



Research Article

The Effects of Daily Variables on Primary Headache Disorders in High-School Children; A Proposal For A Cut-off Value For Study/Leisure Time Regarding Headache Types

Hakan AYTAÇOĞLU¹, Aynur ÖZGE², İlknur KÖSTEKÇİ³, Bahar TAŞDELEN⁴, Nevra ÖKSÜZ⁵, Fevziye TOROS⁶

¹Icel Anatolian Lycee, Student, Mersin, Turkey ²Mersin University School of Medicine, Professor of Neurology and Algology, Mersin, Turkey ³Icel Anatolian Lycee, Physics Teacher, Councelling Teacher for the Students' Projects, Mersin, Turkey ⁴Mersin University School of Medicine, Associate Professor of Biostatistics, Mersin, Turkey ⁵Mersin University School of Medicine, Resident of Neurology, Mersin, Turkey ⁶Mersin University School of Medicine, Professor of Child&Adolescent Psychiatry, Mersin, Turkey

Summary

Objective: We aimed to detailly investigate the effects of in school, after school academic activities and hobbies on the frequencies and properties of headache, in high academic expectation school group.

Methods: The study was carried out among the all students in a high school in Mersin, Turkey. They were all given a standard questionnaire that consisted of the questions regarding the demographics, presence or absence of headache, if yes detailed characteristics questioned, the after school activities, percentage of their happiness and an international scale for the establishment of daily life routines, the MIDAS.

Results: 611 subjects (70.4 % of the total population) were selected to be enrolled for evaluation. The groups were even and were well capable of representing the community. 134 (21.9%) had no headache at all. 278 subjects (45.5%) had TTH and 175 (28.6%) of the participants had migraine. The MIDAS scores were highest in the group who had migraine with aura ($p<0.001$). The proposed cut-off values of study/hobbies time in a week are calculated to be 5.54 ± 0.32 hours for headache disorders (in general), 6.12 ± 0.57 hours for migraine and 5.23 ± 0.39 hours for TTH.

Conclusion: This study demonstrates that headache is a commonly encountered problem among the young adults that raises problems both in their academic and social lives. If this problem is kept unresolved, these young adults that represent the highest academic group among the com-munity carry the risk forming an unhealthy society in terms of both academic and social life in the future.

Key words: Headache, high-school, migraine, tension type headache, study/hobby ratio, MIDAS

Lise Öğrencilerinde Günlük Yaşam Değişkenlerinin Birincil Baş ağrısı Özellikleri Üzerine Etkisi: Baş ağrısı Türüne Göre Ders Çalışma/hobi Zamanı İçin Sınır Değer Önerisi

Özet

Amaç: Bu çalışmada akademik beklentinin yüksek olduğu bir lisede okul içi, okul dışı akademik etkinlikler ve hobilerin baş ağrısı sıklığı ve özelliklerine etkisinin kapsamlı bir şekilde araştırılması amaçlandı.

Gereç ve yöntem: Bu çalışma Mersin ilindeki bir lisedeki tüm öğrenciler üzerinde gerçekleştirildi. Tüm öğrencilere demografik bilgiler, baş ağrısı mevcudiyeti, eğer varsa, detaylı özellikleri, okul sonrası etkinlikleri, mutluluk yüzdeleri ve baş ağrısının günlük yaşam işlevlerine etkisi hakkında enternasyonel bir ölçek olan MIDAS ölçeğini kapsayan standart bir anket uygulandı.

Sonuçlar: Bu çalışmada 611 kişiye (okul mevcudunun %70.4'ü) ait veriler değerlendirilme alındı. Grup içerik ve dağılım açısından örneklemin tamamını yansıtabilecek özellikteydi. Yalnızca 134 öğrencide (%21.9) baş ağrısı yoktu. 278 olgu (%45.5) GTB ve 175 olgu (%28.6) mi-gren tanısı aldı. Auralı migrenlerde MIDAS değerleri en yüksek idi ($p<0.001$). Ders çalışma/Hobi süreleri için önerilen sınır değerler genel olarak 5.54 ± 0.32 saat olup migrenlilerde bu süre 6.12 ± 0.57 saat ve GTB olgularında 5.23 ± 0.39 saat idi.

Sonuç: Bu çalışma baş ağrısının ergenlerde akademik ve sosyal hayatı giderek olumsuz etkileyen ve sık görülen bir problem olduğunu gösterdi. Eğer bu sorun çözülmezse toplumun en yüksek akademik beklentisini yansıtan bu grup genç erişkin olduğunda, sağlıksız bir akademik ve sosyal yaşantı ile karşı karşıya kalacaklardır.

