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Clinical signs of vestibular migraine in adolescents

Sinais clínicos da migrânea vestibular em adolescentes

Signos clínicos de la migraña vestibular em adolescentes

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Abstract

Introduction: Migraine is a disabling type of primary headache that, when associated with vertigo attacks, constitutes vestibular migraine. **Objective:** To investigate the main clinical findings of vestibular migraine in adolescents. **Methods:** This is an integrative literature review, with searches conducted in the electronic databases PubMed/Medline, Scientific Electronic Library Online (SciELO), and the Virtual Health Library Portal (BVS) in June 2022. Publications from the year 2012 to June 2022 were included; observational studies and clinical trials involving human subjects, in which the objective was to assess individuals aged 12 to 19 years diagnosed with vestibular migraine and investigate their main clinical findings in this population. **Results:** All studies mentioned a higher percentage of girls in the samples; however, the difference between sexes for different diagnoses was not assessed in all studies. **Conclusion:** With this review, it was found that the clinical findings of migraine in adolescence are similar to those in the adult population.

Keywords: Migraine Disorders; Adolescent; Headache Disorders, Primary.

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Resumo

Introdução: A migrânea é um tipo de cefaleia primária incapacitante que, quando associada a crises de vertigem, configura-se migrânea vestibular. **Objetivo:** Verificar quais as principais manifestações clínicas da migrânea vestibular em adolescentes. **Métodos:** Trata-se de uma revisão integrativa da literatura, cujas buscas foram executadas nas bases de dados eletrônicas PubMed/Medline, Scientific Electronic Library Online (SciELO), e Portal da Biblioteca Virtual em Saúde (BVS), em junho de 2022. Foram incluídas publicações entre o ano 2012 e o mês de junho de 2022; estudos observacionais e ensaios clínicos envolvendo seres humanos, nos quais o objetivo fosse avaliar indivíduos com idades entre 12 e 19 anos com diagnóstico de migrânea vestibular e verificar suas principais manifestações clínicas nessa população. **Resultados:** Todos os estudos mencionaram um maior percentual de meninas nas amostras, porém a diferença entre os sexos para os diferentes diagnósticos não foi avaliada em todas as pesquisas. **Conclusão:** Verificou-se, com a presente revisão, que as manifestações clínicas da migrânea na adolescência são semelhantes às da população adulta.

Palavras-chave: Transtornos de Enxaqueca; Adolescente; Transtornos da Cefaléia Primários.

Resumen

Introducción: La migraña es em tipo de dolor de cabeza adolescente incapacitante que, cuando se dolesc em ataques de vértigo, constituye la migraña vestibular. **Objetivo:** Investigar las principales manifestaciones clínicas de la migraña vestibular em adolescentes. Métodos: Se trata de em revisión integradora de la literatura, em búsquedas realizadas em las bases de datos electrónicas PubMed/Medline, Scientific Electronic Library Online (SciELO) y el Portal de la Biblioteca Virtual em Salud (BVS) em junio de 2022. Se incluyeron publicaciones desde el año 2012 hasta junio de 2022; dolescê observacionales y ensayos clínicos que involucraran a sujetos humanos, en los cuales el objetivo fuera evaluar adolescentes de 12 a 19 años en diagnóstico de migraña vestibular e investigar sus principales manifestaciones clínicas em esta población. **Resultados:** Todos los adolescentes mencionaron en mayor porcentaje de niñas en las muestras; sin embargo, la diferencia entre los sexos para diferentes diagnósticos no fue evaluada en todos los adolescentes. **Conclusión:** En esta revisión, se descobrió que las manifestaciones clínicas de la migraña en la dolescência son similares a las de la población adulta.

Palabras clave: Trastornos Migrañosos; adolescente; Cefaleas Primarias.

Introduction

Dizziness and vertigo are described in the literature as frequent complaints in medical appointments. In adolescents, the occurrence of at least one of these symptoms varies between 8% and 18%[1,2] and, depending on the intensity and frequency of their occurrence, they can be disabling, leading to poor school attendance and social isolation[3,4]. Therefore, an accurate and early diagnosis of what triggers these symptoms is of utmost importance in order to improve these adolescents' quality of life.

