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THE INFLUENCE OF ATTENTION DEFICIT HYPERACTIVITY DISORDER ON THE DIAGNOSIS OF DEPRESSION IN ADULTS

A INFLUÊNCIA DO TRANSTORNO DO DÉFICE DE ATENÇÃO COM HIPERATIVIDADE NO DIAGNÓSTICO DE DEPRESSÃO EM ADULTOS

LA INFLUENCIA DEL TRASTORNO POR DÉFICIT DE ATENCIÓN CON HIPERACTIVIDAD EN EL DIAGNÓSTICO DE LA DEPRESIÓN EN ADULTOS

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ABSTRACT

Introduction: Attention deficit disorder (ADHD) is a disorder that can affect any individual, regardless of their age group. In adulthood, the disorder can take on significant, very negative contours and even become disabling. Depressive disorder is commonly comorbid with ADHD.

Objectives: To identify how ADHD influences the diagnosis of depression in adults.

Methodology: Integrative literature review using the PICO mnemonic to construct the research question. Articles were searched on the EBSCOhost platform, selecting articles published between October 2013 and October 2023 in the MEDLINE complete and CINAHL complete databases. Six articles were selected and the recommendations of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses – PRISMA.

Results: Once the methodology was applied, a clear interconnection was identified between ADHD (including from childhood) and the development of depression later in adulthood. Risk factors such as being female, experiencing serious conflicts with others, negative coping strategies, among others, were found to suggest a link between ADHD and the development of depression. There is also scientific evidence that a number of protective factors contribute to resilience to the development of depression or even substance abuse problems in individuals with ADHD, such as early and long-term treatment and the adoption of different coping strategies.

Conclusion: Knowledge of the risk factors and signs and symptoms of ADHD and depression is an asset for developing nursing interventions that are sensitive to the illnesses in question. It is therefore considered necessary not only to continue researching the subject under study, but also to apply this knowledge in clinical practice in order to increase the quality of life of individuals living with these types of pathologies.

Keywords: Adult; Attention Deficit Disorder; Depression; Hyperactivity; Nursing Care.

RESUMO

Introdução: O transtorno de défice de atenção (TDAH) é uma perturbação capaz de afetar qualquer indivíduo independentemente da faixa etária em que se encontra. Na idade adulta, a doença pode assumir contornos significativos, bastante negativos e até mesmo tornar-se incapacitante. O transtorno depressivo é comumente comórbido com TDAH.

Objetivos: Identificar de que modo o TDAH influencia o diagnóstico de depressão, em adultos.

Metodologia: Revisão integrativa da literatura que utilizou a mnemónica PICO para construir a pergunta de investigação. Procedeu-se à pesquisa de artigos na plataforma EBSCOhost, selecionando-se artigos publicados entre outubro de 2013 e outubro de 2023 nas bases de dados MEDLINE complete e CINAHL complete. Foram selecionados seis artigos e seguiram-se as recomendações do método *Preferred Reporting Items for Systematic Reviews and Meta-Analyses* – PRISMA.

Resultados: Aplicada a metodologia foi identificada uma clara interligação entre o TDAH (inclusive desde a infância) e o desenvolvimento de depressão posteriormente na idade adulta. Fatores de risco como ser do sexo feminino, viver conflitos graves com outros, estratégias de coping de caráter negativo, entre outros foram achados sugestivos da interligação entre o TDAH e o desenvolvimento de depressão. Existe ainda evidência científica de que um número de fatores protetores contribuem para a resiliência ao desenvolvimento de depressão ou até problemas de abuso de substâncias nos indivíduos com TDAH, como o tratamento precoce e a longo prazo e a adoção de diferentes estratégias de *coping*.

Conclusão: O conhecimento dos fatores de risco e dos sinais e sintomas do TDAH e da depressão é uma mais-valia para o desenvolvimento de intervenções de enfermagem sensíveis às doenças em causa. Considera-se, portanto, necessária não só uma contínua investigação relativamente à temática em estudo, como também uma aplicação dos conhecimentos na prática clínica, no sentido de aumentar a qualidade de vida dos indivíduos que vivem com este tipo de patologias.

Palavras-chave: Adultos; Cuidados de Enfermagem; Depressão; Hiperatividade; Transtorno do Défice de Atenção.

RESUMEN

Introducción: El trastorno por déficit de atención (TDAH) es un trastorno que puede afectar a cualquier individuo independientemente de su grupo de edad. En la edad adulta, el trastorno puede adquirir contornos significativos, muy negativos e incluso llegar a ser incapacitante. El trastorno depresivo suele ser comórbido con el TDAH.

