International Journal of Contemporary Pediatrics
Galal SB et al. Int J Contemp Pediatr. 2017 Nov;4(6):1914-1921
http://www.ijpediatrics.com
pISSN 2349-3283 | eISSN 2349-3291

DOI: http://dx.doi.org/10.18203/2349-3291.ijcp20174721

Original Research Article

Secondary analysis on self-reported headaches among male and female school adolescents

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Received: 09 August 2017
Accepted: 04 September 2017

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ABSTRACT

Background: Recurrent headaches might be an indication of an underlying disease. It could interfere with the quality of life, school attendance and performance, and daily activities. This study aims to identify factors associated to headaches among male and female adolescents.
Methods: This is a secondary analysis of a sample of 548 adolescents of a data set of 863 adolescent students aged 12 to 18 years assessed through a self-administered health questionnaire. The primary survey design was a multistage stratified random sample from preparatory and secondary schools in Cairo and rural areas in Qaliubia governorate, Egypt. No distinction was made between primary and secondary headache. Around 65% of the primary data base was randomly selected by SPSS. Taking gender into consideration, adolescents suffering from at least one headache a week (342) were compared with those who had no complaints of a headache (206).
Results: Headaches were reported among 62.4% of the adolescents studied with a significantly higher number of female than male students reporting headaches; 69.9% versus 55.8%. Adolescent males and females with headaches have significantly more weekly symptoms of any disease than those without (18.7% versus 6.8%). They also suffer significantly more abdominal pain, sleep disturbance, feelings of nervousness or dizziness. Significantly more adolescent females (29.1%) suffer from chronic headaches (4-7 times/week) than their male counterparts (8%).
Conclusions: Adolescents who play sports have significantly fewer headaches. The most relevant factors associated with headaches with binary regression were dizziness (OR=2), abdominal pain (OR=1.34), sleep disturbance (OR=1.25), and feeling nervous (OR=1.24).

Keywords: Adolescents, Contributing-factors, Dizziness, Egypt, Headaches, Self-reported

INTRODUCTION

Approximately one-fifth of the world's populations are adolescents (10-19 years) with more than 80% living in developing countries. Adolescents represent 22% of the Egyptian population.[1] Adolescence period is a critical stage of life marked by physical, psychological and social changes. It is a transitional foundational period of development that is liable to change from a neurobiological, behavioral, and psychosocial perspective.[2] Headache refers to a pain in the area of the head as an outcome of an interaction of biological, psychological or social factors. It is one of the most mentioned health complaints in adolescents.[3]

Globally, around 60% of children and adolescents are liable to headache and may have attacks of variable frequency. Pre-pubescent boys are more frequently affected than pre-pubescent girls, however, after the onset of puberty, headaches occur more frequently in girls.[4] A systematic review of population-based studies on headaches and migraines in children and adolescents estimated that the prevalence of headaches and migraines ranges between 58.4% and 7.7%; adolescent females

were more likely than adolescent males to have headaches and migraines.[5] The prevalence of headaches in Arab countries varied from 8-12% in Saudi Arabia to 72.5% in Qatar and 83.6% in Oman.[6]

Although, the majority of childhood headaches are primary a benign problem or caused by an acute viral infection, headaches can be a sign of a serious underlying condition. Recurrent headaches may be a symptom of a wide range of neurobiological disorders which vary in severity, incidence and duration from mild self-limiting to very serious.[7] Secondary causes of headaches include trauma, intra-cerebral hemorrhage, inflammation of the brain or meningitis, malignancy, glaucoma and carbon monoxide poisoning.[8]

Most healthcare professionals and the public tend to perceive adolescents as a relatively disease-free group which leads to a neglect of their health.[9] In addition, headaches are considered one of the commonest conditions treated without professional advice and the majority of children who have headaches do not seek medical care, as most common causes of recurrent headaches are adequately treated with simple analgesics.[5] Headaches have a profound impact on the quality of life of children and adolescents and they may cause a significant dysfunction and disability for the child and family.[10] Therefore they should be properly managed in order to address associated risk factors, reduce disability and enhance function.[7]

Self-reported health indicators in adolescent seem to be more appropriate from surveys than health indicators based on medical records or medical statistics.[11] Epidemiological data of headaches in Egypt is limited. We therefore, conducted this analysis in order to investigate and identify factors associated to headaches among Egyptian adolescents.

