



Investigating Socioeconomic Associations Among Children and Adolescents With Attention-Deficit/Hyperactivity Disorder Within the United States



Banujan Balachandran, Susan Hughes, Iris Price, Jasmine Garcha
Department of Family and Community Medicine, University of California San Francisco Fresno, Fresno, CA, USA
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INTRODUCTION & BACKGROUND

Attention Deficit Hyperactivity Disorder (ADHD) is one of the most common childhood neurobehavioral disorders in the United States [1]. The Diagnostic and Statistical Manual of Mental Disorders categorizes ADHD as a disease with pervasive developmentally inappropriate symptoms including, but not limited to hyperactivity, impulsivity and a severe lack of attention [2]. An ADHD diagnosis allows eligible children to receive educational assistance in school as well as medications to help alleviate some of the disorder's negative influence on behaviour and learning. However, not all groups of children are equally as likely to receive a formal diagnosis and/or receive the appropriate treatment.

With a reported prevalence between 2 and 5%, ADHD has a complex etiology not simply limited to heritable factors; social, economic, demographic and environmental factors have been postulated to play a significant role as well [3]. Unfortunately, individuals with ADHD are at an increased risk of a plethora of negative outcomes including poor educational achievement and substance abuse [4] While pharmacologic and non-pharmacologic interventions are effective in targeting ADHD symptoms, not enough measures exist addressing some of the causal factors behind the diagnosis. By identifying these factors, it allows for the identification/tackling of symptoms at an early stage and the proper follow-up once a formal diagnosis is made in high-risk groups, to prevent some of the pitfalls later in life associated with ADHD. This study aimed to identify associations between socioeconomic, environmental and demographic factors and ADHD, to identify both high-risk groups and areas where more efforts/resources can be directed.

METHODS

Data Collection

This study utilized the Public Use Data Files from the National Survey of Children's Health (NSCH), a population-based cross-sectional survey sponsored by the Health Resources and Services Administration Maternal and Child Health Bureau. Data was collected through mail- and web-based surveys conducted in English or Spanish from 2016, 2017, and 2018 for children under 18 years of age, answered by adult proxy respondents to perform a retrospective analysis of data through census collection. Weighted prevalence estimates were calculated overall and by demographic and clinical subgroups (n = 5,986,076; 9.8%). The de-identified data housed by the Census Bureau's NSCH webpage was obtained by following the appropriate protocols and initiatives in place to ensure confidentiality was maintained at all times through collection, mining and organization of the data. Data sets were available to download in SAS format after consenting to maintain confidentiality and not try to identify individuals. Data included health conditions, birth information, healthcare services, experience with healthcare providers, healthcare insurance coverage, education, family and household information.

Statistical Analysis

This study looked at associations that were statistically significant among those carrying a diagnosis of ADHD compared to those without. The Chi-square test and Fisher's exact test were employed to compare the categorical data between those carrying a diagnosis and those not carrying a diagnosis of ADHD. A p-value of 0.05 was established as statistical significance.

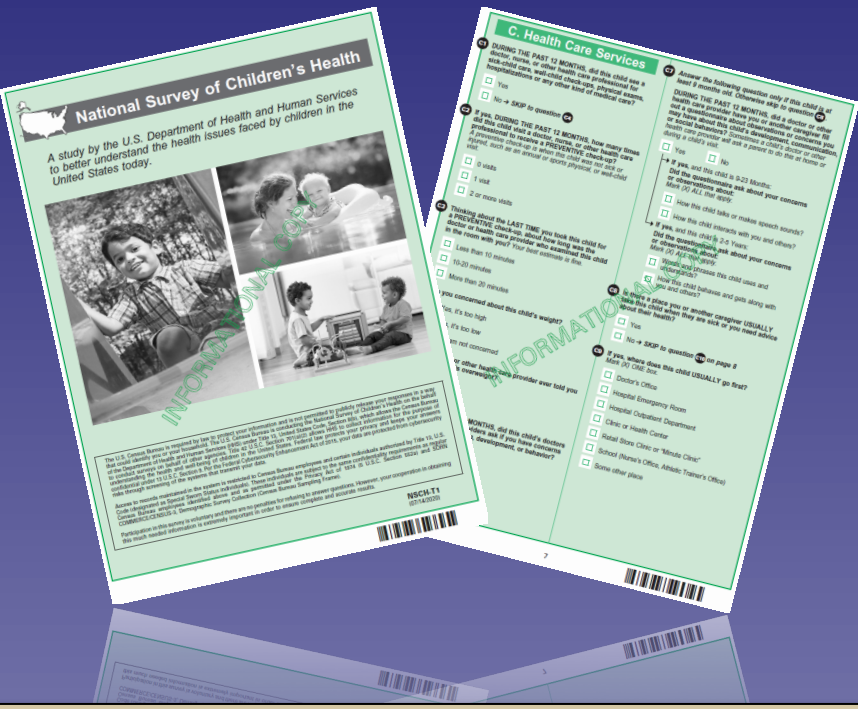


Figure 1

National Survey of Children's Health. A survey that provides data on multiple, intersecting aspects of children's lives including physical and mental health, access to quality healthcare, and the child's family, neighbourhood, school and social contact.