Objetivos: Identificar cómo influye el TDAH en el diagnóstico de depresión en adultos.

Metodología: Revisión bibliográfica integradora utilizando la mnemotecnia PICO para construir la pregunta de investigación. Se realizaron búsquedas de artículos en la plataforma EBSCOhost, seleccionando artículos publicados entre octubre de 2013 y octubre de 2023 en las bases de datos MEDLINE complete y CINAHL complete. Se seleccionaron seis artículos y se siguieron las recomendaciones del método Preferred Reporting Items for Systematic Reviews and Meta-Analyses – PRISMA.

Resultados: Una vez aplicada la metodología, se identificó una clara interconexión entre el TDAH (incluso desde la infancia) y el desarrollo de depresión más tarde en la edad adulta. Se encontraron factores de riesgo como ser mujer, experimentar conflictos graves con otras personas, estrategias negativas de afrontamiento, entre otros, que sugieren una relación entre el TDAH y el desarrollo de depresión. También existen pruebas científicas de que una serie de factores de protección contribuyen a la resiliencia frente al desarrollo de depresión o incluso de problemas de abuso de sustancias en individuos con TDAH, como el tratamiento temprano y a largo plazo y la adopción de diferentes estrategias de afrontamiento.

Conclusión: El conocimiento de los factores de riesgo y de los signos y síntomas del TDAH y la depresión es una ventaja para desarrollar intervenciones de enfermería sensibles a las enfermedades en cuestión. Por lo tanto, se considera necesario no sólo seguir investigando sobre el tema en estudio, sino también aplicar estos conocimientos en la práctica clínica con el fin de aumentar la calidad de vida de las personas que conviven con este tipo de patologías.

Descriptores: Adultos; Cuidados de Enfermería; Depresión; Hiperactividad; Trastorno por Déficit de Atención.

INTRODUCTION

Attention Deficit Hyperactivity Disorder (ADHD) is a condition that can affect individuals of any age group. In adulthood, the disorder can have significant negative impacts on various aspects of life, such as social, academic, and professional spheres, potentially becoming debilitating. Socially, ADHD is not well recognised and is often given less priority compared to its associated comorbidities[1].

ADHD is a neurodevelopmental condition characterised by a combination of inattention, hyperactivity, and/or impulsivity. These symptoms frequently occur in a manner that causes distress to the individual and may be mediated by deficits in executive functions. Early diagnosis and appropriate interventions can mitigate these impacts. The etiology of ADHD can be genetic, environmental, social, cultural, or even due to brain function[2]. Prenatal and perinatal factors are also identified as risk factors[3]. Evidence suggests that excessive weight and obesity in individuals and/or their family environment are risk factors for developing ADHD in males. This evidence is supported by literature showing a relationship between ADHD and obesity, indicating neurobiological dysfunctions compensating for changes in the mesolimbic and mesocortical pathways, both of which are dopaminergic pathways involved in these conditions[4]. These dopaminergic action changes concerning ADHD have been evidenced in pharmacological, genetic, and imaging studies, particularly regarding genetic changes coding for the dopamine transporter (DAT – dopamine active transporter)[3].

ADHD is the most common neurodevelopmental disorder[3]. It is estimated that the global prevalence of ADHD is between 2.5% and 5%. In Portugal, the prevalence of this disorder is 3%[1]. ADHD occurs more frequently in males, being twice as common in this gender (2:1). It is a disorder that typically begins in childhood and commonly persists into adulthood[2].

Regarding depression, it is a highly heterogeneous disorder in that its origin can be multifactorial, and its clinical presentation varies[5]. Depression is an affective disorder, with some associated signs and symptoms such as sadness, changes in motivation and vitality, anxiety, fatigue, sleep disturbances, irritability, social behaviour changes, and loss of interest in previously enjoyable activities[6]. These symptoms, among others, are included in the diagnostic criteria for several types of depression as outlined in the DSM-5[7].

Depression is one of the most common causes of disability worldwide, affecting about 322 million people globally (with a tendency to increase), accounting for 7.5% of years lived with disability[8]. Despite the increase in depression prevalence worldwide, it is relevant to note that it is unclear to what extent this increase is due to actual changes in incidence and prevalence of depression or is merely a result of increased understanding, awareness, and

social recognition of the disease[9]. In Portugal, about 8% of the population is diagnosed with depression. Certain individuals are more predisposed to develop depression throughout their lives, with genetic factors, medical conditions, medication, and exposure to adverse life events being risk factors[6]. Depression significantly impacts quality of life and is the main determinant of suicide deaths. Despite the significant relevance of the above data for global population health, depression is a highly discredited disease by the general population, as most people with this diagnosis do not receive adequate treatment, and prevention strategies are often inadequate or nonexistent[9].