METHODS

This is a secondary analysis of a sample of 548 adolescents from the primary data of 863 adolescent students aged 12 to 18 years from their self-reported health study.[12] The survey design was a multistage stratified random sample from preparatory and secondary schools in Cairo and rural areas in Qaliubia governorate, Egypt. Nearly 63% of students in the primary research reported having headaches.

Sample size

Around 65% of the primary database was randomly selected by SPSS version 21 for the analysis. Those with missing values in relation to headache were excluded making 548 cases. Adolescents suffering at least once a week headache (342) were compared with those who had no headache complain (206) taking gender into consideration. No distinction was made between primary and secondary headache.[13]

Tool of study

In the primary study, a self-administered questionnaire was used adopted from the health of youth questionnaire and was adjusted to the Egyptian culture.[14] The data included gender, age, residence, living conditions and schoolmate's relation. In addition, the weekly frequency of headache, diseases or symptoms such as abdominal pain, dizziness, feeling nervous, sleep disturbance, and medications used to relieve headache or pain and the practice of physical activity were included.[15]

The scores for 'psychic tension' and depression range from 0-18 (6 items each). The split-half reliability test of the depression score was r = 0.76 and r = 0.73 for the 'psychic tension' score. In order to distinguish chronic headaches from other headaches found among adolescents, we adopted partially Mack and Gladstein definition of chronic headaches as 'greater than or equal to 15 headache days per month.[16] Adolescents with 4 times or more headaches per week were distinguished from those who suffered only 1-3 times headaches a week.

Ethical consideration

The secondary researchers were granted permission to access the raw dataset and the protocol followed by the primary researchers.

Statistical analysis

The statistical analysis of data was performed with SPSS version 21. Qualitative data was presented by frequency and percentage. Quantitative data was presented by mean±SD. Chi-square (X^2) and Kendall Tau b test and t-test were used for comparison of those with headache and those without. ANOVA (F) test was used for comparison between means of more than two groups. Binary regression analysis was used to identify the most relevant risk factors to headaches among adolescents. The level of significance was considered at p-value ≤ 0.05 with 95% confidence level. The results were presented by tables and figures.

RESULTS

Table 1 shows the socio-economic characteristics of adolescents with and without headaches. In total 62.4% of adolescents suffer from headaches, with significantly more female students suffering from headaches (69.9%) than their male counterparts (55.8%). The trend shows that headaches increase with age.

However, there was no significant difference regarding residence, and acceptance from schoolmates between either group. Those who play sports have significantly less headaches.

Over 90% of those with and without headaches live with both parents and show no significant difference (p=0.8). There is no significant difference between those living in urban or rural areas (Table 1).

Table 1: Socio-economic characteristics of adolescents with and without headaches.

	Adolescents with headache N=342 (62.4%)	Adolescents without headache N=206 (37.6%)	Significance test	p value
Gender: row %				
Male	163 (55.8)	129 (44.2)	Chi-square = 38.58	0.00*
Female	179 (69.9)	77 (30.1)		
Age (years): row %				
12	45 (60.8)	29 (39.2)	Chi-square = 10.3 Kendall-tau b =2.2	0.1 0.03*
13	54 (55.1)	44 (44.9)		
14	81 (62.8)	48 (37.2)		
15	48 (55.2)	39 (44.8)		
16	45 (68.2)	21 (31.8)		
17	40 (71.4)	16 (28.6)		
18	27 (76.3)	9 (23.7)		
Residence: row %				
Rural	62.4	37.6	Chi-square = 0.00	0.9
Urban	62.4	37.6		
Living conditions	**%**	**%**	Chi-square = 10.1	0.02*
Very good	16.4	27.7		
Good	37.7	34.0		
Middle	41.2	34.5		
Below middle	4.7	3.9		
Acceptance by school mates				
Yes	77.9	79.5	Chi-square = 0.8	0.6
Somehow	20.1	17.6		
No	2.0	2.9		
Practicing sport				
Yes	53.5	68.0	Chi-square =11.1	0.00*
No	46.5	32.0		

