




General

Prevalence of Undiagnosed Attention Deficit Hyperactivity Disorder

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Background

Attention deficit/hyperactivity disorder (ADHD) is a disorder characterized by inattention, hyperactivity, and impulsivity. Primary pharmacologic interventions include stimulants and non-stimulants. Diagnosing ADHD is typically more difficult in women due to a range of different symptoms between the sexes. Although ADHD has had more advocacy recently, misdiagnoses are still common, resulting in ADHD being mistaken for other disorders. This study aims to decipher the prevalence of undiagnosed ADHD.

Methods

A web-based survey was administered, comprising of a questionnaire derived from the Adult ADHD Self-Report Scale (ASRS-V1.1), and two additional questions formulated to determine whether the individual was initially diagnosed with ADHD and whether they take medications for it. The Adult ADHD Self-Report Scale is split into two parts where part A determines the symptoms and part B further probes into specific symptoms.

Results

Amongst the cohort of 200, the percentage undiagnosed ADHD was 14%. 61% were women, while 39% were men. The first two questions on the ASRS-V1.1, pertaining to task completion, were the most statistically significant results.

Conclusion

Although advocacy for ADHD has increased in the last twenty years, our study found that 14% of a layperson cohort are undiagnosed with ADHD. It appears that undiagnosed ADHD is more prevalent in women compared to men.

INTRODUCTION

Attention deficit/hyperactivity disorder (ADHD) represents one of the most prevalent disorders in individuals marked from childhood to adulthood.¹ According to a Albrecht and colleagues, disorders that may be linked to ADHD have been recorded for the last two hundred years.² The first published literature on a disorder similar to ADHD was by Scottish physician Alexander Crichton in 1798, where he was testing insanity within patients.² Within the twenty-first century, ADHD has been gaining more recognition.

ADHD is characterized by three things: inattention, hyperactivity, and impulsivity.³ Inattention refers to difficulty maintaining focus on tasks and activities that require organizational skills, often due to challenges in comprehension and processing of information. Hyperactivity involves excessive movement or restlessness, such as fidgeting or inappropriate physical activity. Impulsivity is characterized by actions or speech that occur without thought. These characterizations reflect difficulties with self-control and

a tendency to act without considering potential consequences.³

ADHD is highly heritable, though it lacks a definitive cause.⁴ The disorder results from a complex interplay of genetics and non-genetic factors, with no single gene responsible.⁴ Family studies indicate that ADHD is more prevalent in individuals with a parental history of the disorder, which suggests a significant genetic component.⁴ Biologically, ADHD is related to the disruption in neural networks, specifically in Default-Mode-Network, when the brain is usually at rest. ADHD blocks activity in the neural networks for task processing during this state, eventually leading to attention span difficulty.⁵

While there is no cure for ADHD, pharmacologic therapy remains the primary treatment for ADHD. The medications are split into two categories: stimulants and non-stimulants.⁶ Stimulants, which include amphetamines and methamphetamines, are effective in approximately 70% of patients.⁶ However, these medications carry a risk of substance abuse.⁶ Non-stimulant medications include antidepressants and alpha agonists; they generally do not produce

as significant of an effect as stimulants.⁶ Alpha agonists, in particular, have side effects such as lowering blood pressure, weight gain, sedation, and an increased risk of cardiovascular issues.

ADHD is more prevalent in boys than girls, with boys exhibiting rates that are nearly double those of girls, at 10% compared to 5%.⁷ Despite more recognition and advocacy for ADHD, only 11% of adults with ADHD are currently receiving treatment.⁸ Many adults diagnosed with ADHD in their childhood were told that they would “grow out of it” eventually. However, over 60% of these adults still have it.⁹ In addition, increasing treatments for ADHD makes it harder for clinicians to have a selective treatment for patients.¹⁰ Despite research into ADHD over the past twenty years, the absence of valid objective criteria and neurological markers is still leading to invalid diagnoses of the disorder.¹¹ Most of the diagnosis is based on impulsivity, hyperactivity, and behavioral symptoms of inattention that are broad and can be caused by a range of factors (CDC, 2022). The differential diagnosis is broad and includes diabetes, thyroid dysfunction, absence seizure disorder, iron deficiency states including anemia, sleep deprivation, inflammatory bowel disease, disordered breathing, and post-concussion states among others.¹²

