Prevalence of Primary Headache Disorder Among Primary and middle School students in Kuwait.

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Abstract

Background Primary headaches are remarkably prevalent worldwide and increasingly reported among children. However, the exact trend in this age group, particularly in the gulf region, remains scarce. **Aims and Objectives** To examine the prevalence of primary headache disorders among primary and middle school students in Kuwait.

Methods We conducted a cross-sectional study that included Kuwaiti primary and middle school children and adolescents of both genders in randomly selected schools located in two governorates in Kuwait in 2018/2019 academic year. Prevalence and attributable burden of headache, definite and probable migraine, definite and probable tension-type headache, chronic headache ≥ 15 days/month and probable medication over use headache were assessed using the Headache-Attributed Restriction, Disability, Social Handicap and Impaired Participation (HARDSHIP) questionnaire for children and adolescents.

Results Of 1485 questionnaires that were distributed, 1091 students completed the questionnaire with a respondent rate of 73.4%. The study population consisted of 422 boys (38.68%) versus 669 girls (61.32%) students with a mean age of 11.5 ± 2.11 years. The lifetime prevalence of any headache was 85.2%, whereas the one-year prevalence of primary headache disorders was 42.71%. The mean age of students with primary headaches was 11.98 ± 2.03 years in both genders. When stratified according to diagnostic criteria, migraine headaches were the most frequently reported (20.81%) followed by tension type headaches (18.7%), chronic headaches (2.75%), and probable medication-overuse headaches (0.46%). Primary headaches were more frequently reported in middle school compared to primary school (50.37% versus 30.48%; $P < 0.02$). It was significantly higher among girls compared to boys in middle-schoolers (66.46% versus 38.49%; $p < 0.001$), however no significant difference in gender among primary school students (33.12% versus 22.33%; $p < 0.118$).

Conclusion Primary headaches are remarkably common in Kuwaiti school students with migraine headache being the most frequently reported type. Age and female gender play a role in the development of primary headaches. The results attract attention of health services for such group and the need for further epidemiological researches.

Introduction

Headache, or cephalgia, is one of the most common disorders in childhood, with an estimated 75% of children reporting significant headache by the age of 15 years [1]. It is defined as head pain that occurs anywhere in the head or neck areas [2]. Headaches amongst children and adolescents are categorized into primary and secondary headaches; the most common primary headaches constitute migraine headaches, tension-type headaches and cluster headaches. These are paralleled in the same manner amongst adults. In children, headaches are commoner among the older segment than the younger ones being considered rare prior to the age of 4. In particular, the peak age for headaches in children is 13 [3–4]. Headaches are accompanied by a wide range of burdens both to the patient's own quality of life as well as the economy [5–7]. In specific, it was found that school attendance was affected amongst children with headaches [8]. Additionally, the same children are more prone to develop psychiatric disorders such as depression and anxiety as well as other somatic symptoms such as abdominal pain [9–11]. Moreover, approximately 50% of the global population is affected by headaches mounting up to £600 million per annum in the UK and between 5.6–17.2 billion in the US [12]. Prevalence studies concerning headaches are scarce worldwide especially concerning the pediatric and adolescent age groups; in specific, the Arab world including Kuwait are lacking in this entity. Thus, a research of this kind is conducted to shed light onto the prevalence of headaches in children and adolescents. Data of this sort is essential to illustrate the magnitude that headaches possess in Kuwait. Once the burden is recognized, efforts can be implemented to improve the patients' quality of life in the future that can have positive governmental impacts in terms of the economy.

Methods

We conducted a cross-sectional study with a school-based sample whereby a questionnaire was distributed to primary and middle school children aged 7–16 years in governmental schools in Kuwait. Equal boys and girls schools were randomly selected from two major governorates in Kuwait; Al-Farwaniyah, the most densely populated and farther away from the center of the State of Kuwait, and Hawally, which is more urbanized and central in location. These two governorates were chosen to cover the geographic diversity of Kuwait.

Population of Interest

Study population included Kuwaiti schoolchildren aged 7–16 years.