Preliminarily, ADHD is associated with high rates of depression as a comorbidity (approximately 16-31% of adults diagnosed with ADHD also have a major depressive disorder diagnosis)[10]. This association is also highlighted in the DSM-5, where it is established that the prevalence of depression is higher in individuals with a prior ADHD diagnosis compared to those without[7].

This Integrative Literature Review aims to evaluate the influence of ADHD on the diagnosis of depression in adults and determine which nursing care interventions can reduce the negative impact of both conditions. It is certain that exploring the interrelation between these two conditions in this review will clarify the degree of correlation between them. Regardless of the identified degree, the interrelation between both diseases emphasises the importance of recognising (and early recognition) each individually, through identifying associated signs and symptoms and nursing interventions sensitive to them. Current evidence supports that mental health alterations such as depression can exacerbate other health conditions through various mechanisms, such as immune response suppression, increased autonomic nervous system activity, and even decreased adherence to healthcare recommendations. These facts underscore the importance of nursing interventions concerning depression and ADHD[11].

METHODS

Ethical Aspects

Ethical approval was not required for this investigation, as it is a secondary study. The formulation of the research question adhered to principles of clarity, objectivity, and precision, aiming to contribute new knowledge to nursing care, specifically focusing on individuals with ADHD and their relationship with a diagnosis of depression. The analysis of data from the selected studies was conducted with respect to the integrity of the results and the respective researchers. Proper citation of authors was ensured according to academic and scientific best practices.

Type of Study

In clinical practice, it is essential to base nursing care on scientific evidence to ensure high-quality care. The process of collecting, interpreting, evaluating, and implementing clinical data is crucial for nurses' decision-making. This process is known as evidence-based practice[12].

The study in question is an Integrative Literature Review, conducted to implement quality care based on the most current scientific evidence. The stages of this review include: (i) identifying the research question; (ii) searching scientific databases; (iii) defining inclusion and exclusion criteria for studies; (iv) selecting studies based on defined criteria; (v) analysing selected articles; (vi) presenting and discussing results; and (vii) synthesising the acquired knowledge.

Methodological Procedures

The following steps were employed as a methodological approach for this Integrative Literature Review: defining the research question, establishing exclusion and inclusion criteria, inputting descriptors into databases, identifying studies in the databases, selecting studies based on title and abstract readings, thoroughly evaluating selected articles, and analysing the collected data.

To achieve the proposed goal, a research question was formulated using the PICO mnemonic, which this review aims to answer. “P” stands for population, “I” for intervention, “C” for comparison/control, and “O” for outcomes. The formulated question was: Does early diagnosis of ADHD in childhood (I) influence the risk of recurrent depression (O) in adults (P)?

Following the PICO question formulation, data collection on the subject was conducted in October 2023 via the EBSCOhost platform. The selected databases were MEDLINE with Full Text, CINAHL Plus with Full Text, and Psychology and Behavioral Sciences Collection. The descriptors used for the search were: "ADHD", "Hyperactivity", "Hyperactivity disorder", "Attention deficit", and "Depression in adults". These descriptors were organized with the Boolean operators OR and AND, in the following order: "ADHD" OR "Hyperactivity" OR "Hyperactivity disorder" OR "Attention deficit" AND "Depression in adults".

To limit the search, inclusion criteria were set: (i) full-text articles; (ii) publication period between 2013 and 2023 (with a preference for studies from the last five years); (iii) articles in English and Portuguese; (iv) peer-reviewed academic journals; and (v) populations over 18 years old (including longitudinal studies starting before adulthood). Exclusion criteria included duplicate articles, studies focusing solely on childhood ADHD, and articles not aligned with the study's objective. Additional exclusions were articles not in English or Portuguese, non-free articles, and articles not found in the selected databases.

After the search, a total of 107 articles were found. However, 27 duplicates were excluded, resulting in 80 articles. These were then further selected in two stages: first by reading titles, abstracts, and keywords, and then by reading the full texts. The first stage resulted in 59 articles. Subsequently, 15 articles were removed due to inaccessible full texts, leaving 6 articles that met all criteria for data collection and analysis. These research steps are illustrated in the PRISMA diagram in Figure 1↗.

RESULTS

To address the proposed objectives, several articles were read, and their content analysed. The characteristics and main results obtained are summarised in Chart 1↗, in chronological order according to the publication date.