Anahtar Kelimeler: Baş ağrısı, lise, migren, gerilim tipi baş ağrısı, ders/hobi zamanı oranı, MIDAS

INTRODUCTION

Headache is one of the most frequently reported health complaints (more than 50% of ado-lescents) among adolescents; approximately 5-15% of them suffer from migraine and further 15-25% from tension-type headache (TTH)^(1-4,7,19,30,39). The results of epidemiological studies indicate that headache have become more prevalent among children and adolescents over the last decades throughout the world^(20,31). In parallel with the developments in the field of headache, the increase in the awareness by both the medical staff and the families may explain this rise in prevalence. The prominent changes in the life styles of the children and their families (i.e. employed and working mothers, unhealthy feeding habits, spending more time on communication devices like televisions and computers, spending less time for the exercises like playing outside in the streets. etc.) appear to be the primarily recalled reasons in the development of headache^(10,20,38).

Individuals who suffer from migraine or severe headaches are also diagnosed with certain other medical conditions (atopic disorders, epileptiform disorders etc) at a higher frequency than expected⁽²⁴⁾. In addition, severe headaches among adults

often presented as comorbidity with psychological conditions, such as depression, tic disorders, and anxiety disorders⁽³⁵⁾. When these parameters coexist, headache becomes an unfavorable factor that enduringly impacts on daily life of young people. The high prevalence of headache in young age has a significant impact on patients and on their families⁽¹²⁾. Re-current headaches can negatively impact a child's life in several ways, including school absences, decreased academic performance, social stigma and impaired ability to establish and maintain peer relationships. The quality of life in children with migraine is impaired to a degree similar to that in children with arthritis or cancer^(12,24).

Chronic stress, the prolonged imbalance between situational requirements and the individuals' coping resources, have been repeatedly found to be related with headaches in adolescents^(8,11,15). Associations with exposure to stressors in adolescents have been reported for both migraine and TTH with a higher frequency than other pain disorders. It was found that children and adolescents with migraine had more days absent from school and leisure activities^(11,21).

As headache, especially migraine, often accounts for a reduced quality of life^(9,28) and a higher prevalence of psychopathological symptoms^(29,36) in adolescents, any strategy to prevent headache might improve adolescents' health considerably.

Keeping in mind the undesired reflections of headache on future social lives of the young adults, we aimed to investigate the effects of in school and after school academic activities and presence or absence of hobbies on the frequencies and properties of headache by also taking into consideration other medical and social variables as well. Moreover we hoped to define a new parameter; a cut-off value associating the probability of headache with the presence or absence of hobbies and time spent for them.

MATERIAL AND METHODS

The investigation universe was selected to be the students of Icel Anatolian Lycee, a high school in Mersin, Turkey, where the students are accepted according to the highest scores in an exam performed countrywide. This group therefore represented the highest academic success in the province. The total of the sample universe was included in the study however 611 subjects (70.39% of the total population) were selected to be enrolled for evaluation of which 304 (49.7%) were females and 307 (50.3%) were males. The remainder of the subjects either did not fill up the constructed questionnaire in an appropriate manner or refused to participate hence they were excluded from the study.

The questionnaire consisted of 4 sections:

1. Demographics: Age, sex, medical history and family histories were questioned in this section.
2. Headache Data: Students that complained from headache were asked to fill in this section. The duration of headache, frequency of the attacks, severity, localization, accompanying

symptoms, triggering stimuli, relieving factors and usage of pain killers were questioned in this section.

3. Daily Life Routines: Students were directed to answer the questions regarding their daily routines, types of their after school activities and time spent on these activities. They were also asked to denote a general happiness percentage.

4. The MIDAS Scale: This scale that was used for the measurement of daily activities of the migraine patients was applied to all the students that complained from headache.

The answers of the students were evaluated by a specialist in headache and their probable initial diagnosis were made according to the headache scale (ICDH-II) which was declared in 2004 by the International Headache Society (IHS)(18). Based on these items, a classification of migraine (including migraine with aura- M_wA or migraine without aura- M_woA) and TTH (including RETTH, FETTH, CTTH) was made. A double diagnosis of combined migraine plus TTH could arise in subjects fulfilling the diagnostic criteria for both probable (chronic) migraine and probable (episodic or chronic) TTH, which require compliance with all but one of the respective diagnostic criteria for migraine or TTH. All other subjects with headache that did not match any of these diagnoses for primary headache were considered to have miscellaneous headaches (MH).

Statistical Analysis

The data obtained with the questionnaires were recorded to the database which was prepared in advance, under the supervision of the statistical consultant. The quality control of the data was performed meticulously. The data were processed and analyzed using the statistical package SPSS-11.5 for Windows. Descriptive data are presented as proportions, means, medians and standard deviations. The dependencies between categorical variables were evaluated using chi-square

test. Differences between grades according to continuous variables were evaluated by using Kruskal-Wallis test because they were not distributed normally. Overall, p value <0.05 was considered to be significant.

RESULTS

The demographic properties of the participating subjects were similar and even so the group was thought to be able to represent the majority of the population. The distribution of the diagnosed headache types according to the classes are given in Table 1 and Figure 1. A total of 78.1% of the students received a diagnosis of having headache. Despite not all of the students

presented adequate data in terms of diagnosing a specific headache, 84.4% of them responded affirmatively to the question "Did you have headache within the last month?" (Table 2). 87.2% of the females and 69.2% of the males suffered from headache ($p<0.001$ against girls). The type of headache diagnosed was primarily tension type headache and the second frequently seen type was migraine. Headache was mostly defined in the 9. grade which was followed by the 12. grade and the 10. grade students. Table 1 demonstrates the distribution of headache complaints according to the grades and headache sub-types.

