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Sex Differences in Children and Adolescents with Attention-Deficit/Hyperactivity Disorder (ADHD): A Literature Review

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ADMINISTRATIVE INFORMATION

Support - ASL-CN1 Neuropsichiatria Infantile Cuneo-Mondovì.
Review Stage at time of this submission - Completed but not published.
Conflicts of interest - None declared.
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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 26 April 2025 and was last updated on 26 April 2025.

INTRODUCTION

Review question / Objective This systematic review aimed to synthesize existing research on the symptomatological and behavioural differences between male and female ADHD in individuals aged 6 to 18 years.

Condition being studied According to the latest edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5-TR), Attention-Deficit/Hyperactivity Disorder (ADHD) is a neurodevelopmental disorder characterized by persistent patterns of inattention and/or hyperactivity-impulsivity that significantly interfere with functioning or development. The DSM-5-TR criteria for ADHD diagnosis require the onset of symptoms before the age of 12 and their presence in multiple settings (home, school, work, social situations) for at least six months.

METHODS

Search strategy The databases will be Pubmed, Psycinfo, Psycarticles and SCOPUS.

Participant or population Females and males between the age of 6 and 18 with ADHD.

Intervention None.

Comparator None.

Study designs to be included Meta-analysis, systematic review, observational studies, enrichment studies,, cohort studies, randomized control trials, cross-sectional studies, clinical assessments, longitudinal studies.

Eligibility criteria Those published between 2008 and march 6 2024, involving a human population aged 6 to 18 years, with the terms "ADHD" or "attention deficit hyperactivity disorder" or similar terms in the title or abstract; exclusively in English; and containing terms such as "male," "masculine," "female," "feminine," "sexual dimorphism," "sexual differences," or "gender differences" or similar terms in the title or abstract.

Information sources Electronic databases.

Main outcome(s) The main outcome of this literature review is to understand the differences between male and female phenotypes in ADHD, focusing on individuals aged 6 to 18. The review explores how ADHD expression varies due to the different maturation rates of brain networks, particularly in the frontal lobes. This includes examining differences in neuropsychological aspects, such as executive functions and attentional performance, as well as psychopathological aspects like internalizing and externalizing symptoms.

The review also investigates behavioral and social aspects, including peer relationships and social skills, and differences in substance use. Academic performance is considered, with a focus on how gender influences the impact of inattention and hyperactivity/impulsivity on mathematical and linguistic skills.

Ultimately, the review aims to provide a comprehensive understanding of how ADHD manifests differently in males and females, considering a wide range of factors from neurobiological development to social and academic outcomes. This understanding is crucial for developing more targeted and effective treatment approaches.

Quality assessment / Risk of bias analysis

CASP Checklist is used in order to assess risk of bias.

Strategy of data synthesis The data synthesis strategy used in the systematic review is the following one:

Guideline Adherence: The review adhered to the PRISMA 2020 guidelines.

Search Strategy: A comprehensive search was conducted using Pubmed, Psycinfo, Psycarticles, and Scopus, employing specific search strings.

Study Selection:

Inclusion Criteria: Articles published between 2008 and March 6, 2024, focusing on clinical (human) populations aged 6-18, mentioning "ADHD" or "attention deficit hyperactivity disorder" (or similar terms) in the title or abstract, and addressing gender differences using phrases like "male," "female," "sexual dimorphism," or "gender differences."

Exclusion Criteria: Studies on diagnostic tools, co-occurrences, theses, single case studies or case reports, articles in languages other than English, and studies involving animal models were excluded.

Data Extraction and Analysis: An initial search yielded 413 records. After removing duplicates using Zotero software, the number was reduced to

343. Three independent professionals (two psychologists and a child neuropsychiatrist) screened the articles based on title and abstract, excluding 271 articles. Further assessment of the remaining 72 articles led to the exclusion of 19 more, resulting in a final analysis of 53 records. One additional study was included from another source, totaling 54 studies.

Synthesis Focus: The review concentrated on gender differences in ADHD, specifically in areas such as hyperactivity, impulsivity, inattention, and the ability to delay gratification.

Presentation: A flowchart was created using the PRISMA 2020 guidelines and the PRISMA_flowdiagram web app to visually represent the study selection process.

Subgroup analysis In this review, a subgroup analysis was conducted. The analysis specifically looked at the differences between males and females with ADHD, examining various aspects such as:

Core ADHD symptoms (inattention, hyperactivity, and impulsivity)

Cognitive performance

Psychopathological aspects (internalizing and externalizing symptoms)

Social skills

Substance use

Academic performance.

Sensitivity analysis None.

Language restriction Only articles written in english will be considered.

Country(ies) involved Italy.

Keywords Attention-deficit/hyperactivity disorder (ADHD), sex difference, Gender difference, Gender Medicine, childhood and adolescence, Female ADHD, systematic review, Social Problems.

Contributions of each author

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