DISCUSSION

Through the identification of the main results obtained from the six articles included in this literature review, it was possible to understand that the various studies are related but also diverge in some results.

Regarding the relationship between depression and ADHD, evidence was found that corroborates the association between childhood ADHD and subsequent depression in adult life[16]. Following this same theme, Nelson *et al* (2018), based on a study conducted with a sample of university students, found that university students with ADHD reported more symptoms of anxiety and depression compared to students without ADHD[14]. This evidence is reiterated by Semeijn *et al* (2015), who, when studying ADHD in the elderly, found that this disorder and depression were associated when the elderly had experienced more severe conflicts during their lives[13]. Similarly, Powell *et al* (2021) noted that severe ADHD symptoms are related to worsening depression[5]. Parallelly, Howard *et al* (2019) also described that, in general, depressive symptoms were more severe in the experimental group of the study (which included adolescents diagnosed with ADHD) compared to the control group[15].

However, Riglin *et al* (2021) reported that it is relevant to note that ADHD alone is not a strong risk factor for adult depression: reducing ADHD symptoms can prevent subsequent depression, but many individuals will develop depression for reasons not explained by the presence of ADHD[16]. Additionally, Powell *et al* (2021) mentioned that there is still the possibility of underlying ADHD being hidden by the diagnosis of depression[5].

To ascertain risk factors for the development of these comorbidities, the impact of the socioeconomic status of individuals with ADHD on the development of depression was evaluated. Demographic factors and life events such as age, the economic status of individuals, and stressful life events are not predictive factors of a higher degree of resilience related to the development of depression; that is, individuals with ADHD who go through these events have the same likelihood of developing a depressive condition as individuals with ADHD who do not experience these situations[10]. The study by Semeijn *et al* (2015) also does

not demonstrate a statistically significant relationship between financial problems (paralleling the economic situation described above) and the development of comorbid ADHD and depression. On the other hand, the same author finds significant data between ADHD symptoms and depression, explaining that the association between them can be partially explained by experiencing serious conflicts with others, meaning the association between ADHD and depression is more significant among individuals who experience conflicts[13]. Since Oddo *et al* (2018) do not specify the etiology of stressful life events mentioned earlier in this paragraph, it is difficult to establish another relationship between the results of both authors under discussion, as these stressful life events may or may not include the serious conflicts with others described by Semeijn *et al* (2015)[10,13]. Similarly, Semeijn *et al* (2015) found that the number of life events does not confer an association between ADHD and depression diagnosis; however, this author does not classify the etiology of life events – life events may or may not be stressful, potentially representing merely milestones or turning points in an individual's life[13]. Therefore, it is considered inappropriate to establish a relationship between the life events described by Semeijn *et al* (2015) and the stressful life events described by Oddo *et al* (2018)[13,10].

Concerning risk factors, Nelson and Liebel (2018) found significant differences regarding gender, meaning that female participants with ADHD showed higher symptoms of depression and anxiety than males[14].

Regarding substance use, ADHD symptoms in adolescence were generally associated with frequent substance use, except for alcohol, in the study conducted by Howard *et al* (2019)[15]. Similarly, the persistence of ADHD symptoms into early adulthood can predict a subsequent substance use disorder (excluding alcohol) due to the continued use of substances. The emergence of depressive symptoms is often related to high substance use during adolescence, a period of significant psychosocial development, where individuals are more exposed to substance use, particularly in social contexts and in their relationships with peers. However, a clear association between depression in adolescence and substance use in adulthood was not found, contrary to the finding related to ADHD, particularly regarding cannabis use[15].

According to the same author, in early adulthood, nicotine dependence (without the presence of other substance abuse disorders) is more prevalent in the experimental group with a diagnosis of depression alongside ADHD. Nonetheless, Howard *et al* (2019) also noted that the persistence of ADHD symptoms does not interact with the diagnosis of depression to increase the risk of developing a substance use disorder in early adulthood[15]. Therefore, the results suggest that depression and ADHD are independent risk factors for substance use and/or substance use disorder.

Certain behavioural and cognitive coping mechanisms are significant risk factors for the existence of comorbid depression with ADHD[10]. Coping mechanisms such as rumination and cognitive and behavioural avoidance in the presence of depressive symptoms are examples of mechanisms related to the presence of ADHD and comorbid depression (even when participants were not depressed at the time and considering subclinical symptoms in the depression diagnosis)[10]. Rumination is often associated with decreased concentration, negative cognitive biases, and inhibition of adopting problem-solving strategies and adaptive coping mechanisms. Thus, avoiding uncomfortable situations and excessively recalling negative events can lead to the development of depressive symptoms; similarly, the absence or infrequency of such cognitive-behavioural responses can be a protective factor against the development of comorbid depression with ADHD[10]. Consequently, Howard *et al* (2019) noted that maladaptive coping mechanisms might contribute to frequent cannabis use by young adults with a history of ADHD; cannabis use is often justified by the therapeutic benefits attributed to the drug, such as symptomatic control of ADHD.