Women are more likely to be underdiagnosed for ADHD for a multitude of reasons, mainly because the symptoms of ADHD in women are different.¹³ Additionally, women and girls tend to internalize their symptoms, while boys and men are more likely to externalize their issues, contributing to an underdiagnosis in women (NIH, 2023). Other recorded causes that lead to women being undiagnosed are societal norms. Many labeled the feminine norm as gentle, empathetic, organized, and obedient, which plants the mindset in women that if they are not consistent with the standard, they face social judgment.¹³ This type of mindset can lead to females masking their symptoms of ADHD.

METHODS

RECRUITMENT & DATA COLLECTION

This study was conducted through an anonymous web-based survey during July 2024. Respondents opt-in to the survey via their mobile device, and provide consent. De-identified data collected includes sex, age, education, income, state, and race, in addition to the survey questions. Through the platform’s surveillance, users with multiple accounts were excluded. Participants had to be 16 years or older to participate and the survey was conducted in English, for respondents living in the United States.

STATISTICAL ANALYSES

Statistical analysis was performed using JMP 18 on MacOS. Nonparametric methods were used for skewed variables while normally distributed variables were analyzed using parametric methods. A p-value <.05 was considered significant.

THE SURVEY

The survey asked multiple questions directly from the validated Adult ADHD Self-Report Scale (ASRS-V1.1) [Figure 1]. Additional information on whether the population was diagnosed with ADHD and whether they take meds for it was also included. If the individual scored four or more boxes in the shaded section for part A (“Sometimes”, “Often”, “Very Often” in questions one through three and “Often” and “Very Often” in questions four through six), they have symptoms that are highly consistent with ADHD. Part B reveals additional cues and probes into the individual’s specific symptoms. Additional questions were cross-checked to see whether the individual had ADHD and was taking medications for it.

RESULTS

The cohort consisted of 200 individuals, ages 16 to 54, took part in the study, 110 of whom were females and 90 of whom were males.

Part B wasn’t a significant factor in diagnosing the participants because its purpose is to discover specific symptoms and not whether the participants have the symptoms. Part B is thus not included in this analysis. With this screening, it is essential to consider working factors, family history, and other external factors.

Twenty-eight respondents fit the criteria of ADHD and did not have a current diagnosis of ADHD. Further analysis showed that 61% of the undiagnosed population were women, with men being at 39%. The total percentage of undiagnosed ADHD is 14%.

Analyzing Part A of (ASRS-V1.1), in question one, 26 of the 28 undiagnosed population answered “Sometimes,” “Often,” or “Very Often.” This result indicated that 26 answers were in the shaded region of question one, which can be seen in Figure 1. This result can narrow down other factors contributing to a person’s attributes when diagnosing ADHD. In question two, 23 undiagnosed adults were marked in the same shaded region as in question one. This result indicates that more than half of the undiagnosed participants have ADHD symptoms related to question two and can have ADHD.

For questions four through six, shaded box responses were classified as “Often” and “Very Often,” as seen in Figure 1. According to Figure 5, representing question 4, only 16 people responded “Often” or “Very Often.” Compared to Figure 6, representing question 5, 18 individuals responded “Often” or “Very Often,” revealing the shaded box responses for this question. Figure 7, representing question 6, yielded 14 individuals responding “Often” or “Very Often.” Combining all six questions from Part A, over 50% of the undiagnosed population fit the symptoms of ADHD.