Among disorders that can cause vertigo and dizziness are central vestibular disorders, defined as any clinical condition in which there is an impairment of the vestibular function and/or system and, consequently, of postural balance as a result of some damage or impairment in the vestibular nuclei, cerebellum, brainstem, spinal cord and/or cerebral cortex[5]. In general, the main clinical findings of vestibular disorders with central origin are imbalance and neurological symptoms such as dysarthria, paresthesia and loss of consciousness, but dizziness and vertigo are also frequently reported in the literature[6] and are considered significant red flags in the assessment of these patients.

An example of central vestibular disorder is migraine, a disabling type of primary headache which is also called vestibular migraine when associated with vertigo attacks[7]. Its worldwide prevalence is estimated at one in 10 individuals, and it has been identified as the most common cause of vertigo in adolescents[2,3,8], therefore interfering with motor performance and social interaction in this population. However, diagnosis requires careful investigation, as these symptoms may be associated with a range of medical conditions in this age group[2].

Thus, the aim of this integrative review is to verify the main clinical findings of vestibular migraine in adolescents, in order to help healthcare professionals who provide medical assistance to this group.

Methods

This study is an integrative literature review, conducted according to the guidelines of Souza, Silva and Carvalho[9], to identify, analyze and synthesize the results of independent studies on the topic concerning migraine in adolescents, in order to verify what the scientific community has reported about the main clinical findings of migraine in this population. Initially, the guiding question was formulated using the Population (P), Exposure (E), Comparison (C) and Outcome (O) (PECO) items. The question of this review was "What are the main clinical findings of vestibular migraine in adolescents complaining of dizziness or vertigo?", hence terms for: adolescents (P); complaints of dizziness or vertigo (E); and diagnosis of migraine (O) were considered for searches.

Based on the criteria defined with the PECO items, the selected terms were checked in English in the Medical Subject Headings (MeSH) metadata system, which can be seen in Table 1. The terms were then matched to each other using the operator OR, creating groups that were then interlinked using the operator AND, making the final search strategy as follows: (P) AND (E) AND (O). In addition to the descriptors, synonymous text words and MeSH suggested terms were used to do broader searches.

Table 1. Selected terms for each item of the PECO components.

Acronym	Definition	Terms used
P	Population	Adolescent [Mesh]; Adolescents; Adolescence; Teens; Teen; Teenagers; Teenager; Youth; Youths;
E	Exposure	Vertigo [Mesh]; Vertigos; Spinning Sensation; Spinning Sensations; Dizziness [Mesh]; Dizzyness; lightheadedness; light headedness; Vestibular Diseases [Mesh]; Vestibular Disease; Vestibular Disorder; vestibular dysfunction; vestibular impairment; vestibulopathy; vestibulum disorder;
C	Comparison	Not considered in the searches
O	Outcomes	Migraine without Aura [Mesh]; Common Migraine; Common Migraines; Migraine with Aura [Mesh]; Migraine Disorders [Mesh]; Migraine; Headache [Mesh]; Cephalgia; Cephalgias; Cephalalgia; Cephalalgias; Cephalea

The searches were run on the electronic databases PubMed/Medline, Scientific Electronic Library Online (SciELO), and the Portal da Biblioteca Virtual em Saúde (BVS), in June 2022. The following inclusion criteria were established for the selection and appraisal of the collected scientific studies: publications between 2012 and June 2022; observational studies and clinical trials involving human beings, in which the aim was to assess individuals aged between 12 and 19 with a diagnosis of vestibular migraine and to investigate its main clinical findings in this group. Studies in which the group of patients with migraine had another associated disorder that could interfere with the clinical findings, studies on the effects of medications, as well as systematic literature reviews, animal studies, letters to the editor, book chapters, abstracts of scientific proceedings, case reports, studies in Japanese and Chinese, and studies that did not provide sufficient information for analysis were excluded from the analysis.

After including and excluding the studies, two reviewers screened the records by checking the title and abstract of it. Subsequently, the records selected by the same reviewers were read in full for final inclusion in the study.

