

The Prevalence of Headache Among Athletic University Students

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Abstract

Background: Headache is certainly one of the most common medical complaints of general population and one of the important causes of consumption of drugs. Despite its high overall prevalence, the epidemiology of exertional headache is not clear enough.

Objectives: To determine the prevalence of headache in athletic and non-athletic university students and also estimating its variation between different sports fields including concussion prone sports.

Materials and Methods: This cross-sectional study comprised 739 subjects (367 athletes and 372 non-athletes). The present study was carried out on athletic and non-athletic university students aging between 18 to 28 years. An athlete was defined as a person who had at least one year of experience in sports including football, volleyball, basketball, wrestling, boxing, martial arts, track and field, chess, handball and swimming for three sessions a week each lasting at least 2 hours. The random selection of these participants was done by an independent statistical consultant. A questionnaire was used for data collection which was then analyzed by statistical methods.

Results: Our study comprised 739 subjects (367 athletes and 372 non-athletes). Among athletic university students, 152 (41.2%) participants complained of headache. Such a complaint was present in 217 (58.3%) non-athletic university students. This lower prevalence of headache in athletes was statistically significant (P value < 0.001). Among ten different sports fields, the prevalence of headache among wrestlers was significantly higher than others (P value < 0.001).

Conclusions: The prevalence of headache is seemingly lower in athletic university students than non-athletic ones. In addition, among athletes, those who are participating in concussion prone sports especially wrestling experience headache more than athletes of other fields.

Keywords: Headache, Sports-Related Concussion, Prevalence

1. Background

Headache is certainly one of the most common medical complaints of general population and one of the important causes of consumption of drugs. Despite its high overall prevalence, the epidemiology of exertional headache is not clear enough. Up to 50% of athletes of certain fields report regular headaches due to their athletic participation (1).

3.8 million sports-related concussions occur per year. Sports-related concussion may contribute to a vast spectrum of neurocognitive symptoms. Headache is a hallmark symptom of such concussions occurring in up to 86% of sufferers and is associated with number, severity and location of previous concussions (2).

The proper management of sports-related headache requires an adequate understanding of the underlying etiology (3). Furthermore, identifying the effect of exertion on exacerbation of headache is also important thus limiting the decision for further activity of the individual as an athlete (4).

2. Objectives

The purpose of current study is determining the prevalence of headache in athletic and non-athletic youth and also estimating its variation between different sports fields including concussion prone sports.

3. Materials and Methods

This study is a cross-sectional one carried out athletic and non-athletic youth. An athlete was defined as a person who had at least one year of experience in sports including football, volleyball, basketball, wrestling, boxing, martial arts, track and field, chess, handball and swimming for three sessions a week each lasting at least 2 hours. The random selection of these participants was done by an independent statistical consultant. For omitting confounding variables, both groups were selected among Shiraz university students aging between 18 to 28 years old. Finally, 367 athletic university students and 372 non-athletic ones were enrolled in our study. A pre-designed questionnaire was used to assess the subjects'

information retrospectively. All collected data were analyzed by SPSS version 16.0 (Chicago, IL). Chi-square or Fisher's exact test was used in order to compare variables between athletic and non-athletic university students and also between different sports fields. A P value less than 0.05 was considered significant.

4. Results

The mean age of athletic and non-athletic university students were 22.46 ± 2.76 and 23 ± 2.45 respectively. 175 (47.7%) athletes were female and 192 (52.3%) were male (F:M ratio = 0.91). In non-athletic group, 222 (59.7%) female and 150 (40.3%) male university students participated in

our study. Among athletic university students, 152 (41.2%) participants complained of headache. Such a complaint was found in 217 (58.3%) non-athletic university students. This lower prevalence of headache in athletes was statistically significant (P value < 0.001). 84 (55.3%) athletes and 136 (62.7%) non-athletes both with complaint of headache were female (P values = 0.16 and 0.015 respectively). Among ten different sports fields, the prevalence of headache in wrestlers was significantly higher than others (P value < 0.001). In addition, in boxing, martial arts and track and field, the prevalence of headache, however not statistically significant, was high. The prevalence of headache in athletes in ten different sports fields are summarized in Tables 1-3.