Table 1: Distribution of the headache types of the students according to the grades.

Diagnosis	9. Grade	10. Grade	11. Grade	12. Grade	TOTAL
No Headache	27 (17.0 %)	36 (18.8 %)	53 (33.1 %)	18 (17.8 %)	134 (21.9 %)
TTH	77 (48.4 %)	87 (45.5 %)	69 (43.1 %)	45 (44.6 %)	278 (45.5 %)
RETHH	67 (42.1 %)	61 (31.9 %)	51 (31.9 %)	33 (32.7 %)	212 (34.7 %)
FETHH	9 (5.7 %)	17 (8.9 %)	9 (5.6 %)	8 (7.9 %)	43 (7.0 %)
CTTH	1 (0.6 %)	9 (4.7 %)	9 (5.6 %)	4 (4.0 %)	23 (3.8 %)
Migraine	53 (33.3 %)	55 (28.8 %)	34 (21.3 %)	33 (32.7 %)	175 (28.6 %)
MW_oA	45 (28.3 %)	48 (25.1 %)	31 (19.4 %)	32 (31.7 %)	156 (25.5 %)
MwA	8 (5.0 %)	7 (3.7 %)	3 (1.9 %)	1 (1.0 %)	19 (3.1 %)
MH	2 (1.3 %)	13 (6.8 %)	4 (2.5 %)	5 (5.0 %)	24 (3.9 %)
TOTAL	159 (26.0 %)	191 (31.3 %)	160 (26.2 %)	101 (16.5 %)	611 (100 %)

* $p<0.05$ was taken as a statistically significant result among the grades.

TTH: Tension Type Headache, RETHH: Rare Episodic Tension Type Headache, FETHH: Frequent Episodic Tension Type Headache, CTTH: Chronic Tension Type Headache, MwoA: Migraine without aura, MwA: Migraine with aura, MH: Miscellaneous headache.

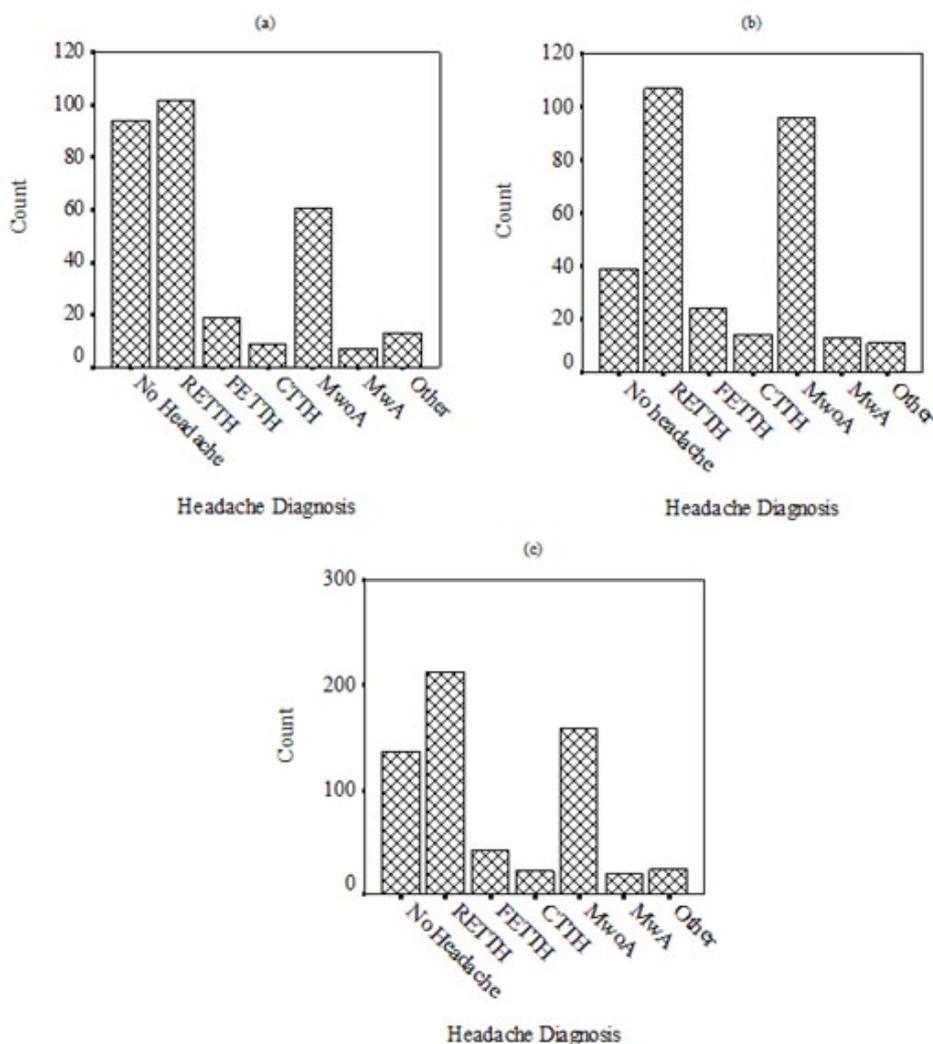


Figure 1: The distribution of headache types of students (Figure 1a- boys, 1b- girls, 1c- overall).