Sample Size

According to the information from Kuwait Ministry of education in academic year 2018/2019, the number of Kuwait students in primary and middle schools is 127653. Of those, 71448 (55.97%) are girls and 56205 (44.03%) are boys. Hence, the sample size was calculated and determined to be 950 using a special formula based on reported prevalence of headache from previous national and international epidemiological studies, which is around 54.4% and of migraine, 9.1% [13–14]. Then, the sample was increased by 20% to overcome the problem of non-response and missing data. Five hundred complete questionnaires were obtained from Al-Farwaniyah governorate and 591 complete questionnaires were obtained from Hawally governorate.

Survey and Sampling

Representative random sample of school classes was selected, stratified by grade (3rd, 5th, 7th, 9th), and school type (school for boys and schools for girls). So, the final selection of schools and school classes that were identified for this study covered age spectrum from childhood through adolescence and reflected Kuwaiti students of schools appropriately. All children and adolescents within these selected classes were included, except for those who refused to participate, were non-Kuwaiti nationals, has history of medical or neurological disease or were absent on the day of the survey.

Of 1485 questionnaires that were distributed, 1091 students completed the questionnaire with a respondent rate of 73.4%. Figure 1 displays the flow chart.

Study Tools

The survey used Lifting the Burden, Headache-Attributed Restriction, Disability, Social Handicap and Impaired Participation (HARDSHIP) questionnaire that was translated into Arabic [15]. The Child HARDSHIP for children aged 6–11 years and Adolescent HARDSHIP questionnaire for adolescents aged 12–17 years were used in this study. The HARDSHIP questionnaire has already demonstrated validity and acceptability in multiple languages and cultures including the Arabic Language. This questionnaire questions including sociodemographic, screening and diagnostic questions and enquiries into burden in various domains and quality of life. The last part of the questionnaire included questions on the use of healthcare system in the past, medication use, and Headache-Attributed Lost Time Index questionnaire. Burden questions referred to the numbers of days missed from school, leaving school early or with impaired everyday activities due to headache, within the previous four weeks. Data were obtained from the children and adolescents themselves after explanation of the questions by physician of the study team. Questionnaire distribution and data collection were organized and conducted by physician supervisors during a school class as a paper-pencil version. To collect study data, well trained physicians conducted face to face interviews using Child and Adolescent HARDSHIP questionnaires

Diagnosis of headache

Diagnoses were performed by HARDSHIP algorithm) applying ICHD-3 criteria is [16–17]. Following the section on personal details and demographic data, a question was introduced: “In the last year, have you had a headache that was not part of another illness?” Participants who responded with “no” were classified as headache-free; those who responded with “yes” were asked whether their headache episodes were of one or more types. If the child reported more than one type of headache, subsequent questions targeted the most bothersome headache type. For diagnosis of headache type, we asked questions about headache frequency and duration, headache characteristics, associated symptoms and use of acute medication. We separated those reporting headache days for 15 or more, and diagnosed probable medication over use headache (pMOH) when acute medication was used on 10 or more days/ month. Participants reporting headache on less than 15 days/month we applied diagnostic criteria, in order, for definite migraine, definite tension type headache (TTH), probable migraine and probable TTH. Participants with headache who fell into none of these categories were categorized as “unclassifiable headache”.

Quality Assurance and Validity

The team leader reliably stored all completed questionnaires at the end of each day. Errors were corrected by discussing them with the interviewer and a revisit was arranged if discrepancies could not be corrected. The team leader monitored and assisted researchers on a regular basis to resolve any problems and to review the completed questionnaires.

Duration of the Project

The fieldwork was carried out over a period of 3 months from 1/10/2018 till 1/1/2019.

Ethics

Ministry of health and ministry of Education in Kuwait approved the study. Participants was given a simple explanation about the aim of the study being considered an ethical issue. Written informed consent was obtained from all participants and their parents before the questionnaire was distributed. The participants were granted the right to decline participation at any time during data collection. All data were protected in accordance with the ethical guidelines of the Council for International Organizations of Medical Sciences and the principles in the Declaration of Helsinki [18–19].

