

Prevalence of migraine and non-migraine headache among high school students at the National Guard Housing in Riyadh, Saudi Arabia

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ABSTRACT

الأهداف: لتحديد نسبة انتشار الصداع والشقيقة، وللتعرف على الأعراض التي ترافق هجمة الصداع، بالإضافة لتحديد تأثير الصداع على دوام طلاب المدرسة، وذلك لمرحلة طلاب الثانوية.

الطريقة: أجريت دراسة مبنية على استبيان لشريحة مقطعية لطلاب المدارس في المرحلة الثانوية في مساكن الحرس الوطني في الرياض - المملكة العربية السعودية، خلال العامين الدراسيين 2002م و 2003م. شملت هذه الدراسة 1750 طالباً من أربعة مدارس وبشكل عشوائي من كل مدرسة. أحتوى الجزء الأول من الاستبيان على معلومات إحصائية، خاصة عن الصداع، فيما لو كان هناك صداع خلال العام السابق لهذا الاستبيان وعن نمط هذا الصداع، بالإضافة لتشخيصه اعتماداً على معايير الجمعية العالمية للصداع (IHS). كما تم السؤال عن مدى تأثير الصداع على الدوام المدرسي.

النتائج: وجدنا أن حوالي الثلث (33.1%) من الشريحة التي أجريت عليها الدراسة سبق وقد تعرضت لصداع متكرر كحادث عرضي لا علاقة له بمرض معين أو حمى، وذلك خلال العام السابق لهذا الاستبيان. إن معدل الانتشار مرتفع وبشكل واضح بين الإناث عما هو بين الذكور، حيث كان بالنسبة للشقيقة 9.3% مقابل 6.3%، أما الصداع لأسباب أخرى غير الشقيقة فكان 29.5% مقابل 22%)، مع ملاحظة أن أقل معدل انتشار كان بين الطلاب بعمر 16-17 عاماً (6%). كما وُجد أن أكثر من الثلث 35.7% من الطلاب الذين أصابهم صداع بشكل متكرر كحادث عرضي قد تغيبوا عن المدرسة.

خاتمة: يعتبر الصداع المتكرر أكثر انتشاراً بين طلاب المرحلة الثانوية، و بين الإناث خاصة. لقد تمت مقارنة معدلات الانتشار هذه مع نتائج أخرى لدراسات مشابهة في مناطق أخرى. وعليه، ننصح كلا من مجلس التعليم، الوحدات الصحية المدرسية، العيادات الأولية، والمجتمع بشكل عام، زيادة الاهتمام بتلك المشكلة العصبية الشائعة بين المراهقين.

Objectives: To determine the prevalence of headache and migraine, to identify symptoms that accompany headache attack, and to determine the possible effect of headache on school attendance, among high school students.

Methods: A cross-sectional, questionnaire-based study of secondary school students of the National Guard Housing in Riyadh, Kingdom of Saudi Arabia, was executed during the academic year of 2002 and 2003. A sample of 1750 students was included from 4 schools by systemic random sampling for each school. The questionnaire included demographic data. The second part includes specific questions on headache, and whether there had been headache in the year preceding the survey, type of headache, and its diagnosis according to International Headache Society (IHS) criteria. Possible effect of headache on school attendance was recorded.

Results: Approximately one-third of the entire study sample had recurrent headache episodes not related to febrile illness in the year preceding the survey. Female students showed a significantly higher prevalence than males of migraine, as well as non-migraine headache, with the least prevalence among the younger students of ages 16-17 years. More than one-third of all students were absent from school due to headache.

Conclusion: Recurrent headache is prevalent among the high school students, and more among female students. These prevalence rates are comparable with those reported elsewhere. Health education sessions at schools, primary care clinics, and the society in general are recommended to increase awareness for this common adolescent's neurological problem.

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Headache is a common reason for consultation in both adult and pediatric neurology clinics.^{1,2} The epidemiology of headache in children and adolescents has been well studied in western countries, but very little similar information has been recorded in developing countries.³⁻⁵ In addition, results from the different studies have been extremely variable.^{3,4} The reported prevalence of headache in children has ranged from 25-82%.^{3,4} Migraine is said to be the most common cause of primary headache in children.^{2,3} Studies in Europe and the USA has reported a prevalence of migraine in adolescents ranging from 2.7-22%.⁶⁻¹⁰ As many migraines sufferers, especially the mild ones, do not consult doctors, and are not medically diagnosed; studies based on medical diagnosis and self-diagnosis underestimate migraine prevalence.¹¹ Furthermore, much less is known on the prevalence and cause of headache in the non-hospital population among school children.⁷ The International Headache Society (IHS) has facilitated epidemiological research on headache by providing uniform case definitions for the broad range of disorders that produce headache.¹² We conducted the present study in Riyadh, Saudi Arabia aiming to determine the prevalence rate of headache and migraine, as defined by IHS criteria, to identify symptoms that accompany headache attacks, and to understand the impact of headache on school attendance, among secondary school students in Riyadh, Saudi Arabia.