In the aspect of headache characteristics (please refer to Table 2); 183 students (38.2%) complained of having instant headaches as they filled out the questionnaire. Complaint from instant headache was primarily among the 10. grade students (33.6%). Albeit 47.9% of the subjects defined to experience headache anytime throughout the day, 44.9% described their headaches to be mainly during the evenings. Also 55.2% of the participants said that they were not participating in sports and exercises as their headaches were growing to be worse with effort. The localization of headaches was mainly at the temporal areas (32.5%).

Headaches were mainly accompanied by being disturbed from sounds (phonophobia) (57.5%) and sense of being dizzy (19.1%). However, only 7.7% of students reported accompanying disturbance from light (photohobia) and from odors (osmophobia (1.8 %)). The relief of headaches was primarily attained by sleeping and resting (62.7%). 42.1% of the students could sense their coming headaches (discomfort, irritability, inattentiveness, light flashes, etc.). Headaches were primarily triggered by the coming examinations (29.4%) which were followed by studying for longer periods (25.8%).

Table 2. Headache features of the high-school students.

Questions about headache	Answers	n (%)	
Did you have a headache attack in last month?	Yes	438 (84.4%)	
	No	80(15.4%)	
How can you describe your headache character?	Throbbing	183 (38.2%)	
	Pressing	142(29.6%)	
	Sharp	40(8.4%)	
	Blunt	107(22.3%)	
	Other	6(1.3%)	
When you have headache attacks?	Mornings	34(7.2%)	
	Evenings	213(44.9%)	
Aggravated your attacks with routine physical exercise?	Does Not Matter	227(47.9%)	
	Yes	259(55.2%)	
	No	209(44.6%)	
	Generalized	68(14.5%)	
Where located your headache attacks?	About Eyes	73(15.6%)	
	Sub Occipital	58(12.4%)	
	Temples	152(32.5%)	
	Unilateral	21(4.5%)	
	Forehead	96(20.5%)	
	Nausea	34(7.5%)	
	Vomiting	4(0.9%)	
Associated features of headache attacks?	Phonophobia	262(57.5%)	
	Photophobia	35(7.7%)	
	Vertigo	20(4.4%)	
	Dizziness	87(19.1%)	
	Osmophobia	8(1.8%)	
	Other	6(1.3%)	
	Visual	18(8.7%)	
	Sensory	7(3.4%)	
	Appetite Changes	13(6.3%)	
	Attention Deficit	47(22.8%)	
Which type of aura or prodromal symptoms you have?	Anxiety	56(27.2%)	
	Necessity for Studying	58(28.2%)	
	Feeling of Frequently Going to the Toilette	1(0.5%)	
	Others	4(1.9%)	
	Examination	148(29.4%)	
	Chocolate	1(0.2%)	
	Watching the TV	35(7.0%)	
	Hunger	26(5.2%)	
	Which type of triggers start your headache attacks?	Sun exposure	30(6.0%)
		Eating Icecream	4(0.8%)
Studying		130(25.8%)	
Sports, Being Tired		14(2.8%)	
Sleeping		106(21.1%)	
	Cold Weather	5(1.0%)	

Students with MwoA showed a high frequency of positive headache history for mothers (17.1%) and fathers (10.8%) as well (Please refer to Table 3). The longest and most severe attacks were found to be in subjects having MwoA and the shortest and least severe attacks were in subjects with RETTH. Students with the highest MIDAS scores took place in the group which was diagnosed to have MwA (15.2 ± 16.8 , $p < 0.001$) and this had a negative effect both on their happiness percentage and the time they were sparing for their hobbies. These students constituted the group that spent the least time for their hobbies (2.97 h/week) with the least percentage of happiness (57.4%) ($p = 0.001$).

The most commonly encountered medical problem derived from the history of the subjects was sinusitis in 43.4% and attention deficit disorder in 11.2%. Only 11.5% of the students had a medical problem other than headache. The family history of the all students put forward headache in mothers of 56.4%, in fathers of 30.1% and in siblings of 39.7%, independent from headache sub-type. This finding has driven our attention to the effects of genetics and environmental stimuli for this topic. The duration and intensity of headache was significantly higher in the group with MwA.

The subjects that used medication for headaches were mostly in the group with chronic tension type headache (mean 5.6 ± 10.2 pills/month). These students were accepted to be candidates for a very important headache type named medication overuse headache. There is an increased attention to this type of headache and the high incidence among our sample universe has drawn our attention.