From the population of 200 hundred individuals, 28 were undiagnosed with ADHD. Compared with the ages of the undiagnosed population, the age range of most individuals is between 35 and 44. The second highest age range with the most participants is between the ages of 18 and 24. To

Adult ADHD Self-Report Scale (ASRS-v1.1) Symptom Checklist

| Patient Name | | | Today's Date | | | | | | |
|---|--|--|--------------|--|-------|--------|-----------|-------|------------|
| Please answer the questions below, rating yourself on each of the criteria shown using the scale on the right side of the page. As you answer each question, place an X in the box that best describes how you have felt and conducted yourself over the past 6 months. Please give this completed checklist to your healthcare professional to discuss during today's appointment. | | | | | Never | Rarely | Sometimes | Often | Very Often |
| 1. How often do you have trouble wrapping up the final details of a project, once the challenging parts have been done? | | | | | | | | | |
| 2. How often do you have difficulty getting things in order when you have to do a task that requires organization? | | | | | | | | | |
| 3. How often do you have problems remembering appointments or obligations? | | | | | | | | | |
| 4. When you have a task that requires a lot of thought, how often do you avoid or delay getting started? | | | | | | | | | |
| 5. How often do you fidget or squirm with your hands or feet when you have to sit down for a long time? | | | | | | | | | |
| 6. How often do you feel overly active and compelled to do things, like you were driven by a motor? | | | | | | | | | |

Part A

Figure 1. Part A of Adult ADHD Self-Report Scale (ASRS-V1.1) with shaded boxes designed to demonstrate consistency with ADHD symptoms.

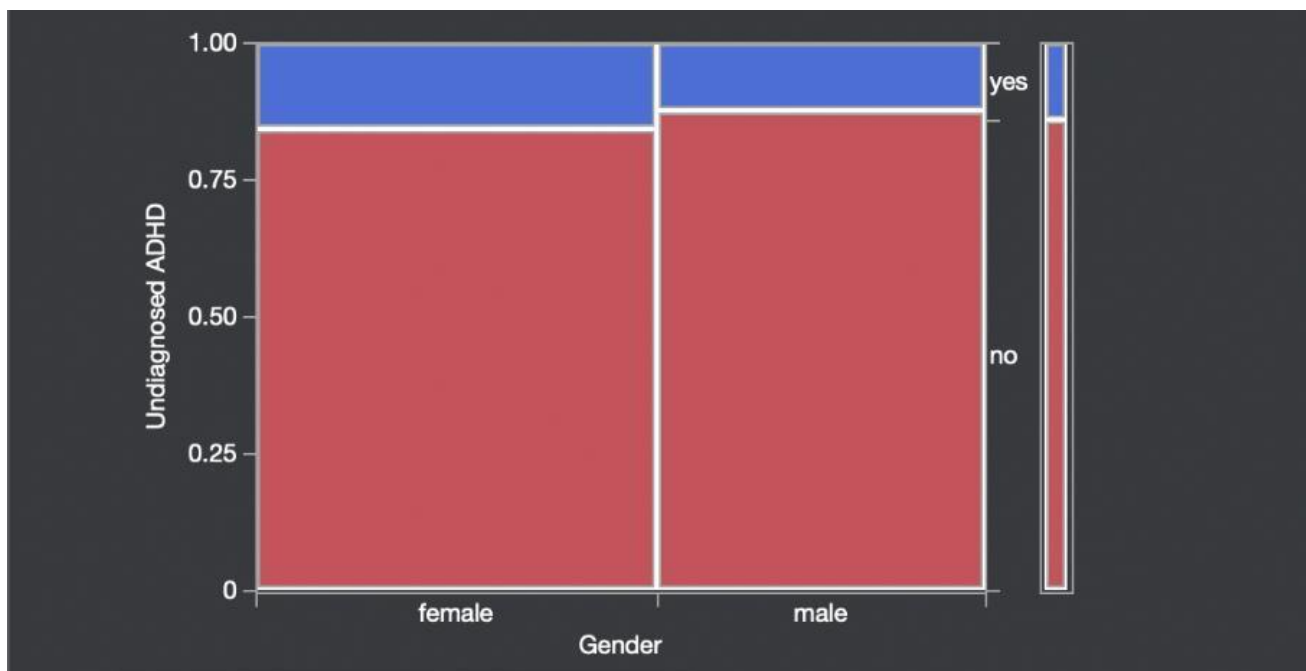


Figure 2. Contingency Graph comparing undiagnosed ADHD between males and females.

infer, it can be due to the societal influences that come with their generation. Factors may include the fact that ADHD advocacy may not have been more significant in their childhood.