*Significant

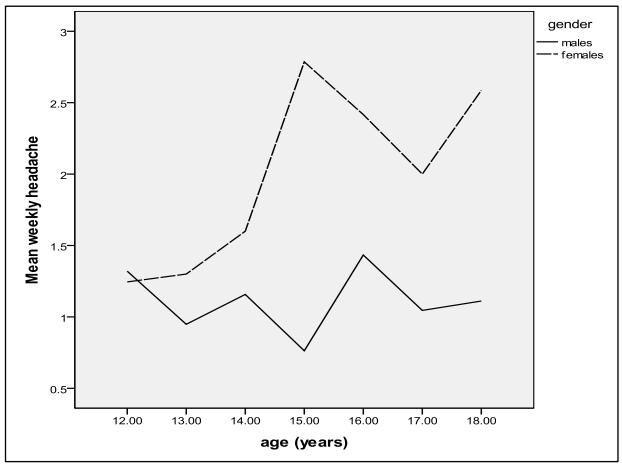

Figure 1: Mean weekly occurrences of headaches among adolescent females and males.

Table 2 illustrates weekly symptoms among gender with and without headaches. Adolescent males and females with headaches have significantly more diseases than those without (18.7% versus 6.8%). They suffer from more abdominal pain, disturbed sleep, feeling of nervousness or dizziness.

They also have higher scores of 'psychic tension' and depression than those without headaches. In general, females have higher percentages and scores than males for all of these complaints except in regard to diseases Table 2.

Table 3 display weekly headache occurrences among adolescent females and males. Significantly more females (29.1%) suffer from chronic headache (4-7 times/week) than males (8%). There is no significant difference between females (49.7 %) and males (42.3%) in taking medication to relieve headache. Females experience an increase in headache with age, while this doesn't change significantly in males Table 3. The mean number of headaches per week was significantly higher among adolescent females than males (Figure 1).

Table 2: Weekly symptoms among gender with and without headaches.

	% With headache (342)		% Without headache (206)		Significance test	P
Having symptoms or complains 1-7 times per week	**Male N=163**	**Female N=179**	**Male N=129**	**Female N=77**		
Any disease						
Yes	19.1	18.4	7.1	6.5	Chi-square = 8.7	0.00*
No	80.9	81.6	92.9	93.5		
Feeling dizzy						
Yes	32.5	46.9	10.9	10.4	Chi-square = 53.9	0.00*
No	67.5	53.1	89.1	89.6		
Feeling nervous						
Yes	42.9	60.9	11.6	26.0	Chi-square = 34.2	0.00*
No	57.1	39.1	88.4	74.0		
Sleep disturbance						
Yes	37.4	47.5	9.3	15.6	Chi-square =30.4	0.00*
No	62.6	52.5	84.4	90.7		
Abdominal pain						
Yes	42.9	62.0	10.9	32.2	Chi-square = 61.8	0.00*
No	57.1	38.0	89.1	67.8		
	Mean ± SD				ANOVA	
Psychic tension score	5.7±2.9	7.1±3.5	4.3±2.9	5.4±3.4	F = 11.7	0.00*
Depression score	5.3±3.3	7.9±4.7	3.8±2.8	6.2±4.3	F = 11.8	0.00*

*significant

Table 3: Weekly headache occurrences among adolescent females and males.

	Adolescents with headache				
	Male N=163	**(%)**	**Female N=179**	**(%)**	**Significance test; p-value**
Occurrence of headache per week					
1	77	(47.2)	58	(32.4)	
2	44	(27.0)	41	(22.9)	
3	29	(17.8)	28	(15.6)	Chi-square = 27.2 P=0.00*
4	8	(4.9)	19	(10.6)	
5	3	(1.8)	20	(11.2)	
6	1	(0.6)	6	(3.4)	
7	1	(0.6)	7	(3.9)	
Headache					
1-3 times/week	92.0		70.9		Chi-square = 33.79 P=0.00*
4-7 times/week	8.0		29.1		
Taking medication					
Yes	42.3		49.7		Chi-square = 1.9 P=0.2
No	57.7		50.3		
	Mean number of headache per week±SD				
Age (years)					
12	1.3±1.6		1.2±1.5		
13	0.9±1.1		1.3±1.7		
14	1.2±1.2		1.6±1.7		
15	0.8±1.0		2.8±2.3		
16	1.4±1.6		2.4±2.0		
17	1.0±1.1		2.0±1.8		
18	1.1±1.5		2.6±1.9		
ANOVA	F=1.3, p=0.2		F=4.2	p=0.00*	

Table 4 demonstrates the logistic regression analysis of the most relevant factors of headaches in all adolescents; being female, dizziness (odd ratio = 2), abdominal pain (OR = 1.34), sleep disturbance (OR = 1.25) and feeling nervous (OR = 1.24). While, among adolescent males and females; dizziness for both genders is important. Among males' sleep disturbance (odd ratio = 1.51) is significant,

while among females' abdominal pain (OR = 1.37; p = 0.01) is significant Table 4.