Methods. Riyadh City has 6 million inhabitants. Of those, 60,000 live in the King Abdulaziz National Guard Housing City, East quarter of Riyadh, Kingdom of Saudi Arabia. The student population there is around 18,000. Approximately 40% of all students attend 18 schools for intermediate and secondary education (9 for boys and 9 for girls). Using an equal allocation method of sampling, 4 schools were selected at random to represent intermediate and secondary schools of both genders. Thus, a total of 1750 students of the National Guard Housing in Riyadh during the academic year of 2002 and 2003, constituted the target of the present study. A cross-sectional study was performed on students, using a self-administered questionnaire. The first part of the questionnaire was designed to collect demographic data, and whether there had been headache in the year preceding the survey. If the answer to this question was yes, the student was asked to complete the second part of the questionnaire, which contained questions regarding the number of episodes of headache, their duration, and if they were related to febrile illnesses. Type of headache and its diagnosis was defined according to the IHS criteria.¹² Possible effect of headache on school attendance was recorded

Data was then computed using Microsoft Excel Worksheet and Statistical Package for the Social Science (SPSS) version 15. This study was approved by the Institute Review Board of King Abdulaziz Medical City National Guard Health Affairs, Riyadh, KSA.

Results. Approximately one-third of the entire study sample had recurrent headache episodes not related to febrile illness in the year preceding the survey. Female students showed a significantly higher prevalence than males with migraine, as well as non-migraine headache. Both migraine and non-migraine headaches were more prevalent among girls than among boys. However, this gender difference was evident only among students aged 18-19 years (Tables 1 & 2). The prevalence of migraine was significantly associated with age, only among girls, with the least prevalence among the young students of ages 16-17 years, as compared with the prevalence of the 2 older groups (Table 1). Female students aged 18 years or more were approximately 2 times more likely to contract migraine than those below 18 years of age. However, non-migraine headache was not significantly associated with age in either gender (Table 2). More than one-third of all students, who had recurrent headache episodes not related to febrile illness in the year preceding the survey were absent from the school due to headache. This figure was significantly higher for migraine than for non-migraine headache. School absenteeism was significantly more prevalent among boys than among girls. This was evident for both migraine and non-migraine headache (Table 3). Table 4 shows the frequency of symptoms commonly associated with migraine among the 538 students who had a recurrent migraine in the year preceding the survey. Both the increased intensity of pain with physical activity and the pulsating pain ranked first, followed by unilateralism, then phonophobia and photophobia, while nausea and vomiting ranked last.

Discussion. Headache is a common complaint for children, although it may be under-recognized. A number of studies have examined the prevalence of headache and migraine in children and adolescents. Results of these studies are variable and may be attributable to variations in case definitions, methodology, and socio-demographic differences in the subject population themselves. Some studies have assessed lifetime prevalence, while others have examined one-year prevalence. The age group included also varies, and few age-specific and age adjusted prevalence rates are available. Some studies were community based, while others assessed prevalence rates in school children. Finally, the definition of migraine was based on IHS criteria in some studies, while in others it was based on Vahlquist or Prensly criteria.¹³

Table 1 - Prevalence of migraine among high school students by age and sex.

Age group (years)	Prevalence of migraine										Gender difference			
	Boys				Girls				Total		χ^2	P-value		
	Total	n	(%)	OR	Total	n	(%)	OR	Total	n			(%)	OR
16-17	270	11	(4.1)	1	334	20	(6.0)	1	604	31	(5.1)	1	1.12	0.29
18-19	497	37	(7.4)	1.89	346	42	(12.1)	2.18	843	79	(9.4)	1.24	5.29	0.02‡
20-21	117	8	(6.8)	1.73	62	7	(11.3)	2.0	179	15	(8.4)	1.10	1.05	0.31
Total	884	56	(6.3)		742	69	(9.3)		1626	125	(7.7)		6.80*	0.009‡
	$\chi^2=2.09, \dagger p=0.15$				$\chi^2=6.10, p=0.014^*$				$\chi^2=0.32, p=0.57$					

*Mantel-Haenszel Chi-square test was applied, †Chi square test for linear trend was applied, ‡Statistically significant difference

Table 2 - Prevalence of non-migraine headache among high school students by age and sex.

Age group (years)	Prevalence of non-migraine										Gender difference			
	Boys				Girls				Total		χ^2	P-value		
	Total	n	(%)	OR	Total	n	(%)	OR	Total	n			(%)	OR
16-17	270	56	(20.7)	1	334	88	(26.3)	1	604	144	(23.8)	1	2.58	0.10
18-19	497	108	(21.7)	1.06	346	112	(32.4)	1.34	843	220	(26.1)	1.15	11.97	<0.0006‡
20-21	117	30	(25.6)	1.32	62	19	(30.6)	1.24	179	49	(27.4)	1.20	0.33	0.56
Total	884	194	(22.0)		742	219	(29.5)		1626	413	(25.4)		13.05*	0.0003‡
	$\chi^2=0.93, \dagger p=0.34$				$\chi^2=2.06, \dagger p=0.15$				$\chi^2=1.45, \dagger p=0.23$					

*Mantel-Haenszel Chi-square test was applied, †Chi square test for linear trend was applied, ‡Statistically significant difference

Table 3 - Frequency (%) of school absenteeism due to headache by type of headache and gender.