This result emphasizes the importance of early and continuous treatment of ADHD, which can later prevent the development of depression as a comorbidity or even prevent substance abuse disorder[10].

Regarding treatment and medication, individuals with ADHD have a 20% lower rate of depression when receiving ADHD medication compared to when they are not taking it[16]. Thus, it was found that medication intended for symptomatic control of ADHD was associated with a decreased long-term risk of depression. Consistent with these data, Oddo *et al* (2018) found evidence that ADHD treatment was associated with greater resilience against developing depressive conditions, particularly if this treatment is initiated early and continued[10]. It is also noted that the specific treatment of ADHD symptoms in women with recurrent depression can improve long-term clinical outcomes. Therefore, according to these three authors, reducing ADHD symptoms through therapeutic means can prevent subsequent depression[5].

Women with recurrent depression and ADHD symptoms but without a defined diagnosis were taking second-line antidepressants, as they had poor responses to first-line antidepressants and the potential for side effects. Therefore, many of these patients, not receiving treatment for ADHD but for depression, continued to have significant ADHD symptoms[5].

Limitations

The first limitation encountered was in the research and selection of articles due to the scarcity of studies exclusively related to both topics of our theme (ADHD and depression) published in the last 5 years. For this reason, another limitation to point out was the temporal research design, in which one article published not in the last 5 years but in the last 10 years was included. It is considered that many of the articles sought and published in the last 5, and even in the last 10 years, covered additional pathologies that were not of particular interest to address.

Another identified limitation is related to the research limitation imposed by the inclusion criteria of the language of the articles; the research assumed that only articles in Portuguese and English would be considered. Within the same topic, there is another limitation, related to the fact that all the available articles found to support this integrative review were exclusively in English (no articles in Portuguese were found, which was one of the two languages considered at the beginning); this fact reduced the selected articles to those exclusively in English.

Another limiting factor in the selection of articles was that they were sometimes behind a paywall for full access, as one of the inclusion criteria was free and complete access to the articles.

A considerable limitation to add is the age range considered as an inclusion criterion. Due to the relative scarcity of recent studies (in the last 5 to 10 years) that relate only the diagnosis of ADHD and the diagnosis of depression, the inclusion criteria were altered from what was initially expected. In addition to adults (age range commonly considered between 18 and 65 years), elderly individuals diagnosed with ADHD (considered in one of the studies included in this review between 60 and 94 years old) were also considered. Additionally, some longitudinal methodology studies were included, whose data collections were conducted over periods exceeding 10 years, often starting in childhood (as it is usually the age range where the first signs and symptoms of ADHD begin) and extending through adolescence into early adulthood. Although these latter articles were fully analyzed, their results were obtained from people over 18 years old, and these results were used to support the discussion of this integrative review.

Finally, another identified limitation was the non-consideration of all articles in the selected languages from all existing platforms (limited to only 3 research platforms).

Applicability and Implications in Clinical Practice

In nursing practice, professionals must be constantly attentive to changes in the signs and symptoms of their patients. Knowing the signs and symptoms of the pathologies in question in this review, ADHD and depression, facilitates the early implementation of interventions, as there is a higher degree of prevention and awareness about them. Thus, it is useful for there to be regular and continuous monitoring by healthcare professionals, assuming an early diagnosis of ADHD to prevent the emergence of depression symptoms in adulthood.

FINAL CONSIDERATIONS

This Integrative Literature Review aimed to understand the importance of ADHD in the diagnosis of depression in adults and determine which nursing care interventions can reduce the negative impact that both can cause. The interrelation explored during this review between the two pathologies solidified our understanding of the correlation between them, considering the selected articles for review. The correlation found after analyzing the studies demonstrated a higher probability of depression occurring in individuals with ADHD. Some of the factors explored regarding the development of depression upon the diagnosis of ADHD were gender, treatment/medication, duration of ADHD treatment, conflicts/life events, behavioural patterns and coping, severity of ADHD symptoms, and the influence of substance abuse on the diagnosis of depression.