DISCUSSION

Identification of the factors that contribute to headaches among adolescents is of great importance for planning a prevention and control program. Headaches are common symptom and complaint in pediatric practice, however, consultation rates do not reveal the true prevalence given that the majority of adolescents who have health problems do not seek medical care.[17] Headache represents a common disabling health problem among 58.4% of school age children in Ain Helwan district, Cairo, Egypt.[18] Similarly, this secondary analysis found that 62.4% of adolescents studied reported headaches.

Table 4: Binary regression analysis of the most relevant factors to headache occurrence in males and females adolescents with headache.

Variable	β -coefficient		p-value		Odd ratio		(95% confidence interval)	
Sex	0.268		0.105		1.307		(0.95-1.81)	
Weekly times of feeling dizzy	0.697		0.000		2.008		(1.56-2.59)	
Psychic tension score	0.080		0.003		1.083		(1.03-1.14)	
Weekly times of sleep disturbance	0.225		0.012		1.252		(1.05-1.49)	
Weekly time of feeling nervous	0.219		0.001		1.245		(1.1-1.41)	
Weekly times of abdominal pain	0.294		0.001		1.342		(1.12-1.6)	
By gender	**Males**	**Females**	**Males**	**Females**	**Males**	**Females**	**Males**	**Females**
Weekly times of feeling dizzy	0.663	0.769	0.00	0.00	1.94	2.16	(1.39-2.7)	(1.43-3.2)
Psychic tension score	0.090	0.076	0.01	0.058	1.09	1.08	(1.02-1.17)	(0.99-1.1)
Weekly times of sleep disturbance	0.414	0.062	0.004	0.60	1.51	1.06	(1.14-2.0)	(0.84-1.3)
Weekly time of feeling nervous	0.23	0.239	0.016	0.009	1.26	1.27	(1.04-1.5)	(1.06-1.5)
Weekly times of abdominal pain	0.237	0.314	0.085	0.01	1.27	1.37	(0.97-1.66)	(1.08-1.7)

Demographic characteristics

Bigal et al reported that a low household income correlated with chronic migraine among those without a family history of migraine, thus suggesting a social cause.[19] Moreover, psychological and socioeconomic factors like depression, lower household economic status, and acute family financial distress were predictors for incident chronic migraines or chronic daily headaches.[20] In present analysis, middle and low-income adolescents have a significantly higher number of headaches, while the area of residence, living with both or single parents household, and the acceptance by schoolmates were not significantly different between those suffering from headaches and those without. The socio-economic factors are therefore, likely stress factors for adolescents.

Roh reported that the frequency of migraines and tension-type headaches increased with age.[21] This is similar to the present findings, as we found that headaches tend to increase with age. However, the present findings focus on headaches in general, without distinguishing between primary and secondary headache. Contrary, Talebian et al reported no association between primary headaches (migraine, tension-type headache) and age.[22] This might be different for secondary headaches. Kroner-Herwig and Gassmann found that primary headaches were significantly higher among females.[23] This is similar to this analysis in which significantly more female students reported suffering from headaches than male students.

Gender differences

Fearon and Hotopf mentioned that by age 11, significantly more females have frequent headaches.[24] This study found that, as of the age 13, adolescent females have significantly more headaches than males. Either the age of menarche has changed or it differs from one population to the other. A possible cause could be the effects of estrogen on the nervous system among girls.[25] The chronic daily headaches and chronic tension-type headaches were significantly higher in girls than boys.[26] In the present analysis, adolescent females suffer from chronic headaches (4-7 times/week) significantly more

than males. Headache episodes increase with age in females while it doesn't change significantly in males. The social stress and limitations on girls can increase the prevalence of headaches.[27] Conversely, other studies mentioned that the prevalence of migraines was greater among males and gender was not a factor related to types of primary headache in any age group as it is unknown whether sex hormones contribute to this phenomenon or not.[20,22,28,29]

Associated factors

Physical inactivity was significantly associated with migraine and related to tension- type headaches.[30] This is in accordance with results of this study, where adolescents who play sport have significantly less headaches.