Data Analysis

We used IBM SPSS Statistics 20.0. Completed questionnaire data and double check of all data was made, with inconsistencies reconciled by reference to the original documents. Error rate of 1.9% was identified. One year prevalence for primary headache disorders as percentages with 95% CIs. Adjusted prevalence for gender and school stage according to the participation of the Kuwaiti students was reported. Duration of headache was recorded as continuous data in hours. Headache frequency was recorded in days over the preceding 3 months, and typical headache intensity on a verbal rating scale (“not bad,” “quite bad,” and “very bad”). We used proportions, 95% CIs, means, and SDs to summarize the distributions of variables and chi-square, for significance of differences. $P < 0.05$ was considered as statistically significant.

Results

Table 1 demonstrates the sociodemographic characteristics of the study population. A total of 1091 students participated in the study, of which 420 were primary school students and the remainder were middle school students. The study population consisted of 422 male (38.68%) and 669 female (61.32%) students with the majority being middle schoolers in both genders. The mean age of the participants was 11.5 +/- 2.11 years. Collectively, 85.2% of students reported having any headache at least once in their lifetime, whereas 78.09% students had at least one episode in the past year with most episodes being reported by middle schoolers. The 1-year prevalence of primary headache disorders, however, was found to be 42.71% (Table 1). When stratified according to diagnostic criteria, migraine headaches were the most commonly reported (20.81%) followed by tension type headaches (18.7%), chronic headaches (2.75%), and probable medication-overuse headaches (0.46%).

Table 2 demonstrate the sociodemographic characteristics of students with headache. The mean age of students with primary headaches was 11.98 +/- 2.03 years in both genders. When stratified according to gender, 31.12% of boys experienced primary headaches as compared to 68.88% of girls. Primary headaches were more frequently reported among boys and girls middle-schoolers. Within the past month, students reported a mean of 6.24 +/- 5.18 days of headaches with a mean duration of 9.12 +/- 2.51 hours per attack and a mean of 3.26 +/- 4.2 days of analgesia use. As regards severity, the majority of students (59.44%) labeled their headaches as 'quite bad', whereas 17.38% of students experienced 'very bad' headaches. Headache reporters had to lose a mean of 0.99 +/- 2.015 days off school due to headaches and had to leave school early on a mean of 0.77 +/- 1.69 days.

Table 3 demonstrated the one-year prevalence of primary headache disorders stratified by school stage and gender. Primary headaches were more frequently reported in middle school compared to primary school (50.37% versus 30.48%; $P < 0.01$). Of male students, 22.33% of primary schoolers reported primary headaches as compared to 38.49% of middle schoolers (Table 3). This was similarly observed among females where middle schoolers with primary headaches (66.46%) within the past year were double the number of female primary schoolers (33.12%). The 1-year prevalence of primary headaches was significantly higher among females compared to males in middle-schoolers (66.46% versus 38.49%; $p < 0.001$), however no significant difference in gender among primary school students (33.12% versus 22.33%; $p < 0.118$).

Among primary schoolers, migraine headaches (28.1%) were the most reported in both genders followed by tension type headaches (24.9%) (Table 4). Female primary schoolers reported all types of primary headaches more frequently than their male counterparts but no significant difference among gender.

Similarly, migraine headaches were the most frequently reported type amongst female (29.26%) and male (18.18%) middle schoolers (Table 5). This was followed by tension type headache, chronic headaches, and probable medication-overuse headaches in that order. Female Gender of middle-schoolers was significantly associated with a diagnosis of migraine headache ($P < 0.001$) and tension type headache ($P < 0.0001$).

Table 1
Demographic data and Prevalence of Headache among School Students.