The necessary information and data were extracted from the selected articles in a standardized way and the data was analyzed using a qualitative approach, considering the following variables: year of publication, country of origin of the study, sample size, age, prevalence of migraine in the sample, main clinical findings, and analysis of differences between genders and age groups.

Results

A total of 4384 articles were identified in the searches of the described electronic databases, of which 1931 were from PubMed, 2452 from BVS and 1 article from SciELO. Of these, 1754 duplicates were removed. Of the remaining studies, after reading the titles and abstracts, 52 were selected for full analysis, with 5 articles being considered eligible for this review.

Table 2. Studies included in the review.

Authors (year)	Country of origin	Sample (n)	Age of participants	Prevalence of migraine	Sex differences	Difference in age groups
Aksu et al (2022)	Turkey	171 adolescents	12-18 years	56,1 % had migraine without aura 28,1% had migraine with aura 15,8% had chronic migraine	Higher prevalence of dizziness in females	Not considered
Langhagen et al (2015)	Germany	118 children and adolescentes	3-18 years	30% had vestibular migraine 28% had probable vestibular migraine 29% had suspected vestibular migraine 7% had other migraine symptoms (without aura n=4, with aura n=3, chronic n=1).	Higher prevalence of dizziness in females	Not considered
andgraf et al (2015)	Germany	601 adolescents	12-19 years	Migraine group n= 360	Higher prevalence of dizziness in females	Not considered
Blaschek et al (2014)	Germany	1445 adolescents	12-19 years	41.2% had tension-type headache, 9.4% had migraine 32.5% had both.	Higher prevalence of migraine in females	Not considered
Bernardo et al (2020)	Brazil	300 children and adolescentes	6-17 years	27,3% had migraine without aura, 29,7% had migraine with aura, 0,3% had chronic migraine, 27% had suspected migraine	Not considered	Not considered

All of the studies included in the analysis were written in English and published in the last 10 years, with the oldest publication dating from 2014[10] and the most recent from 2022[11]. With regard to the country where the research was performed, Germany was the country with the highest number of publications, with three articles[10,12,13] covering this topic. The other publications included were from Turkey[11] and Brazil[14].

In terms of sample size, the studies ranged from 118[13] to 1445[10] subjects aged between 12 and 19 years. All the studies mentioned a higher percentage of girls in the samples, but the division of the sample into subgroups considering the gender variable, to check for possible clinical differences, was not made in the study led by Bernardo et al (2020). The studies reported a prevalence of migraine diagnosis of 9.4%[10] to 59%[12] in the samples.

Discussion

Most of the studies included revealed that the findings for adolescents are similar to those for adults, especially in terms of the difference in prevalence between the genders, with all the studies included in this review reporting a higher percentage of girls in their samples and identifying a higher prevalence of migraine in this gender. One study[15] reinforces the fact that there is female predominance among migraineurs from adolescence onwards, with prevalence reaching 13.8% of adult women worldwide[16], and an incidence of 2 to 5 women for each man diagnosed with migraine. One hypothesis for understanding the increased prevalence of diagnosis in this gender during adolescence is due to the association between female hormones and migraine, previously investigated,

with estrogen being indicated as a likely trigger for the onset of a headache crisis[15,16,17], making girls and women more susceptible, especially during periods of hormonal shifts such as puberty and, later, the menstrual cycle in adulthood.

Regarding clinical features, as it is a type of primary headache, pain in migraineurs cannot be attributed to any structural or metabolic condition that justifies it[7]. Therefore, it is currently interpreted that atypical responses in sensory processing to extrinsic and intrinsic stimuli can lead to an increased susceptibility to headache attacks, and its treatment consists mainly of controlling these triggers. Due to this, migraine is also considered a multifactorial neurological disorder[7,8]. Stress, exposure to artificial light and very intense sounds or smells, and excessive consumption of caffeine and alcoholic drinks are among the triggers of a crisis in adults[18,19]. It should also be highlighted that a headache occurs at the peak of a crisis and can last from 4 hours to 3 days, cause moderate to severe pain and be accompanied by symptoms of nausea, photophobia and phonophobia. However, other symptoms are present during this phase, and the patient can experience symptoms up to 72 hours before the headache, with mood and eating swings, neck pain and also focal and transient neurological dysfunctions[20].