Table 1. The Prevalence of Headache in 10 Sports Fields

Sports field	Male	Female	Total Number	Headache ^a
Martial arts	8	2	54	28 (51.9)
Wrestling	28	0	44	28 (63.6)
Track and field	1	22	40	23 (57.5)
Handball	2	17	44	19 (33.3)
Volleyball	2	12	41	14 (34.1)
Football	14	0	71	14 (19.7)
Basketball	5	8	38	13 (34.2)
Swimming	2	4	18	6 (41.4)
Boxing	5	0	10	5 (50)
Chess	1	1	7	2 (28.6)
Total	68	84	367	152 (41.2)

^aValues are expressed as No. (%).

Table 2. Demographic Data

Participants	Athlete	Non-Athlete
Male	192	150
Female	175	222

Table 3. Frequency of Headache Among Athletes and Non-Athletes^a

Participants	Participants With Headache
Athletes	
Female	84 (48)
Male	68(35.4)
Non-athletes	
Female	136 (61.2)
Male	81 (54)

^aValues are expressed as No. (%).

5. Discussion

Our study revealed a lower overall prevalence of headache in the athletic group compared with an age/occupation matched non-athletic group. To date, the estimated prevalence of headache in different sports fields has demonstrated a significant and sometimes controversial difference in comparison with that of the general population. In the distance runners, a higher proportion of migraine headache is reported. The runners suffering from migraine headache were significantly younger than others with no migraine headache and most of them had a previous head injury (5). Despite the higher frequency of headache among the distance runners and similar to our findings, the occurrence of headaches among professional soccer players and also in basketball players appeared to be significantly lower, as compared to that found in the general population (6, 7). Furthermore, the prevalence of headache was reported to be higher in Australian football players than what is estimated in community studies varying between 49% during competitive match play and 60% during training (8).

A migraine attack occurring in the course of an athletic event, particularly contact sports can simulate a serious neurologic emergency (9). Comparing the athletes with no headache, athletes complaining of headache and athletes with characteristics of posttraumatic migraine represented that characteristics of posttraumatic migraine triggered by sports-related concussion are related to the increased neurocognitive dysfunction following a minor traumatic brain injury (10, 11). Concussion is the result of acceleration-deceleration forces applied to a moving brain caused by either a direct trauma or a sudden shearing/rotational force eventually contributing to a traumatic depolarization within the brain and following neurocognitive impairments (12). The higher prevalence of headache among athletes participating in sports associated by more probable concussion including wrestling, boxing and martial arts in our study was similar to findings reported by Guskiewicz et al. and Register-Mihalik et al. (2, 13). Such significant increase in prevalence of headache in concussion prone sports has also been showed in other studies (14, 15). However, in ours, whether the more probability for concussion occurrence is a leading cause of higher prevalence of headache in mentioned sports fields above or not, remains uncertain. Furthermore, according to our data, a high prevalence is seen among athletes involved in track and field where concussion is not so much common.

Sex differences are also believed to affect the frequency of headache reported by athletes. Headache is reported to be reduced in the female athletes after aerobic exercise in contrast to the male gender showing no significant change (16). In contrast, an increased prevalence of migraine was observed in American female basketball players than in men (6). In our study, however, no significant correlation of sports-related headache with gender was found. It was not in line with the results of a study in Tehran (17).

The total number of each sports field participants in our sampling was selected based on the overall number of university students involved in each one. That is why the number of participants in a few fields are strikingly less than others which seems to be one of the defects of our study.

Based on our findings, the prevalence of headache is seemingly lower in athletic university students than non-athletic ones. In addition, among athletes, those who are participating in concussion prone sports fields experience headache more than athletes of other fields. These findings inspire the consideration of physical activity as a reducing factor in headache prevalence and concussion prone sports as an inducing/aggravating factor of neurocognitive symptoms including headache. However, such presumption requires much more studies worldwide in respect to current controversy.

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Footnotes

Authors' Contribution: Study concept and design: Gholamreza Abdollahifard; acquisition of data: Pegah Jahani and Maral Marzban; analysis and interpretation of data: Mohsen Salesi; drafting of the manuscript: Pegah Jahani and Maral Marzban; critical revision of the manuscript for important intellectual content: Gholamreza Abdollahifard; statistical analysis: Mohsen Salesi; administrative, technical, and material support: Mohsen Salesi; study supervision: Gholamreza Abdollahifard.