Variables	Total School students N = 1091 M ± SD/No (%) [CI 95%]	Primary School Students N = 420 M ± SD/No (%) [CI 95%]	Middle School Students N = 671 M ± SD/No (%) [CI 95%]
Gender: • Male • Female	422 (38.68%) [35.83–41.61] 669 (61.32%) [58.39–64.17]	103 (24.52%) [20.65–28.86] 317 (75.48%) [71.14–79.35]	317 (47.24%) [43.49–51.03] 352 (52.46%) [48.68–56.21]
Mean Age in years Range	11.50 ± 2.11 7–17	9.20 ± 0.10 7–12	12.94 ± 1.13 10–17
Life time prevalence of Any Headache	929 (85.15%) [82.91–87.14]	312 (74.29%) [69.89–78.24]	617 (91.95%) [89.63–93.79]
One Year Prevalence of Any Headache	852 (78.09%) [75.54–80.45]	271 (64.52%) [59.83–68.95]	581 (86.59%) [83.79–88.97]
One Year Prevalence of Primary Headache disorder	466 (42.71%) [39.81–45.67]	128 (30.48%) [26.26–35.04]	338 (50.37%) [46.60–54.14]
• Migraine	227 (20.81%) [18.50–23.32]	65 (15.48%) [12.32–19.26]	161 (23.99%) [20.91–27.37]
• TTH	204 (18.70%) [16.49–21.12]	55 (13.10%) [10.18–16.68]	150 (22.35%) [19.36–25.66]
• CH	30 (2.75%) [1.92–3.91]	7 (1.67%) [0.74–3.47]	23 (3.43%) [2.27–5.12]
• MOH	5 (0.46%) [0.16–1.1]	1 (0.24%) [0.01–1.48]	4 (0.63%) [0.59–0.66]
TTH: tension type headache; CH: chronic headache; pMOH: probable medication-overuse headache; M: mean, SD: standard deviation; CI 95%: confidence interval 95%			

Table 2
Characters of Primary Headache among school children with Primary Headache Disorders (No = 466)

Variables	Total School students with primary headache N = 466 M ± SD/No (%) [CI 95%]	Primary School Students with primary headache N = 128 M ± SD/No (%) [CI 95%]	Middle School Students with primary headache N = 338 M ± SD/No (%) [CI 95%]
Gender: • Male • Female	145 (31.12%) [27.08–35.46] 321 (68.88%) [64.54–72.92]	23 (17.97%) [12.22–25.59] 105 (82.03%) [74.41–87.78]	216 (63.91%) [58.65–68.85] 122 (36.09%) [31.15–41.35]
Mean Age in years	11.98 ± 2.03	9.22 ± 0.99	13.03 ± 1.16
Range	7–17	7–12	11–17
Number of headache days in the last four weeks	6.24 ± 5.18	5.28 ± 4.82	6.58 ± 5.27
Duration of attacks in hours in the last four weeks	9.12 ± 2.51	8.82 ± 2.16	9.32 ± 3.11
Number of analgesic days in the last four weeks	3.26 ± 4.20	3.03 ± 3.45	3.35 ± 4.45
Severity of headache • Not bad • Quite bad • Very bad	108 (23.18%) [19.57–27.22] 277 (59.44%) [54.92–63.81] 81 (17.38%) [14.20–21.10]	27 (21.09%) [14.87–29.00] 85 (86.94%) [84.68–88.91] 16 (12.50%) [7.74–19.44]	81 (23.96%) [19.71–28.80] 192 (65.80%) [51.48–61.98] 65 (19.23%) [15.37–23.78]
M: mean, SD: standard deviation; CI 95%: confidence interval 95%			

Table 3
One-year prevalence of Primary headache disorders stratified by school stage and gender

Primary headache disorder	Total			Male			Female			P
School class	Participant Students	Headache cases	Prevalence % (CI 95%)	Participant Students	Headache cases	Prevalence % (CI 95%)	Participant Students	Headache cases	Prevalence % (CI 95%)	
Primary School	420	128	30.48% (26.26–35.04)	103	23	22.33% (15.31–31.34)	317	105	33.12 (28.17–38.48)	0.118
Middle School	671	338	50.37% (46.60–54.14)	317	122	38.49% (33.30–43.95)	352	216	66.46% (61.16–71.38)	0.001*
Total	1091	466	42.71% (39.81–45.67)	422	145	34.36% (29.99–39.02)	669	321	47.98% (44.22–51.77)	0.001*
CI 95%: confidence interval; *: significant p value.										

Table 4

One-year prevalence of Types of Primary headache disorders stratified by gender in primary school students (N = 420).