According to leisure time activities, 31.8% of the students were attending to extra courses or taking private lessons after school and among them 83.3% had various

hobbies. Happiness was significantly higher in subjects who had hobbies ($p = 0.002$, Mann-Whitney U: 19454.0)

When after school studying time/time spent for the hobbies (h/week) ratio was evaluated in terms of discriminating headache we realized that it is possible to say for subjects in whom this ratio was ≤ 5.6 it was likely that they would not experience headache. In other words this ratio was below 5.6 in 82.20% of the subjects without headache [Sensitivity: 34.18%, specificity: 82.20%, +LR (Positive likelihood ratio): 1.92, -LR (Negative likelihood ratio): 0.80, +PV (Positive predictive value): 86.5, -PV (Negative predictive value): 27.2]. This ratio's selectivity for the ones without headache was high however its ability to differentiate the ones with headache was low. In general the median of this cut off value have been calculated to be 5.54 ± 0.32 (95% CI: 4.91-6.17).

When after school studying time/time spent for the hobbies (h/week) ratio was evaluated in terms of discriminating migraine type headache we can say that subjects having a cut off value ≤ 5.25 are not likely to have headache. In other words this ratio was lower than 5.25 in subjects without headache [Sensitivity: 37.84%, specificity: 80.51%, +LR: 1.94, -LR: 0.77, +PV: 70.9, -PV: 50.8]. This ratio's selectivity for the ones without headache was high however its ability to differentiate the ones with headache was low. In general the median of his cut off value have been calculated to be 6.12 ± 0.57 (95% CI: 4.98-7.25).

When after school studying time/time spent for the hobbies (h/week) ratio was evaluated in terms of discriminating TTH we could say that subjects with a cut off value of ≤ 5.6 would not experience headache, that is to say, this ratio is below 5.6 in 82.20% of the subjects without headache [Sensitivity: 33.48%, specificity: 82.2%, +LR: 1.88, -LR: 0.81, +PV: 78.6, -

PV: 38.8]. This ratio's selectivity for the ones without headache was high however its ability to differentiate the ones with headache was low. In general the median of this cut off value have been calculated to be 5.23±0.39 (95% CI: 4.45-6.02).

We investigated the effects of percentage of happiness and studying/hobby ratio on head-ache with logistics regression

analysis which unveiled that as the percentage of happiness increased the risk of having headache was decreased (OR=0,985 p=0,001) where the risk of having headache was increased as studying/hobby ratio was increased (OR=1,042 p=0,041).

Table 3. Headache family history of student’s and some headache characteristics

	Headache diagnosis (n=611)						
	None	FETTH	RETH	CTTH	MwoA	MwA	MH
Mother’s headache history	47 (7.6%)	111 (18.1%)	25 (4.0%)	15 (2.4 %)	105 (17.1 %)	14 (2.3 %)	10 (1.6 %)
Father’s headache history	18 (2.9%)	48 (7.8%)	12 (1.9 %)	6 (0.9 %)	66 (10.8 %)	12 (1.9 %)	9 (1.4 %)
Duration of attacks (hour)		161.25±161.54	70.90±66.45	160.00±139.94	151.32±176.28	222.94±373.61	171.08±288.06
Severity of attacks (VAS)		90 (10–720)	60 (5–360)	120 (20–360)	120 (10–***)	120(30–***)	54 (10–840)
MIDAS		5.07±2.09	3.60±1.70	6.31±1.49	5.78±1.86	7.09±1.79	4.08±2.35
Time spent for the hobbies		5 (1–10)	3 (1–8)	6 (4–10)	6 (1–10)	7 (4–10)	4(1–7)
Happiness (%)		12.61±12.95	5.61±10.74	12.31±9.61	13.34±12.45	15.29±18.11	13.92±29.39
		9.5 (0–46)	3 (0–102)	12 (1–30)	10 (0–69)	10 (0–67)	5.5 (0–106)
	3.50±1.47	3.43±1.35	2.89±1.55	3.69±1.44	3.01±1.64	3.24±1.72	3.58±1.83
	4 (1-5)	3 (1–5)	2 (0–5)	4 (1–5)	3 (0–5)	3 (1–5)	5 (1–5)
	73.24±22.79	70.38±24.16	64.53±24.82	60.79±20.79	57.26±26.31	59.50±30.01	71.17±16.79
	79 (19-100)	75 (5-100)	70 (1-100)	60 (15-99)	60 (0-100)	55 (0-100)	75 (37-100)

FETTH: Frequent Episodic Tension Type Headache, RETH: Rare Episodic Tension Type Headache, CTTH: Chronic Tension Type Headache, MwoA: Migraine without aura, MwA: Migraine with aura, MH: Miscellaneous headache.

DISCUSSION

In this study we showed a high frequency of headache disorders in a special high-school population. These headache disorders showed important effects on youngs' daily life activities and happiness depending on gender and headache type. In

this study we not only focused on the frequency and types of headaches but on the determining factors as well. We determined the effects of the students' daily variables on their happiness and the MIDAS score too. We also proposed calcu-lated new cut-off values for time spent for studying/time spared for hobbies

during after school activities within a week.