Among these variables, the most relevant during the analysis was the attempt to mitigate ADHD symptoms, noting that it is possible to prevent subsequent depression. Regardless of the identified degree, the interrelation between both diseases emphasizes the importance of recognizing (and early recognizing) each of them individually. Knowing the risk factors and the signs and symptoms of ADHD and depression is a valuable asset for developing nursing interventions sensitive to these diseases, increasing the quality of life for individuals living with such pathologies.

The postulated objective for this integrative literature review was: "Identify how ADHD influences the diagnosis of depression in adults". Thus, despite the identified limitations, it is possible to conclude that the objective was achieved. Nevertheless, it is considered important to mention that continuous research by the scientific community on the topic is necessary, as is the application of knowledge obtained through research in clinical practice, aiming to improve the quality and accuracy of care. Although mental health appears to be an increasingly discussed topic, it remains, in our view, undervalued by the vast majority of citizens, numerous governments, and even health professionals. Aiming at the recognition

of the importance of this and other topics related to the mental health of the population, we appeal to clinical practice that values scientific rigor and the continuity of research for more and better evidence to support the care provided.

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CR: Study design, data analysis, review and discussion of results.
MA: Study design, data analysis, review and discussion of results.
AJ: Study coordination, study design, data collection, storage and analysis, review and discussion of the results.
MG: Study design, data analysis, review and discussion of results.
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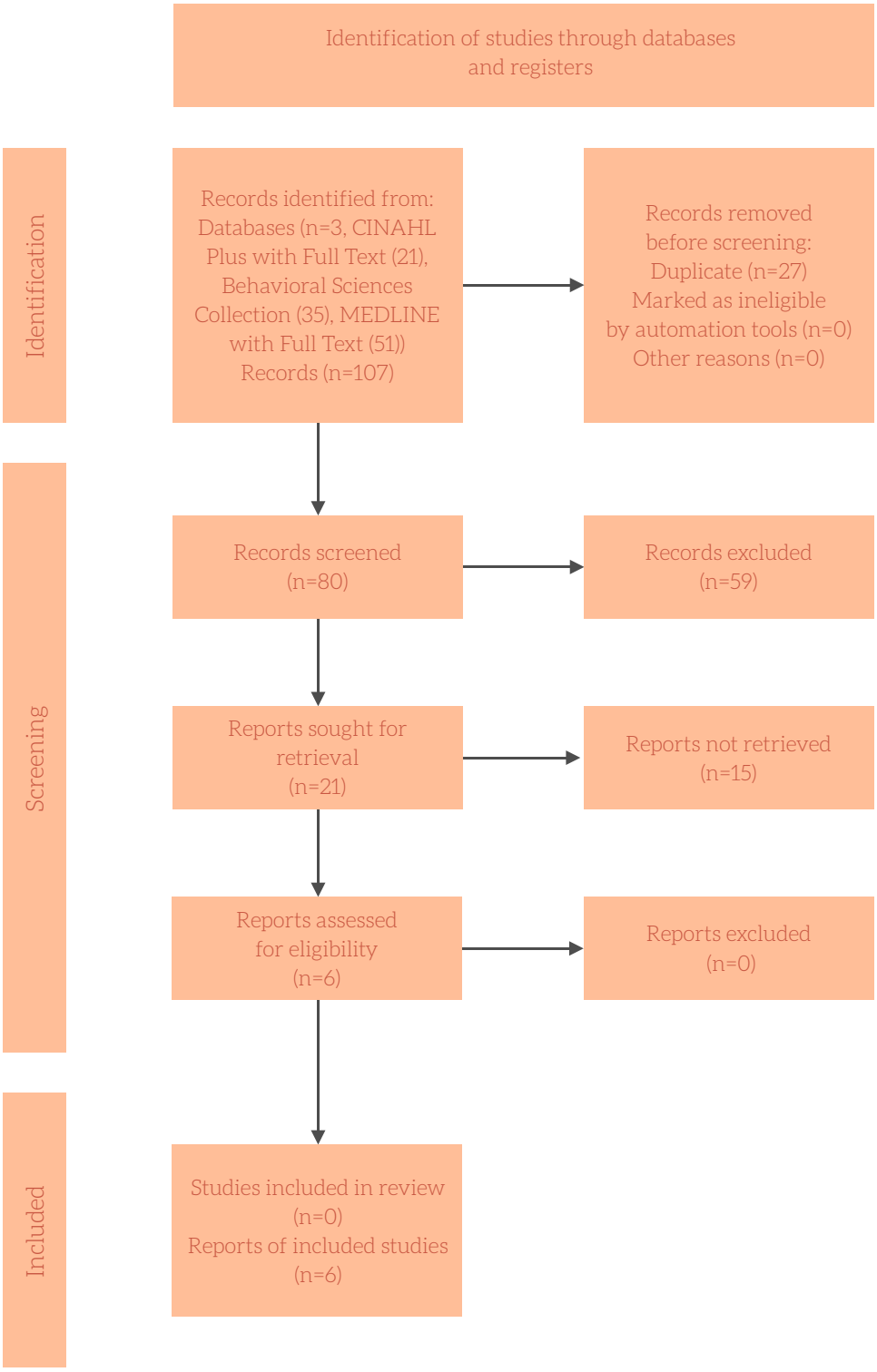