Lipton mentioned that headaches are often triggered by stress, sleep deprivation, menstruation, and can cause symptoms like head pain, dizziness, stomachaches, nausea and/or vomiting.[31] The male and female adolescents with headaches studied have significantly more abdominal pain, disturbed sleep, feelings of nervousness or dizziness than those without headaches. Children with headaches may complain of other physical and psychiatric symptoms; headaches are the most frequently reported pain in children followed by abdominal and musculoskeletal pain.[17,24] The combination of dizziness and headaches was the most common justification for referral to vestibular testing among teenagers.[32]

The most relevant factors to headache among the studied adolescents were feeling dizzy, abdominal pain, sleep disturbance, feeling nervous and psychic tension score. This in agreement with Miller et al who reported a high prevalence of sleep disorders in children with migraines and Isik et al, who demonstrated a link between of migraines and parasomnia (teeth grinding, sleep verbalization, nightmares, bedtime struggle, and sleep walking).[33,34] Additionally, those who reported more frequent or more painful headaches episodes were prevalently women, with more frequent sleep disorders.[35] Additionally, sleep disorders were the most significantly associated factors with migraine headaches.[22] Accordingly, prompt diagnosis and treatment of children with recurrent or significant headaches is essential to reduce headache-related disability and to improve adolescents' quality of life.[21]

Children with chronic daily headaches may be at increased risk of comorbid psychiatric conditions.[36] Psychiatric comorbidity was identified among up to 65.5% of children and adolescents with migraines.[37] Present results indicated higher scores of psychological tension and depression among adolescents with headaches than those without. These were higher among females in comparison to males but they did not indicate psychiatric comorbidity.

In this analysis, we were unable to distinguish whether dizziness or abdominal pain are related to headaches or other diseases. Similar to headaches, sleep disturbance might be due to biological, psychological or social factors. The question that arises is whether sleep disturbances lead to headache or vice versa.

Self-medication

Other studies revealed that most adolescents reported use of self-medication to alleviate pain and only 26.3% of them consider seeking medical care for headaches.[38,39] Less than half of the adolescents in this study take medication to relieve headaches. Considering that the overuse of headache medication is believed to worsen headaches.[40] In addition to this, chronic headaches and the overuse of medication could constitute a vicious cycle possibly leading to drug addiction. It is important to inform the population about the consequences of frequent use of non-prescribed headache medications.[39]

Children with headache are at a higher risk of experiencing recurring headaches during adulthood; accordingly, strategies for coping with psychosocial adversity in childhood may improve the prognosis in adulthood.[24] Therefore a healthy lifestyle including regular physical exercise, may improve headaches in children and adolescents.[41] Lifestyle modification is the key preventive strategy of headache. Adolescents should be encouraged to improve the extent of their physical activities, their sleep behavior, meal schedules, fluid intake, and stress levels. Management of any adolescent headache is an alliance between the adolescent, parents, and healthcare providers at all levels. Pediatrician should exclude underlying disorders causing the headache in children.[7] It is recommended that primary health care workers carry out early detection, diagnosis and treatment of headaches. Awareness about healthy life-styles should be raised and the misconception that headaches are a common problem that don't require medical attention should be eliminated. Moreover, this study may pave the way for further studies to better understand the epidemiology of headaches among adolescents in Egypt.

This is a secondary analysis study of data collected using a primary survey, indicating adolescents' health status. Headaches were one item, among others, and were not separated into primary and secondary headaches. Family history was not taken. In addition, out-of-school adolescents were not included in this study.

CONCLUSION

Among the school adolescents studied 62.4% reported suffering from headache. Significantly more females reported having headaches and higher weekly frequency of headaches than males. Sleep disturbances, dizziness, higher scores of psychological tension and depression as well as having any disease are significantly associated with headaches. Sleep disturbances seem to affect

headaches more among adolescent males than females, while abdominal pain is relevant for the occurrence of headaches among females. Adolescents who practiced sport have significantly less headaches.

ACKNOWLEDGEMENTS

The authors would like to thank Sarah Keller for editing this article.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Galal SB, Abo-Elkheir OI. Secondary analysis on self-reported headaches among male and female school adolescents. Int J Contemp Pediatr 2017;4:1914-21.