DISCUSSION

Although advocacy for ADHD has significantly increased in the twenty-first century, ADHD is still seen to be undiagnosed by 20%.¹³ This phenomenon can be due to the sample size being small and having an individual less likely to have undiagnosed ADHD because there are other metrics. Individuals are typically screened at a young age since

| How often do you have difficulty getting things in order when you have to do a task that requires organization? | | | | | | |
|---|---------|--------|-------|--------|---------------|---------------|
| Undiagnosed ADHD | Count | Never | Often | Rarely | Sometim es | Very often |
| | Total % | | | | | |
| | Col % | | | | | |
| | Row % | | | | | |
| | no | 29 | 21 | 58 | 53 | 11 |
| | | 14.50 | 10.50 | 29.00 | 26.50 | 5.50 |
| | | 100.00 | 67.74 | 95.08 | 81.54 | 78.57 |
| | | 16.86 | 12.21 | 33.72 | 30.81 | 6.40 |
| | yes | 0 | 10 | 3 | 12 | 3 |
| | | 0.00 | 5.00 | 1.50 | 6.00 | 1.50 |
| | | 0.00 | 32.26 | 4.92 | 18.46 | 21.43 |
| | | 0.00 | 35.71 | 10.71 | 42.86 | 10.71 |
| | Total | 29 | 31 | 61 | 65 | 14 |
| | | 14.50 | 15.50 | 30.50 | 32.50 | 7.00 |
| | | | | | | |

Figure 3. Contingency graph of question one compared to the undiagnosed population.

| How often do you have problems remembering appointments or obligations? | | | | | | |
|---|---------|-------|-------|--------|---------------|---------------|
| Undiagnosed ADHD | Count | Never | Often | Rarely | Sometim es | Very often |
| | Total % | | | | | |
| | Col % | | | | | |
| | Row % | | | | | |
| | no | 36 | 17 | 60 | 44 | 15 |
| | | 18.00 | 8.50 | 30.00 | 22.00 | 7.50 |
| | | 97.30 | 65.38 | 93.75 | 80.00 | 83.33 |
| | | 20.93 | 9.88 | 34.88 | 25.58 | 8.72 |
| | yes | 1 | 9 | 4 | 11 | 3 |
| | | 0.50 | 4.50 | 2.00 | 5.50 | 1.50 |
| | | 2.70 | 34.62 | 6.25 | 20.00 | 16.67 |
| | | 3.57 | 32.14 | 14.29 | 39.29 | 10.71 |
| | Total | 37 | 26 | 64 | 55 | 18 |
| | | 18.50 | 13.00 | 32.00 | 27.50 | 9.00 |
| | | | | | | |

Figure 4. Contingency graph of question four comparing to the undiagnosed population

the symptoms first occur.⁶ However, only 11.3% of children from 2020-2023 have received a proper diagnosis for ADHD.¹³ This discrepancy can lead to why 14% of 200 participants are undiagnosed with ADHD.

Compared to the statistic that ADHD is more prevalent in boys than girls, girls are more undiagnosed. The study results showed that 55% of the undiagnosed population were women. This statistic means that women are more likely to be misdiagnosed. Considering external factors, societal norms, and symptoms are different between both sexes. Women are pressured to be more empathetic and or-

ganized.¹³ This pressure creates a fear of being outed by societal norms and can lead to women more than likely hiding symptoms of ADHD. Another factor provided is that men are more likely to externalize their problems while women are more likely to internalize the issue. Comparing this with societal norms, one reason why women are underdiagnosed for ADHD is that they hide the symptoms more discretely.