Figure 1 – PRISMA Flowchart.[↖]

Chart 1 – Identification of studies and main results.

Authors/method/ evidence level	Objectives	Results
Semeijn EJ, Comijs HC, Kooij JJ, Michielsen M, Beekman AT, Deeg DJ (2015)[13]. **Method:** Longitudinal Study, Quantitative. **Evidence Level:** Level 4.	Determine whether ADHD in the elderly is associated with more adverse life moments, as well as the relationship between ADHD and depression, and how these are influenced by the impact of life's adversities.	In the present study, it was found that, compared to older adults without ADHD, those with the same condition experience more severe conflicts, making this the first study to demonstrate this comparison. The association between ADHD and depression is substantially stronger in those who experience severe conflicts and adverse life events. It was found that ADHD and depression may share the same aetiology and/or that ADHD may lead to depression. One hypothesis is that one of the reasons why ADHD may lead to depression is the increased frequency of experiencing adverse life events, particularly having conflicts with others. The fact that experiencing more adverse life events explained the association between ADHD and depression. From a clinical perspective, elderly individuals with ADHD have lived with the disorder without having had the opportunity to be properly evaluated and diagnosed or to have undergone treatment throughout their lives. During the childhood and adulthood of the interviewees, the diagnosis of ADHD was not yet known. As a result, the life events they experienced may have led to higher levels of depression compared to children and adults with currently diagnosed ADHD.
Nelson JM, Liebel SW (2018)[14]. **Method:** Correlational. **Evidence Level:** Level 4.	This study examined the symptoms of anxiety and depression in university students with attention deficit hyperactivity disorder (ADHD).	University students with ADHD reported experiencing more symptoms of anxiety and depression compared to students without ADHD. The results indicated that the number of complaints made by parents of students with ADHD regarding the aforementioned symptoms is higher than the number of complaints made by their children (university students). Significant sex differences were also found among participants with ADHD, with females showing greater symptoms of depression and anxiety than males. Parental complaints regarding anxiety symptoms were higher in students with predominantly inattentive ADHD compared to those with combined ADHD.

Chart 1 – Identification of studies and main results.

Authors/method/ evidence level	Objectives	Results
Oddo LE, Knouse LE, Surman CB, Safren SA (2018)[10]. **Method:** Quantitative Study. **Evidence Level:** Level 4.	Determine the probability of an individual with ADHD being resilient to depression throughout their life, provided they have been receiving long-term treatment for ADHD. The defined objective was to ascertain whether a person with ADHD undergoing prolonged treatment is less predisposed to develop maladaptive cognitive and behavioural strategies in the face of the condition, and exhibits fewer ADHD symptoms.	In this study, the authors found that there are protective factors that may potentially contribute to resilience against the development of comorbid depression in adults with ADHD. Adults with ADHD who typically do not develop patterns of obsessive thinking and cognitive-behavioural avoidance when experiencing feelings of sadness, combined with more extensive treatment for ADHD, are the most likely among individuals with ADHD to show resilience against the emergence of depression as a comorbidity. Additionally, indicators that would be expected to increase the risk of depression in individuals with ADHD (recent negative life events or more severe ADHD symptoms) did not predict increased resilience against the development of depression in the studied population. It was also found that the presence of treatment regarding the diagnosis of ADHD was associated with greater resilience against developing depressive conditions. This result adds evidence, along with other previously conducted studies, that early and continued treatment of ADHD may later prevent the onset of depression as a comorbidity or even prevent the development of substance abuse problems. Treatments based on understanding protective factors (such as coping mechanisms) that constitute resilience to the existence of comorbid depression seem to be the best way to prevent the development of depression in adults diagnosed with ADHD.

Chart 1 – Identification of studies and main results.