There are different reports about the frequencies of headache disorders in high-school populations. Our results suggested that there is an overall increasing frequency of headache disorders, especially migraine in this age group (see Table 4). However this is not a prevalence study but using a special sample we can say that headache is an important problem in high-academic grade high-school population with a difference in frequency with increasing grade.

In our sample 84.4% of all students reported headache in the last month and 78.1% of them received specific headache diagnosis against girls. We showed a high frequency of TTH (45.5%) as mainly RETTH and proportionally high frequency of chronic TTH (3.8%) as was reported previously^(5,17,19,27,33,34). Our sample showed a high frequency of migraine (28.6%), mainly MwoA (25.5%). These ratios also were higher than previous common population based reports^(5,19,39) however our sample specifically did not represent a population based data.

Table 4. Selected papers about headache prevalence including high-school children.

Author, date, Country	n	Age	Headache diagnostic criteria	Headache prevalence	Migraine prevalence	TTB prevalence
Abu-Arafeh, 1993, England	1754	5-15	ICHD-I	-	%10.6	%0.9
Barea, 1996, Brasil	538	10-18	ICHD-I	%82.9	%9.9	%72.8
Al Jumah, 2002, Saudi Arabia	1400	6-18	ICHD-I	%49.8	%7.1	%42.7
Özge- 2002, Turkey	5562	8-16	ICHD-I	%49.2	%10.4	%24.7
Zencir,2004, Turkey	2490	11-18	ICHD-I	-	%8.8	-
Karlı,2006, Turkey	2387	12-17	ICHD-II	%52.2	%14.5	%31.9
Ando, 2007, Turkey	6472	12-15	ICHD-II	%22.8	%4.8	-
Akyol, 2007, Turkey	7721	9-17	ICHD-II	%83.3**	%9.7	-

Frequent headache is associated with the report of a reduced ability to work and a decline in quality of work^(27,33). Studies interpret these data and suggest that head pain can be associated with impairment in functioning, either psychologically or behaviorally^(17,34). Recent reviews of epidemiological studies report that

psychiatric disorders, especially depression and anxiety, are found disproportionately among headache patients^(13,22,32), suggesting that impairment is present in emotional functioning. In addition, performance is adversely affected by headache due to days missed from the workplace as well as inefficiency at the

workplace^(16,25,26). However these studies commonly focused the frequency of headache and co-morbid psychiatric disturbances. In this study, independent from an epidemiological survey, we focused on the daily living effects of primary headache disorders on adolescent life style of an academically high population. We evaluated not only migraine but also TTH with specific subtypes which were not mentioned in previous studies. Daily living activities were evaluated specifically with MIDAS, a specific questionnaire for migraine, and additionally specific questions about daily routine for studying and hobbies. We calculated a specific cut-off point for headache disorders based on this database. According to our results we showed that MIDAS score is significantly high in youngs with primary headache disorders (both with migraine and TTH) compared to students without headache.

Some studies reported a reduced quality of life (QOL) associated with headache^(2,6,29). An important population based study showed that adolescents with migraine reported higher reductions in physical wellbeing and total QOL than subjects with tension-type headache (TTH). The size of the reduction in QOL scores was small but similar to that observed for other chronic conditions in adolescents. Headache prevention programs might therefore have an impact on QOL in adolescents⁽²⁹⁾. In our study we did not perform a QOL questionnaire in order not to extend the questionnaire and preserve the data reliability. But we picked up MIDAS data as a specific representative of migraine on daily living activities and showed important scores in migraine group than TTH which supports disturbed daily living activities related to headache. We also asked the ratio of current happiness.

A small but significant reduction in QOL due to headache was observed in adolescents, which could not be explained by confounding variables. The impact on

QOL was more pronounced than that seen in many chronic conditions studied in adolescence and similar to that observed for obesity and attention deficit hyperactivity disorders. Many forms of headache in adolescents may be either prevented or treated by psychological interventions⁽³⁷⁾ and QOL may improve with decreasing headache intensity and frequency^(23,37). Prevention of headache might help to improve QOL in adolescents, while psychological treatment—although improving recurrent pain—may not improve QOL to a similar extent⁽¹⁴⁾. The low percentage of happiness and decreased daily life performance demonstrated with this study in a highly academic population was thought provoking.

On the other hand a cut off point for studying/hobby time ratio after school is higher than 5.25 in all types of primary headache disorders, specifically highest in migraine group than the TTH group. We propose longer hobby times for students especially for those who study harder, in an effort to keep them away from the burden of primary headache disorders. This will help the families in reducing the management times and the youth those who are growing up with good coping strategies. Should this be managed the forthcoming generations will be constituted by healthier and happier individuals.