With age, the undiagnosed population is seen in the older population because screening for ADHD was not as common for them growing up (NIMH, 2023). As seen in age ranges 35-44 in [Figure 7](#), there was the highest number of

| How often do you have problems remembering appointments or obligations? | | | | | | |
|---|---------|-------|-------|--------|---------------|---------------|
| Undiagnosed ADHD | Count | Never | Often | Rarely | Sometim es | Very often |
| | Total % | | | | | |
| | Col % | | | | | |
| | Row % | | | | | |
| | no | 36 | 17 | 60 | 44 | 15 |
| | | 18.00 | 8.50 | 30.00 | 22.00 | 7.50 |
| | | 97.30 | 65.38 | 93.75 | 80.00 | 83.33 |
| | | 20.93 | 9.88 | 34.88 | 25.58 | 8.72 |
| | yes | 1 | 9 | 4 | 11 | 3 |
| | | 0.50 | 4.50 | 2.00 | 5.50 | 1.50 |
| | | 2.70 | 34.62 | 6.25 | 20.00 | 16.67 |
| | | 3.57 | 32.14 | 14.29 | 39.29 | 10.71 |
| | Total | 37 | 26 | 64 | 55 | 18 |
| | | 18.50 | 13.00 | 32.00 | 27.50 | 9.00 |

Figure 5. Contingency graph of question three compared to the undiagnosed population.

| When you have a task that requires a lot of thought, how often do you avoid or delay getting started? | | | | | | |
|---|---------|-------|-------|--------|---------------|---------------|
| Undiagnosed ADHD | Count | Never | Often | Rarely | Sometim es | Very often |
| | Total % | | | | | |
| | Col % | | | | | |
| | Row % | | | | | |
| | no | 26 | 25 | 45 | 67 | 9 |
| | | 13.00 | 12.50 | 22.50 | 33.50 | 4.50 |
| | | 96.30 | 73.53 | 93.75 | 89.33 | 56.25 |
| | | 15.12 | 14.53 | 26.16 | 38.95 | 5.23 |
| | yes | 1 | 9 | 3 | 8 | 7 |
| | | 0.50 | 4.50 | 1.50 | 4.00 | 3.50 |
| | | 3.70 | 26.47 | 6.25 | 10.67 | 43.75 |
| | | 3.57 | 32.14 | 10.71 | 28.57 | 25.00 |
| | Total | 27 | 34 | 48 | 75 | 16 |
| | | 13.50 | 17.00 | 24.00 | 37.50 | 8.00 |

Figure 6. Contingency graph of question four comparing to the undiagnosed population

individuals with undiagnosed ADHD. Most adults are told that they will grow out of ADHD, and others think that they do not need a screening. Another factor that increases this statistic is the convenience of getting tested for ADHD.

CONCLUSION

Even though advocacy for ADHD has increased for the last twenty years, the study found that 14% of 200 individuals are undiagnosed with ADHD. 55% were women, while 45% were men. Due to the fact that there are more women undiagnosed, it supports the finding that women are more undiagnosed for ADHD than men. Results urge the scientific and medical community to find a better way for ADHD screen-

ing that is made individually for two sexes as symptoms differ between the two. This advocacy can lead to more reliable diagnoses that can help individuals initially.

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How often do you fidget or squirm with your hands or feet when you have to sit down for a long time?

| Undiagnosed ADHD | Count | Never | Often | Rarely | Sometim es | Very often | Total |
|------------------|---------|-------|-------|--------|---------------|---------------|-------|
| | Total % | | | | | | |
| | Col % | | | | | | |
| | Row % | | | | | | |
| no | | 26 | 35 | 37 | 55 | 19 | 172 |
| | | 13.00 | 17.50 | 18.50 | 27.50 | 9.50 | 86.00 |
| | | 92.86 | 79.55 | 92.50 | 91.67 | 67.86 | |
| | | 15.12 | 20.35 | 21.51 | 31.98 | 11.05 | |
| yes | | 2 | 9 | 3 | 5 | 9 | 28 |
| | | 1.00 | 4.50 | 1.50 | 2.50 | 4.50 | 14.00 |
| | | 7.14 | 20.45 | 7.50 | 8.33 | 32.14 | |
| | | 7.14 | 32.14 | 10.71 | 17.86 | 32.14 | |
| Total | | 28 | 44 | 40 | 60 | 28 | 200 |
| | | 14.00 | 22.00 | 20.00 | 30.00 | 14.00 | |

Figure 7. Contingency graph of question five comparing to the undiagnosed population

How often do you feel overly active and compelled to do things, like you were driven by a motor?