Authors/method/ evidence level	Objectives	Results
Howard AL *et al* (2019)[15]. **Method:** Quantitative, Longitudinal. **Evidence Level:** Level 4.	Determine whether depression in adolescence influences the development of substance abuse in children with ADHD. This study examines two hypotheses: (1) depression in adolescence conditions the risk of substance abuse related to ADHD in adulthood by occurring more frequently in individuals with ADHD and leading more often to later substance use; and (2) depression in adolescence moderates the existence of substance use associated with the diagnosis of ADHD, while the effects of ADHD in childhood are associated with the severity and number of depressive symptoms in adolescence.	This study takes into account variables such as substance use (1. alcohol, 2. cannabis, 3. tobacco, and 4. other illicit drugs/prescription medications); the assessment of depressive symptoms; the evaluation of ADHD symptoms (through the differentiated assessment of inattention/concentration difficulty symptoms and hyperactivity and/or impulsive behaviour symptoms); and the persistence of ADHD symptoms into adulthood/diagnosis in adulthood. It was found that depressive symptoms in adolescence did not show any association between childhood ADHD and subsequent substance use in adulthood. Subsequently, the use of any of the substances considered in the "substance use" variable during adolescence was more frequent during specific periods when adolescents experienced more severe depressive symptoms, regardless of their history with ADHD. Adolescents with more severe depressive symptoms (in multiple assessments) compared to the majority of the sample showed a greater tendency towards more frequent substance use (except for alcoholic beverages) in adolescence. Most of the observed effects in adolescents with attention deficit symptoms revealed a higher frequency of cannabis and tobacco use in adulthood. In adolescents with prevalent hyperactivity and/or impulsivity symptoms, the study suggests a greater tendency for frequent illicit drug[1] use in adulthood.
Riglin L, *et al* (2021) [16]. **Method:** Experimental Study, Longitudinal. **Evidence Level:** Level 1.	Investigate whether ADHD and the genetics of ADHD are causally related to depression using two different methods (through the use of two different designs: a longitudinal population cohort design and Mendelian Randomisation (MR)) to explore a possible causal relationship between ADHD and depression.	In this longitudinal study, evidence was found supporting an association between childhood ADHD and subsequent depression in adulthood. Within the population studied, it was determined that childhood ADHD was associated with an increased risk of recurrent depression in young adulthood. This association was established by controlling for sex, adversity, maternal education, and maternal depression. The findings suggest that this association is not driven by childhood depression but rather by the fact that children with ADHD develop subsequent depression. It was observed that much of this association was explained by the continuation of ADHD into adulthood. Records indicate that children diagnosed with ADHD were approximately six times more likely to have depression within one year of an ADHD diagnosis and twice as likely within five years, compared to children without ADHD (Gundel *et al*, 2018). It is important to note that ADHD by itself is not a strong risk factor for adult depression: reducing ADHD symptoms may prevent subsequent depression, but many individuals will develop depression for reasons not explained by the presence of ADHD.

[1]The cited study considers "illicit drugs" independently of "cannabis"" (both included in the substance use variable). Thus, these variables are considered as described regardless of the legal status of cannabis use, which may differ by country.

Chart 1 – Identification of studies and main results.

Authors/method/ evidence level	Objectives	Results
Powell V, *et al* (2021) [5]. **Method:** Longitudinal Study, Quantitative. **Evidence Level:** Level 4.	The objective of this 13-year longitudinal study is to investigate ADHD in women with recurrent depression. Firstly, it is necessary to investigate the prevalence of ADHD in women, followed by an investigation into the clinical characteristics of depression associated with ADHD, such as the age of onset, severity, recurrence of episodes, persistence of subthreshold symptoms, suicidal thoughts, self-harm, psychotic and affective symptoms, and irritability. Additionally, the study aims to investigate the association of ADHD symptoms with aspects of clinical management of depression, including hospitalisation and the consumption of both first-line and non-first-line antidepressant medications as an indicator of poor treatment response or a complex clinical situation.	In this prospective longitudinal study, it was found that 12.8% of women with recurrent depression had elevated ADHD symptoms, and 3.4% met the DSM-5 diagnostic criteria for ADHD. None of these women reported having been diagnosed with ADHD by a medical professional, indicating that these women do not have a formal ADHD diagnosis. According to the study by Powell, V., E. *et al* (2021), ADHD symptoms appear at an earlier age, specifically under 25 years old, and are associated with the onset of depression. ADHD exacerbates depressive symptoms, leading to a higher recurrence of depressive episodes over the 13-year study period, such as increased irritability, risk of self-harm, or suicide attempts. Individuals with elevated ADHD symptoms are more likely to face an increased risk of hospitalization and to receive second-line antidepressant medication. This might suggest that these individuals were recognized by doctors as having a more complex presentation of depression or a lower response to first-line antidepressants.