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References

1. McCrory P. Headaches and exercise. *Sports Med.* 2000;**30**(3):221-9. [PubMed:10999425]
2. Register-Mihalik J, Guskiewicz KM, Mann JD, Shields EW. The effects of headache on clinical measures of neurocognitive function. *Clin J Sport Med.* 2007;**17**(4):282-8. doi: 10.1097/JSM.0b013e31804ca68a. [PubMed: 17620782]
3. Ramadan NM. Sports-related headache. *Curr Pain Headache Rep.* 2004;**8**(4):301-5. [PubMed: 15228890]
4. Swain RA, Kaplan B. Diagnosis, prophylaxis, and treatment of headaches in the athlete. *South Med J.* 1997;**90**(9):878-88. [PubMed: 9305295]
5. Swain R, Rosencrance G. Headache occurrence and classification among distance runners. *W V Med J.* 1999;**95**(2):76-9. [PubMed: 10214096]
6. Kinart CM, Cuppett MM, Berg K. Prevalence of migraines in NCAA division I male and female basketball players. National Collegiate Athletic Association. *Headache.* 2002;**42**(7):620-9. [PubMed: 12482214]
7. Mainardi F, Alicicco E, Maggioni F, Devetag F, Lisotto C, Zanchin G. Headache and soccer: a survey in professional soccer players of the Italian "Serie A". *Neurol Sci.* 2009;**30**(1):33-6. doi: 10.1007/s10072-009-0021-2. [PubMed: 19169623]
8. McCrory P, Heywood J, Coffey C. Prevalence of headache in Australian footballers. *Br J Sports Med.* 2005;**39**(2):e10. doi: 10.1136/bjism.2004.014860. [PubMed: 15665188]
9. Bennett DR, Fuenning SI, Sullivan G, Weber J. Migraine precipitated by head trauma in athletes. *Am J Sports Med.* 1980;**8**(3):202-5. [PubMed: 7377455]

10. Mihalik JP, Stump JE, Collins MW, Lovell MR, Field M, Maroon JC. Posttraumatic migraine characteristics in athletes following sports-related concussion. *J Neurosurg*. 2005;**102**(5):850-5. doi: 10.3171/jns.2005.102.5.0850. [PubMed: 15926709]
11. Register-Mihalik JK, Mihalik JP, Guskiewicz KM. Balance deficits after sports-related concussion in individuals reporting posttraumatic headache. *Neurosurgery*. 2008;**63**(1):76-80. doi: 10.1227/01.neu.0000335073.39728.ce. [PubMed: 18728571]
12. Asplund CA, McKeag DB, Olsen CH. Sport-related concussion: factors associated with prolonged return to play. *Clin J Sport Med*. 2004;**14**(6):339-43. [PubMed: 15523205]
13. Guskiewicz KM, Weaver NL, Padua DA, Garrett WJ. Epidemiology of concussion in collegiate and high school football players. *Am J Sports Med*. 2000;**28**(5):643-50. [PubMed: 11032218]
14. Moser RS, Schatz P. Enduring effects of concussion in youth athletes. *Arch Clin Neuropsychol*. 2002;**17**(1):91-100. [PubMed: 14589756]
15. Ruchinskas RA, Francis JP, Barth JT. Mild head injury in sports. *Appl Neuropsychol*. 1997;**4**(1):43-9. doi: 10.1207/s15324826an0401_5. [PubMed: 16318494]
16. Gaetz MB, Iverson GL. Sex differences in self-reported symptoms after aerobic exercise in non-injured athletes: implications for concussion management programmes. *Br J Sports Med*. 2009;**43**(7):508-13. doi:10.1136/bjism.2008.051748. [PubMed: 19139034]
17. Rabiee B, Mohammadinejad P, Kordi R, Yunesian M. The Epidemiology of Exertional Headache in the General Population of Tehran, Iran. *Headache*. 2015;**55**(9):1225-32. doi: 10.1111/head.12610. [PubMed: 26198401]