Limitations;

There are some limitations in this study that must be denoted. Some have already been described. First and foremost, the study requires replication. Second, this study did not assess all high school students but a specific selected population. Third, questionnaires were used in this university setting; the only alternative, interviews, was not an option for the sample size. One or the other is necessary, as headache frequency must be assessed by a self-report. In order to increase attention on the questionnaire and attain a maximum efficiency out of the questions, counseling

teachers gave a detailed description about headache and the contents of the forms. The last limitation is to be mentioned concerns assessment of happiness which was solicited subjectively without the use of any specific scale. Adding questions to the questionnaire regarding depression, anxiety and self confidence or a poll for quality of life would have been more pleasing however this would significantly lengthen an already time consuming (approximately 30 minutes) questionnaire. Keeping in mind that the students would not be willing to participate or we could have encountered with untrusted answers we consciously decided not to take this chance of ours for reaching to this data.

Implications;

It is best to our knowledge that this study is the first of its kind in terms of being planned and applied by a high school student with a multidisciplinary support. In this study a pursuit for an evidence based solution is being expressed for a student who observed a problem on his own friends. Also up to date measures that have to be taken in reaching to an ache free and a population consisting of happy adults (mothers, fathers, employed, etc.) have been shared. The final point to be attained will be the enlightenment of many individuals all over the world with the obtained re-sults.

Conclusions;

- > Headache is an important problem among high-school students.
- > Most important causes of this symptom are migraine and TTH.
- > Headache has a negative effect on happiness.
- > The good modification of life-style could reduce the hazard of headache, especially in-creased leisure time activities.
- > Early recognition and appropriate prevention of headache attacks will decrease the risk of chronic headaches and disease burden in adulthood.

Acknowledgements

We express our great appreciation to all the high school students and teachers in Icel Anadolu Lycee for participating in this study and to Associate Professor Dr. Barlas N. Aytaçoğlu for his kind efforts for editing the manuscript in English.

Correspondence to:

Aynur Ozge
E-mail: [aозge@mersin.edu.tr](mailto:aozge@mersin.edu.tr)

Received by: 23 August 2011

Accepted: 25 October 2011

The Online Journal of Neurological Sciences (Turkish) 1984-2011

This e-journal is run by Ege University Faculty of Medicine, Dept. of Neurological Surgery, Bornova, Izmir-35100TR

as part of the Ege Neurological Surgery World Wide Web service.

Comments and feedback:

E-mail: editor@jns.dergisi.org

URL: <http://www.jns.dergisi.org>

Journal of Neurological Sciences (Turkish)

Abbr: J. Neurol. Sci.[Turk]

ISSNe 1302-1664,

REFERENCES

1. Abu-Arafah, I.A.& Russell, G. *Epidemiology of headache and migraine in children. Dev Med Child Neurol.* 1993;35(4):370-1.
2. Akyol, A., Kiylioglu, N., Aydin, I. et al. *Epidemiology and clinical characteristics of migraine among school children in the Menderes region. Cephalalgia* 2007;27(7):781-7.
3. Al Jumah, M., Awada, A. & Al Azzam, S. *Headache syndromes amongst schoolchildren in Riyadh, Saudi Arabia. Headache* 2002;42(4):281-6.
4. Ando, N., Fujimoto, S., Ishikawa, T. et al. *Prevalence and features of migraine in Japanese junior high school students aged 12-15 yr. Brain Dev.* 2007;29(8):482-5.
5. Arruda, M. A., Guidetti, V., Galli, F. et al. *Frequent headaches in the preadolescent pediatric population : A population-based study. Neurology* 2010;74(11):903-8.