Types of headache	Frequency of school absenteeism								Gender difference			
	Boys			Girls			Total		χ^2	P-value		
	Total	n	(%)	Total	n	(%)	Total	n			(%)	
Migraine	56	42	(75.0)	69	29	(42.0)	125	71	(56.8)	12.38	<0.001 [*]	
Non-migraine	194	75	(38.7)	219	46	(21.0)	413	121	(29.3)	14.64	<0.001 [*]	
Total	250	117	(46.8)	288	75	(13.9)	538	192	(35.7)	24.23	<0.001[*]	
	$\chi^2=21.61, p<0.001$			$\chi^2=10.97, p<0.001$			$\chi^2=30.44, p<0.001$					

*Statistically significant difference

Table 4 - Frequency (%) of symptoms that were commonly associated with migraine among high school students (N=538).

Symptom	n	(%)	95% Confidence interval
Increased intensity with physical activity	436	(81)	78-84
Pulsating pain	414	(77)	73-81
Unilateralism	338	(63)	59-67
Phonophobia	290	(54)	50-58
Photophobia	279	(52)	48-56
Nausea and vomiting	188	(35)	31-39

The overall prevalence of recurrent headache in our study was 33.1% (38.8% for girls and 28.3% for boys). For children and the adolescent population, the reported prevalence rate has varied from 24-90%, but the study reporting the higher prevalence included subjects up to 29 years of age.^{10,14} A local study carried out by Bille¹ examined 1181 school children in grade 1 - grade 9 (younger than our subjects) randomly selected from 8 schools in Riyadh. The prevalence rate of recurrent headache was 44% (which is slightly higher than our result). Another study was performed in the Persian Gulf region, by Bener et al,¹¹ among United Arab Emirate National children. The prevalence rate of headache was 36.9%, which is nearly similar to ours. Our rate was also slightly lower than that reported in the United Kingdom by Abu-Arefeh and Russell,⁷ that employed a slightly different methodology (interview at general practice), the prevalence rate of recurrent headache was 29% (41% boys and 37% girls).

Girls have tended to have higher headache prevalence than boys.^{7-10,13,14} Migraine was reported to be more common in females than in males.^{9,10} This feature was present in our study population, where female students showed significantly higher prevalence of both migraine and non-migraine headaches. This gender difference was evident in the age group of 18-19 years, a finding that might reflect the possible role of different hormonal and pubertal changes during this period in males than in females whose puberty starts earlier.

Similar to other studies,^{7,8,10,13,17} our data showed that the prevalence of headache was increasing with age, with the highest prevalence rate of headache (35.8%) occurring among those aged 20-21 years. It is well known that migraine headache prevalence rates increase at puberty for females and continue to increase up to the menopausal age, a pattern taken to indicate a role for estrogens in headache pathogenesis.^{8,10,15} The increase is more difficult to explain in boys, although the prevalence of migraine in males has also been shown to increase with age (up to aged 40).¹⁵ Non-migraine headache, mostly of tension type, also increased with age in our study with a female predominance.

The effect of migraine on children's education is difficult to assess in isolation from other confounding factors.⁷ Bener et al¹¹ reported that 30.4% of students with migraine have school absence due to headache. The present study showed that 56.8% of students with migraine had school absenteeism due to headache, with significantly higher rate among males than among females ($p < 0.001$). This gender difference might be explained by the possible difference in the perception of pain in both genders.

Apart from the duration of headache (>4 hours), which is a mandatory criterion for IHS migraine diagnosis, increased intensity with physical activity appeared to

be the most associated symptom for migraine, followed by pulsating pain, and unilateral pain. Similar data was reported by Winner et al,¹⁰ when he studied migraine characteristics in adolescents, and reported migraine was aggravated by physical activity in most of the adolescents (88%), 74% had pulsating pain, and 58% had unilateral pain. None of these features occurred in all patients who meet a strict definition of migraine, and no single symptom is required for diagnosis. Thus, physicians who required unilateral pain as a criterion for diagnosis would miss 37% of cases. The least associated symptom was nausea or vomiting. Similar results were reported in the previous study (80%).¹

In conclusion, the prevalence of headache, and migraine among school children in Saudi Arabia is similar to other parts of the world. Non-migrainous headache is the most frequent, and their prevalence rates increase with age. Adolescents with migraine are characterized by pulsating pain, which is unilateral and aggravated by activity. This study provides initial insight into this common adolescent's neurological problem. Further studies will clarify the picture and help us to provide better care for this population. From the above data, it was concluded that the prevalence of migraine headache was underestimated in our culture, this might lead to more suffering of the the headaches sufferers and this adversely affects the quality of life. So the threshold of awareness should be low, so that more cases would be detected early. To achieve this goal, we recommend health education sessions at their schools, primary care settings, and the society at large. The team has produced a small booklet on migraine and their diagnosis management.

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