In adolescents, the symptoms are similar to those identified in adults. In two studies that aimed to determine the association between migraine crises and pain in the shoulder and neck areas, the authors concluded that pain in these areas is a recurring feature in patients with chronic migraine, i.e. frequent crises. The authors then hypothesized that pain in these areas may be a helpful finding in the differential diagnosis between migraine and other types of headache. In addition, these studies report a correlation between stress, excessive drinking of alcoholic or caffeinated substances and smoking with migraine attacks in adolescents[10,12]. In another study that aimed to determine which lifestyle factors of young people can trigger migraine symptoms, a further finding was the correlation between migraine and obesity or overweight, as well as excessive exposure to television or smartphone screens[21]. Some other clinical signs cited repeatedly in the literature are vertigo, dizziness, nausea or vomiting, and exacerbated sensitivity to lights, sounds and odors (photophobia, phonophobia and osmophobia, respectively)[11,13,14]. However, in some cases, children and adolescents don't show any progression of symptoms, as well as can not describe their current symptoms appropriately, which makes a successful diagnosis a challenging task.

It is also worth adding that, aside from the symptoms, the consequences of migraine on teenagers' quality of life were discussed in the studies. Overall, all migrainous teens had some psychological complaint or diagnosis, with one study citing psychosomatic vertigo, i.e. triggered by emotional changes[13]. Anxiety and depression were the most commonly mentioned disorders, leading to school withdrawal and a tendency to keep their feelings private, affecting their social interaction and putting adolescents off the diagnosis of migraine, if the condition has not yet been detected[11,14,21]. As it has a significant impact on patients' lives, Langhagen et al.[13] suggest that the diagnostic criteria consider a shorter clinical history period, in order to enable adolescents to receive appropriate treatment. Recently, a group of authors from the Bárány Society in association with the International Headache Society published a document that corroborates this suggestion. The document proposes diagnostic criteria for migraine in individuals under the age of 18, with one of the items stipulating shorter periods of crisis and a lower number of occurrences throughout life compared to the criteria for adults[22]. As a result, there is a standardized approach with more specific and detailed features, which help to identify the condition at an early stage.

Despite the relevant results of our study, the data also has some limitations. As the period was restricted to 10 years (2012 to 2022) and only 3 databases were accessed, we cannot assure we gathered all of the available evidence. However, the chosen databases are some of the most widely accessed in the world, which increases the credibility of this research. Furthermore, by restricting the period to the last 10 years, our data is more up-to-date.

Conclusion

In the present review, the clinical findings of migraine in adolescence were akin to those observed in the adult population. The main reported symptoms included pain in the shoulder and cervical region, dizziness, vertigo, nausea, vomiting, photophobia, phonophobia, and osmophobia. It is hypothesized that these findings could contribute

to the clinical practice of healthcare professionals attending to adolescents, facilitating an early diagnosis of migraine and mitigating the impact on patients' quality of life. Given the updates in diagnostic criteria, this study underscores the necessity for additional research in this field for a more thorough analysis of clinical findings of migraine in adolescence, thus aiding in the diagnosis and treatment of cases.

References

1. Langhagen T, Albers L, Heinen F, Straube A, Filippopulos F, Landgraf MN et al. Period Prevalence of Dizziness and Vertigo in Adolescents. PLoS One. 2015; 10(9): e0136512. doi:10.1371/journal.pone.0136512

2. Filippopulos FM, Albers L, Straube A, Gerstl L, Blum B, Langhagen T, et al. Vertigo and dizziness in adolescents: Risk factors and their population attributable risk. PLoS One. 2017; 12(11): e0187819. https://doi.org/10.1371/journal.pone.0187819

3. Niemensivu R, Pyykkö I, Wiener-Vacher SR, Kentala E. Vertigo and balance problems in children—An epidemiologic study in Finland. Int J Pediatr Otorhinolaryngol. 2006; 70(2): 259–65.