6. Bandell-Hoekstra, I.E.N.G., Abu-Saad, H.H., Passchier, J et al. Coping and quality of life in relation to headache in Dutch schoolchildren. *Eur J Pain*. 2002;6(4): 315–21.
7. Barea, L.M., Tannhauser, M.& Rotta, N.T. An epidemiological study of headache among children and adolescents of southern Brazil. *Cephalalgia* 1996;16(8):545-9; discussion 523.
8. Björling, E.A. The momentary relationship between stress and headaches in adolescent girls. *Headache*. 2009;49(8):1186–97.
9. Brna, P., Gordon, K., Dooley, J. Canadian adolescents with migraine: Impaired health-related quality of life. *J Child Neurol*. 2008;23(1):39-43.
10. Bugdayci, R., Ozge A., Sasmaz, T. et al. Prevalence and factors affecting headache in Turk-ish schoolchildren. *Pediatr Int*. 2005;47(3):316-22.
11. Carlsson, J. Prevalence of headache in schoolchildren: relation to family and school factors. *Acta Paediatr*. 1996;85(6):692-6.
12. Grazi, L. & A drasik, F. Headache in young age: classification of primary forms. *Neurol Sci*. 2010;31 Suppl 1:S77-9.
13. Hamelsky, S.W.& Lipton, R.B. Psychiatric comorbidity of migraine. *Headache*. 2006;46(9): 1327–33.
14. Hicks, C.L., von Baeyer, C.L. & McGrath, P.J. Online psychological treatment for pediatric recurrent pain: a randomized evaluation. *J Pediatr Psychol*. 2006;31(7):724–36.
15. Hjern, A., Alfvén, G. & Ostberg, V. School stressors, psychological complaints and psycho-somatic pain. *Acta Paediatr*. 2008;97(1): 112–7.
16. Holmes, W.F., MacGregor, A., Sawyer, J.P.C. et al. Information about migraine disability influences physicians' perceptions of illness severity and treatment needs. *Headache*. 2001;41(4): 343–50.
17. Holroyd, K.A., Stensland, M., Lipchik, G.L. et al. Psychosocial correlates and impact of chronic tension-type headaches. *Headache*. 2000;40(1):3–16.
18. International Headache Society. *The International Classification of Headache Disorders: 2nd Edition*. *Cephalalgia*. 2004;24 Suppl 1 :9-160.
19. Karli, N., Akgoz, S., Zarifoglu, M. et al. Clinical characteristics of tension-type headache and migraine in adolescents: a student-based study. *Headache* 2006;46(3):399-412.
20. Karli, N., Akiş, N., Zarifoğlu, M. et al. Headache prevalence in adolescents aged 12 to 17: a student-based epidemiological study in Bursa. *Headache* 2006;46(4):649-55.
21. Karwautz, A., Wöber, C., Lang, T. et al. Psychosocial factors in children and adolescents with migraine and tension-type headache: a controlled study and review of the literature. *Cephalalgia*. 1999;19(1):32–43.
22. Lake, A.E., Rains, J.C., Penzien, D.B. et al. Headache and psychiatric comorbidity: historical context, clinical implications, and research relevance. *Headache*. 2005;45(5):493–506.
23. Langeveld, J.H., Koot, H.M. & Passchier, J. Headache intensity and quality of life in adolescents: How are changes in headache intensity in adolescents related to changes in experiences quality of life? *Headache*. 1997;37(1):37–42.
24. Lateef, T.M., Merikangas, K.R., He, J., Kalaydjian, A. et al. Headache in a national sample of American children: prevalence and comorbidity. *J Child Neurol* 2009;24(5):536-43.
25. Linde, M.& Dahlof, C. Attitudes and burden of disease among self-considered mi-graineurs—a nation-wide population-based survey in Sweden. *Cephalalgia*. 2004; 24(6):455–65.
26. Lipton, R.B., Liberman, J.N., Kolodner, K.B. et al. Migraine headache disability and health-related quality-of-life: a population-based case-control study from England. *Cephalalgia*. 2003;23(6):441–50.
27. Lofland, J.H.& Frick, K.D. Workplace absenteeism and aspects of access to health care for individuals with migraine headache. *Headache*. 2006;46(4):563–76.
28. Milde-Busch A, Heinrich S, Thomas S et al. Quality of life in adolescents with headache: Results from a population-based survey. *Cephalalgia*. 2010;30(6):713-21.
29. Milde-Busch, A., Boneberger, A., Heinrich, S., et al. Higher prevalence of psychopathological symptoms in adolescents with headache: A population-based cross-sectional study. *Headache*. 2010;50(5):738–48.
30. Ozge, A., Bugdayci, R., Sasmaz, T. et al. The sensitivity and specificity of the case definition criteria in diagnosis of headache: a school-based epidemiological study of 5562 children in Mersin. *Cephalalgia* 2002; 22(10):791–8.
31. Ozge, A., Sasmaz, T., Cakmak, S.E. et al. Epidemiological-Based Childhood Headache Natural History Study: After an Interval of Six Years. *Cephalalgia* 2010;30(6):703-12.
32. Powers, S.W., Gilman, D.K. & Hershey, A.D. Headache and psychological functioning in children and adolescents. *Headache*. 2006;46(9):1404–15.
33. Raak, R. & Raak, A. Work attendance despite headache and its economic impact: a comparison between two workplaces. *Headache*. 2003;43(10):1097–101.
34. Radat, F. & Swendsen J. (). Psychiatric comorbidity in migraine: A review. *Cephalalgia*. 2005;25(3):165–78.
35. Silberstein, S.D., Lipton, R.B., Breslau, N. Migraine: association with personality characteristics and psychopathology. *Cephalalgia* 1995;15(5):358–69;discussion 336.
36. Strine TW, Okoro CA, McGuire LC et al. The associations among childhood headaches, emotional and behavioral difficulties, and health care use. *Pediatrics* 2006;117(5):1728-35.
37. Trautmann, E., Lackschewitz, H. & Kröner-Herwig, B. Psychological treatment of recurrent headache in children and adolescents: a meta-analysis. *Cephalalgia*. 2006;26(12): 1411–26.
38. Zarifoglu, M., Karli, N.& Taskapilioglu, O. Can ID Migraine be used as a screening test for adolescent migraine? *Cephalalgia* 2008; 28(1): 65–71.
39. Zencir, M., Ergin, H., Sahiner, T. et al. Epidemiology and symptomatology of migraine among school children: Denizli urban area in Turkey. *Headache* 2004;44(8):780-5.