| Undiagnosed ADHD | Count | Never | Often | Rarely | Sometim es | Very often | Total |
|------------------|---------|-------|-------|--------|---------------|---------------|-------|
| | Total % | | | | | | |
| | Col % | | | | | | |
| | Row % | | | | | | |
| no | | 30 | 27 | 40 | 65 | 10 | 172 |
| | | 15.00 | 13.50 | 20.00 | 32.50 | 5.00 | 86.00 |
| | | 96.77 | 72.97 | 90.91 | 87.84 | 71.43 | |
| | | 17.44 | 15.70 | 23.26 | 37.79 | 5.81 | |
| yes | | 1 | 10 | 4 | 9 | 4 | 28 |
| | | 0.50 | 5.00 | 2.00 | 4.50 | 2.00 | 14.00 |
| | | 3.23 | 27.03 | 9.09 | 12.16 | 28.57 | |
| | | 3.57 | 35.71 | 14.29 | 32.14 | 14.29 | |
| Total | | 31 | 37 | 44 | 74 | 14 | 200 |
| | | 15.50 | 18.50 | 22.00 | 37.00 | 7.00 | |

Figure 8. Contingency graph of question six comparing to the undiagnosed population

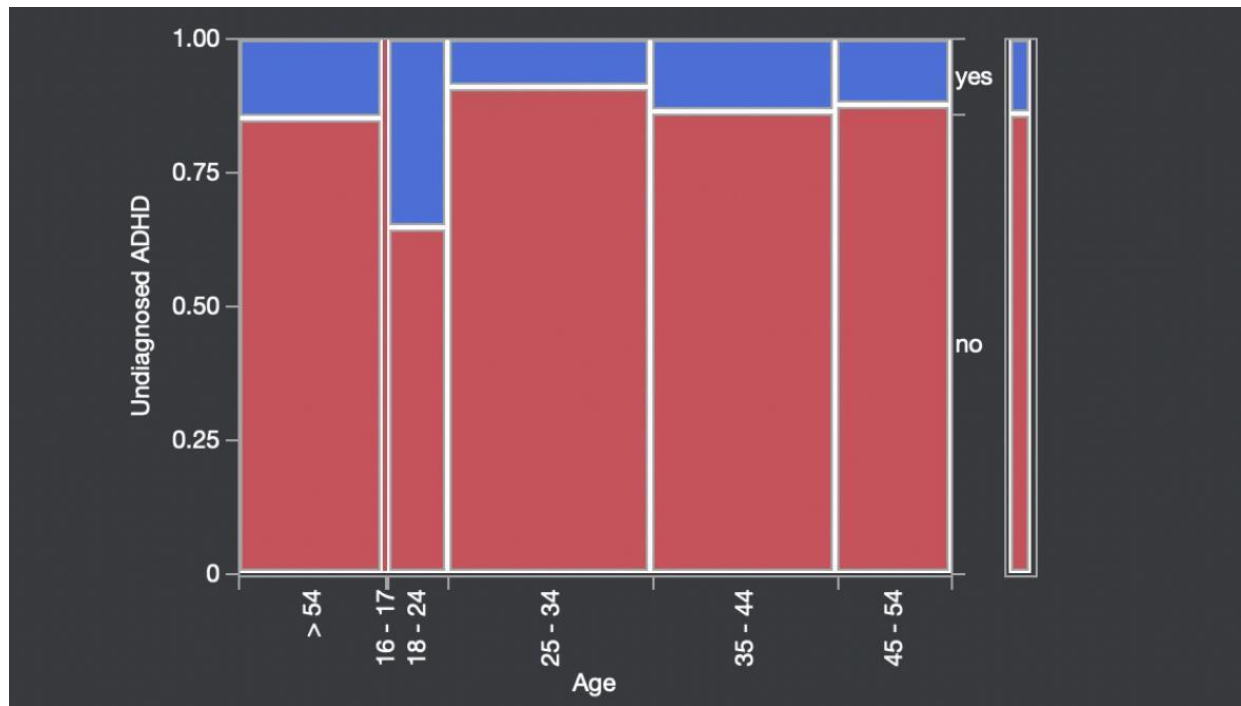


Figure 9. Contingency Graph comparing ages with undiagnosed

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