4. Duarte JA, Leão EM, Fragano DS, Marquez GJ, Pires APB de Á, Silva MLS, et al. Vestibular Syndromes in Childhood and Adolescence. Int Arch Otorhinolaryngol. 2020; 24(4): e477–81.

5. Ganança FF, Silva RC, Morganti L, Salmito MC. Vertigem central. In: Piltcher OB, Costa SS, Maahs GS, Kuhl G (orgs.). Rotinas em otorrinolaringologia. Porto Alegre: Artmed; 2015. p. 134-41.

6. Strupp M, Brandt T, Huppert D, Grill E. Prevalence of motion sickness in various vestibular disorders: a study on 749 patients. J Neurol. 2018; 265(Suppl 1): 95–7.

7. Sociedade Internacional de Cefaleia. Classificação Internacional das Cefaleias. 3ª ed. São Paulo: OmniFarma; 2019.

8. Woldeamanuel YW, Cowan RP. Migraine affects 1 in 10 people worldwide featuring recent rise: A systematic review and meta-analysis of community-based studies involving 6 million participants. J Neurol Sci. 2017; 372: 307–15.

9. Souza MT, Silva MD, Carvalho R. Integrative review: what is it? How to do it? Einstein. 2010; 8(1): 102–6.

10. Blaschek A, Decke S, Albers L, Schroeder AS, Lehmann S, Straube A, et al. Self-reported neck pain is associated with migraine but not with tension-type headache in adolescents. Cephalalgia. 2014; 34(11): 895–903.

11. Aksu GG, Kayar O, Tufan AE, Kütük MÖ, Sucu DH, Taşdelen B, et al. Early maladaptive schemas differing according to sex may contribute to migraine among the youth. Brain Dev. 2022; 44(7): 427–37.

12. Landgraf MN, von Kries R, Heinen F, Langhagen T, Straube A, Albers L. Self-reported neck and shoulder pain in adolescents is associated with episodic and chronic migraine. Cephalalgia. 2016; 36(8): 807–11.

13. Langhagen T, Lehrer N, Borggraefe I, Heinen F, Jahn K. Vestibular Migraine in Children and Adolescents: Clinical Findings and Laboratory Tests. Front Neurol. 2015; 5: 292.

14. Bernardo AAO, Medeiros FL, Rocha-Filho PAS. Osmophobia and Odor-Triggered Headaches in Children and Adolescents: Prevalence, Associated Factors, and Importance in the Diagnosis of Migraine. Headache. 2020; 60(5): 954–66.

15. Vetvik KG, MacGregor EA. Sex differences in the epidemiology, clinical features, and pathophysiology of migraine. Lancet Neurol. 2017; 16(1): 76–87.

16. Morganti LOG, Salmito MC, Duarte JA, Bezerra KC, Simões JC, Ganança FF. Vestibular migraine: clinical and epidemiological aspects. Braz J Otorhinolaryngol. 2016; 82(4): 397–402.

17. Peters GL. Migraine overview and summary of current and emerging treatment options. Am J Manag Care. 2019; 25(2 Suppl): S23–34.

18. Charles A. The pathophysiology of migraine: implications for clinical management. Lancet Neurol. 2018;17(2):174–82.

19. Goadsby PJ, Holland PR. An Update: Pathophysiology of Migraine. Neurol Clin. 2019; 37(4): 651–71.

20. Goadsby PJ, Holland PR, Martins-Oliveira M, Hoffmann J, Schankin C, Akerman S. Pathophysiology of Migraine: A Disorder of Sensory Processing. Physiol Rev. 2017; 97(2): 553–622.

21. Russo A, Bruno A, Trojsi F, Tessitore A, Tedeschi G. Lifestyle Factors and Migraine in Childhood. Curr Pain Headache Rep. 2016; 20(2): 9.

22. Van de Berg R, Widdershoven J, Bisdorff A, Evers S, Wiener-Vacher S, Cushing SL, et al. Vestibular Migraine of Childhood and Recurrent Vertigo of Childhood: Diagnostic criteria Consensus document of the Committee for the Classification of Vestibular Disorders of the Bárány Society and the International Headache Society. J Vestib Res. 2021; 31(1): 1–9.