177/0883073815623635
31. Margari F, Lucarelli E, Craig F, *et al*. Psychopathology in children and adolescents with primary headaches: categorical and dimensional approaches. *Cephalalgia* 2013;33(16):1311-8. DOI: 10.1177/0333102413495966
32. Straube A, Heinen F, Ebinger F, von Kries R. Headache in school children: prevalence and risk factors. *Dtsch Ärztebl Int* 2013;110(48):811. DOI: 10.3238/arztebl.2013.0811
33. Arruda M, Guidetti V, Galli F, Albuquerque R, Bigal M. Migraine, tension-type headache, and attention-deficit/hyperactivity disorder in childhood: A population-based study. *Postgrad Med* 2010;122:18-26. DOI: 10.3810/pgm.2010.09.2197
34. Arruda MA, Arruda R, Guidetti V, Bigal ME. Psychosocial adjustment of children with migraine and tension- type headache–A nationwide study. *Headache* 2015;55:39-50. DOI: 10.1111/head.12510
35. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. 5th ed. Arlington, VA: American Psychiatric Association; 2013.
36. Kelly M, Strelzik J, Langdon R, DiSabella M. Pediatric headache: overview. *Curr Opin Pediatr* 2018;30(6):748-54. DOI: 10.1097/MOP.0000000000000688
37. Guidetti V, Dosi C, Bruni O. The relationship between sleep and headache in children: implications for treatment. *Cephalalgia* 2014;34(10):767-76. DOI: 10.1177/0333102414541817
38. Blake MJ, Allen NB. Prevention of internalizing disorders and suicide via adolescent sleep interventions. *Curr Opin Psychol* 2020;34:37-42. DOI: 10.1016/j.copsyc.2019.08.027