Types of Primary headache disorder	Male (N = 103) N (%) [CI 95%]	Female (N = 317) N (%) [CI 95%]	P
Migraine	11 (10.7%) [15.31–31.34]	44 (17.4%) [28.17–38.48]	0.120
TTH	12 (11.7%) [33.30–43.95]	42 (13.2%) (61.16–71.38)	0.674
CH	0	7 (2.2%) [44.22–51.77]	0.128
pMOH	0	1 (0.3%)	0.568
TTH: tension type headache; CH: chronic headache; pMOH: probable medication-overuse headache; M: mean, SD: standard deviation; CI 95%: confidence interval 95%			

Table 5

One-year prevalence of Types of Primary headache disorders stratified by gender in Middle school students (N = 671).

Types of Primary headache disorder	Male (N = 319) N (%) [CI 95%]	Female (N = 352) N (%) [CI 95%]	P
Migraine	58 (18.18%) [14.32–22.80]	103 (29.26%) [24.75–34.22]	0.001*
TTH	52 (16.30%) [12.63–20.77]	98 (27.84%) [23.41–32.75]	0.0001*
CH	10(3.13%) [1.64–5.75]	13 (3.72%) [3.23–4.23]	0.691
pMOH	2 (0.63%) [0.02–2.41]	2 (0.57%) [0.02–2.19]	0.921
TTH: tension type headache; CH: chronic headache; pMOH: probable medication-overuse headache; M: mean, SD: standard deviation; CI 95%: confidence interval 95%.			

Discussion

Our study included only Kuwaiti students who are resident in Kuwait over last year before the survey. Our results demonstrated that a substantial proportion of Kuwaiti primary and middle school children suffered from primary headache disorders. We reported a 1-year prevalence of primary headaches of 42.71% among our study population. This represents a remarkable difference from the results of our previous epidemiological study that demonstrated a 1-year prevalence of 19.4% of primary headache disorders in children and adolescents approached in the community [13]. This discrepancy can be contributed to the two different approaches in each study. Children approached in their homes may be influenced by the presence of their parents, who in fact may be the major source of the data, potentially underreporting actual figures. On the other hand, children approached in schools self-report their complaints without any parental influence. Nevertheless, our results are fairly comparable to international studies similarly targeting school children. In Turkey, 46.2% of schoolchildren aged 6–10 years were found to have headaches over a 1-year period [20]. In another study conducted in the South Korea [21], 29.1% of schoolchildren of both genders reported having a headache over the past year. These consistent results emphasize the significant magnitude of the young population affected by primary headaches, a diagnosis that was once primarily seen to have an adult predilection. Other studies, on the contrary, reported substantially higher or lower proportions of children with headaches. For example, 75.7% of Austrian schoolchildren and adolescents aged 10–18 years were found to have headaches over a 1-year period [22], while 88% of Dutch elementary and secondary schoolchildren of both genders reported having a headache at least once over the previous year [23]. Many factors could contribute to variations in reported results, including biological, environmental, cultural, geographical and those pertaining to methodological differences and diagnostic criteria used in each study.

Our results found that age played an important role in the development of headaches. It was reported more frequently amongst middle schoolers compared to primary schoolers. This applies to both genders. This was also observed in our previous epidemiological study [13, 24]. In further support of our findings, epidemiologic cross-sectional [24–26] and longitudinal [27] studies show that the prevalence of headaches increases with age. Our findings were in line with an American study that yielded a prevalence of 12.84% amongst 6 to 12 year old versus 21.71% that of 12 to 16 year olds [27]. This was also paralleled in a Canadian study whereby 26.3% of 12- to 13-year-olds and 31.2% of the 14- to 15-year-olds experienced headaches [28]. Gaßmann [29] reported that 3.6% of 8-year-olds and 10.7% of 15-year-olds had at least one headache weekly. Similar results were mirrored in Germany, Southern England, as well as in Italy [27, 30, 31].

