



REVIEW ARTICLE

Prevalence of asthenopia in children: a systematic review with meta-analysis[☆]



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KEYWORDS

Asthenopia;
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Visual fatigue;
Eyestrain;
Fatigue;
Visual

Abstract

Objective: To estimate the prevalence of asthenopia in 0–18 year-old children through a systematic review and meta-analysis of prevalence studies.

Sources: Inclusion criteria were population-based studies from 1960 to May of 2014 reporting the prevalence of asthenopia in children. The search was performed independently by two reviewers in the PubMed, EMBASE, and LILACS databases, with no language restriction. This systematic review was performed in accordance with the Cochrane Collaboration guidelines and the PRISMA Statement. Downs and Black score was used for quality assessment.

Summary of findings: Out of 1692 potentially relevant citations retrieved from electronic databases and searches of reference lists, 26 were identified as potentially eligible. Five of these studies met the inclusion criteria, comprising a total of 2465 subjects. Pooled prevalence of asthenopia was 19.7% (12.4–26.4%). The majority of children with asthenopia did not present visual acuity or refraction abnormalities. The largest study evaluated 1448 children aged 6 years and estimated a prevalence of 12.6%. Associated risk factors were not clearly established.

Conclusion: Although asthenopia is a frequent and relevant clinical problem in childhood, with potential consequences for learning, the scarcity of studies about the prevalence and clinical impact of asthenopia hinders the effective planning of public health measures.

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PALAVRAS-CHAVE

Astenopia;
Fadiga Ocular;
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Prevalência de astenopia em crianças: análise sistemática com meta-análise**Resumo**

Objetivo: pretendemos estimar a prevalência de astenopia em crianças de 0 a 18 anos de idade por meio de uma análise sistemática e uma meta-análise dos estudos de prevalência.

Fontes dos dados: os critérios de inclusão foram estudos de base populacional de 1960 a maio de 2014 que relataram prevalência de astenopia em crianças. A busca foi realizada de maneira independente por dois analisadores nas bases de dados PubMed, EMBASE e LILACS, sem restrição de idioma. Essa análise sistemática foi realizada de acordo com as diretrizes da Colaboração Cochrane e com a Declaração dos Itens de Relatório Preferidos para Análises Sistemáticas e Meta-Análise (PRISMA). A escala Downs & Black foi usada para avaliação da qualidade.

Síntese dos achados: de um total de 1692 citações possivelmente relevantes recuperadas de bases de dados eletrônicas e buscas de listas de referência, 26 foram identificadas como possivelmente elegíveis. Cinco desses estudos atenderam aos critérios de inclusão, incluindo um total de 2465 indivíduos. A prevalência total de astenopia foi de 19,7% (12,4–26,4%). A maioria das crianças com astenopia não apresentavam anomalias de acuidade visual ou refração. O maior estudo avaliou 1448 crianças de 6 anos de idade, com prevalência estimada de 12,6%. Os fatores de risco associados não foram claramente estabelecidos.

Conclusão: embora a astenopia seja um problema clínico frequente e relevante na infância, com possíveis consequências para o aprendizado, a escassez de estudos sobre a prevalência e o impacto clínico da astenopia prejudica o planejamento efetivo das medidas de saúde pública.

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Introduction

Asthenopia, defined as a subjective sensation of visual fatigue, eye weakness, or eyestrain, is a common condition in adults^{1–4} and can result from a variety of causes, including uncorrected refractive errors, imbalance of extra ocular muscles, accommodative impairment, and improper lighting.^{5,6} It can manifest itself through different symptoms, such as watery eyes, itching, double vision, blurred vision, sore eyes, headache, dry eye sensation, and redness.⁶

Asthenopia is frequently associated with situations where the accommodative and vergence processes are more intense, such as in those who work long periods looking at video display units (VDU). Although children are using electronic devices, such as computers and videogames, with increasing frequency, the prevalence of asthenopia in this age group is unknown.^{1–5}

This is an important gap in the literature, because when it affects children, visual fatigue may be related to problems involving reading, writing and learning disability, attention, and memory, as well as school performance.⁵ Visual fatigue may also indicate the existence of complex conditions such as dyslexia, which require special handling.^{5–8}

Most studies of children have small samples and are highly heterogeneous regarding evaluation methods, with no standardized tools for diagnosis, population, and exposure conditions.

This study aimed to describe the prevalence of asthenopia and its related factors in childhood through a systematic review and meta-analysis of observational studies.

Methods

This systematic review was performed in accordance with the Cochrane Collaboration guidelines and the PRISMA Statement.^{9,10}

Eligibility criteria

Eligibility criteria were: studies describing asthenopia prevalence in children aged 0–18 years. Asthenopia was defined by the presence of visual fatigue or eye weakness during the performance of near visual tasks, writing, or reading as reported directly by children. Case reports, case series, and case-control studies in which no data on prevalence could be estimated were excluded. Studies of children referred to ophthalmic care due to eye symptoms were also excluded.

If a study contained multiple publications (or sub-studies), only the most recent publication was included, while the other publications were used for supplemental information.

Information sources

The review protocol was registered with the institutional research committee. The search comprised online databases – MEDLINE (accessed via PubMed), Cochrane Library, LILACS, Google Scholar, SCIELO, and EMBASE, using MeSH terms for PubMed and Embase, and DeCS for LILACS and SCIELO. The search included references from 1960 to May of 2014 and comprised the following terms: ‘‘asthenopia’’,

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