We found that most children suffering from migraine headache (20.81%) followed by tension type (18.7%), chronic (2.75%), and probable medication-overuse (0.46%) headaches. This was similarly documented by other studies where migraine headache was followed in frequency by other headache types [18, 32, 33]. In contrast, Rho et al reported tension type headache as the most frequent type among Korean schoolchildren followed by migraine headache [21]. Our results reported a significantly higher 1-year prevalence of primary headaches among females compared to males. This observation was noted in the overall study population (47.98% vs. 34.36%; $P < 0.001$) and among middle schoolers (66.46% vs. 38.49%; $P < 0.001$) but rendered nonsignificant among primary schoolers. This was reiterated by Zwart et al [34], Mehta [32], and our community-based epidemiological study [13], where we found a significantly higher prevalence of headaches among girls.

When stratified according to diagnostic criteria, migraine (29.26% vs. 18.18%; $P < 0.001$) and tension type (27.84% vs. 16.3%; $P < 0.0001$) headaches were more significantly reported among female middle schoolers compared to males. However, differences were not statistically significant among primary schoolers and for other types of headaches among middle schoolers. These findings go in line with other epidemiological studies, including our own [15]. Laurell et al detected a higher rate of migraine and tension type headaches among females [25], a finding that was similarly reported by Lyngberg et al, where the male: female ratio for migraine and tension type headaches was 1:6 and 1:3, respectively [35]. These findings point to an increased risk of females to develop primary headaches, particularly migraine and tension type headaches, compared to their male counterparts. It has been already established in the literature that women are at increased risk of developing migraine headaches and are 3.25 more likely to suffer from migraine than men [36]. From a pathophysiological perspective, the female brain manifests a sex-specific activity that can be detected via functional neuroimaging in terms of cortical regions involved in pain modulation and affective processing, such as the insula and precuneus, display enhanced activation in women [37].

Strengths and Limitations of the Study

Our study had several strengths. It is the first of its kind in Kuwait and the Gulf region providing valuable data on the prevalence of primary headache disorders among children and adolescents and their association with gender. Our study represents a great contribution to the regional and global headache epidemiological dataset by closing gaps in the attributable burden of primary headaches in the region. It generated a large randomized stratified sample representative of the entire country. Information obtained from this study may potentially help in predicting the future trends of primary headaches as well as deciding on the optimal management of this disorder in the pediatric population via strategies similar or different from those used in adults.

Our study has limitations inherent to its retrospective design, including recall bias introduced by answering the questionnaire, and the reliance on self reports of clinical parameters of headaches. Being a cross-sectional study, associations between headache and age and gender could not be interpreted in a causal manner.

Conclusions

Primary headache disorders are remarkably common in children and adolescents of Kuwait and occur in frequencies comparable to elsewhere worldwide. Migraine is the most prevalent type in both genders. Female adolescents have a significantly higher risk of developing migraine and tension type headaches compared to their male counterparts, a finding that was not observed among primary schoolers or with other types of headaches. This suggests an increased propensity of the adolescent female to develop primary headaches possibly mediated by sex-specific phenomena that affect select regions in the female brain.

Abbreviations

Chronic headache

CH

Headache-Attributed Restriction, Disability, Social Handicap and Impaired Participation

HARDSHIP

International Classification of Headache Disorders III

ICHD-III

Probable Medication over use headache

pMOH

Tension Type Headache

TTH

Declarations

Ethics approval and consent to participate

Not applicable

Consent for publication

Not applicable.

Competing interests

No competing interests.

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Authors' contributions

JA-H designed the study and reviewed the manuscript. SF A designed the study, performed statistical analysis, criticized and reviewed the manuscript., AA, SS, AH, SOS, AF performed data collection, data entry and drafted the manuscript, RA reviewed the manuscript All authors read and approved the final manuscript.

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Conflicts of Interest

All authors declare that there are no conflicts of interest.

Data Availability

Source documents are available on request from the Department of Neurology, at administrative section, Ibn Sina Hospital, Safat, Kuwait. P.O.Box 25427, 13115 Safat, Kuwait City, Kuwait.

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Figures

Figure 1

Flow chart of participants. *Non Kuwaiti, has medical or neurological disorder, or younger than 7 years.