RESULTS

Table 1

Prevalence of ADHD by Gender, Race, Nativity, and Birth

Characteristic	Parent-reported child currently or ever having ADHD		Parent-reported child never having ADHD		p-value
	Weighted Prevalence [95% CI]		Weighted Prevalence [95% CI]		
Gender (%)					<0.0001
Male	68.89	[66.83 – 70.95]	49.29	[48.48 – 50.11]	
Female	31.11	[29.05 – 33.17]	50.71	[49.89 – 51.52]	
Race/Ethnicity					<0.0001
Hispanic	19.49	[17.21 – 21.70]	25.70	[24.81 – 26.60]	
Non-Hispanic White	56.57	[54.29 – 58.85]	50.34	[49.55 – 51.14]	
Non-Hispanic Black	16.85	[14.90 – 18.80]	13.15	[12.56 – 13.75]	
Other	7.13	[6.30 – 7.95]	10.80	[10.38 – 11.22]	
Nativity					0.0621
Born in the US	96.52	[95.36 – 97.67]	95.20	[94.84 – 95.57]	
Born outside the US	3.48	[2.33 – 4.64]	4.80	[4.43 – 5.16]	
Premature	17.02	[15.29 – 18.74]	11.01	[10.47–11.55]	<0.0001
Birth Weight (<2500 g)	12.27	[10.85 – 13.68]	9.03	[8.53 – 9.52]	<0.0001
Child's Health Fair/Poor	5.14	[3.72 – 6.55]	1.28	[0.89 – 1.67]	<0.0001
Daily Activities Consistently Affected	19.18	[17.48 – 20.90]	2.19	[1.92 – 2.45]	<0.0001
Two or More ER Visits	8.94	[7.32 – 10.56]	3.61	[3.27 – 3.95]	<0.0001
Concern About Weight					<0.0001
Weight is too high	12.30	[10.95 – 13.64]	8.40	[7.93 – 8.87]	
Weight is too low	8.53	[7.29 – 10.56]	2.35	[2.10 – 2.60]	

Table 2

Prevalence of ADHD by Family Structure and Living Conditions

Characteristic	Parent-reported child currently or ever having ADHD		Parent-reported child never having ADHD		p-value
	Weighted Prevalence [95% CI]		Weighted Prevalence [95% CI]		
Family Structure					<0.0001
Two Parent House	59.86	[56.79 – 62.91]	75.78	[74.78 – 76.69]	
Single Mother	25.48	[22.90 – 28.06]	15.47	[14.61 – 16.32]	
Eat Meals Together Daily	37.42	[35.25 – 39.58]	41.91	[41.08 – 42.74]	<0.0001
Difficult Covering Basics like Food/Housing	10.38	[9.06 – 11.69]	4.39	[4.06 – 4.72]	<0.0001
Smoker in Household	24.28	[22.27 – 26.29]	14.80	[14.23 – 15.36]	<0.0001
Park or Playground	72.62	[70.85 – 74.40]	76.02	[75.33 – 76.70]	0.0003
Recreation Center	48.45	[46.26 – 50.65]	50.17	[49.36 – 50.98]	0.15
Library or Bookmobile	66.90	[64.88 – 68.91]	68.79	[68.03 – 69.55]	0.08

Table 4

Prevalence of ADHD and Behavioural Therapy Compliance

Characteristic	ADHD Child Received Behavioral Therapy in Last 12 months		ADHD Child Did Not Receive Behavioral Therapy in Last 12 months		p-value
	Weighted Prevalence [95% CI]		Weighted Prevalence [95% CI]		
Race/Ethnicity					0.0023
Hispanic	43.58	[36.88 – 50.28]	56.42	[49.72 – 63.12]	
Non-Hispanic White	40.11	[37.98 – 42.23]	59.89	[57.77 – 62.02]	
Non-Hispanic Black	52.75	[46.10 – 59.40]	47.25	[40.60 – 53.90]	
Other	44.24	[38.44 – 50.03]	55.77	[49.97 – 61.56]	
0-99% of Federal Poverty Line	48.91	[43.83 – 59.98]	51.09	[46.02 – 56.17]	0.018
Less than High School	45.99	[34.27 – 57.72]	54.01	[42.28 – 65.73]	0.70
College Degree or Higher	42.65	[40.01 – 45.29]	57.35	[54.71 – 59.99]	0.70
Insurance Coverage	43.32	[41.11 – 45.54]	56.68	[54.46 – 58.89]	0.36

Table 3

Prevalence of ADHD and Medication Compliance

Characteristic	ADHD Child Currently Taking ADHD Medication		ADHD Child Not Currently Taking ADHD Medication		p-value
	Weighted Prevalence [95% CI]		Weighted Prevalence [95% CI]		
Race/Ethnicity					<0.0001
Hispanic	47.06	[40.21 – 53.91]	52.94	[46.09 – 59.79]	
Non-Hispanic White	60.44	[58.30 – 62.57]	39.56	[37.43 – 41.70]	
Non-Hispanic Black	61.50	[55.39 – 67.61]	38.50	[32.39 – 44.61]	
Other	56.53	[50.86 – 62.20]	43.47	[37.80 – 49.14]	
0-99% of Federal Poverty Line	57.27	[52.31 – 62.24]	42.73	[14.23 – 15.36]	0.58
Less than High School	64.61	[52.64 – 76.59]	35.39	[75.33 – 76.70]	0.28
College Degree or Higher	57.73	[55.04 – 60.41]	42.27	[39.59 – 44.96]	0.28
Insurance Coverage	58.90	[56.67 – 61.13]	41.10	[38.87 – 43.33]	<0.0001

Key Points

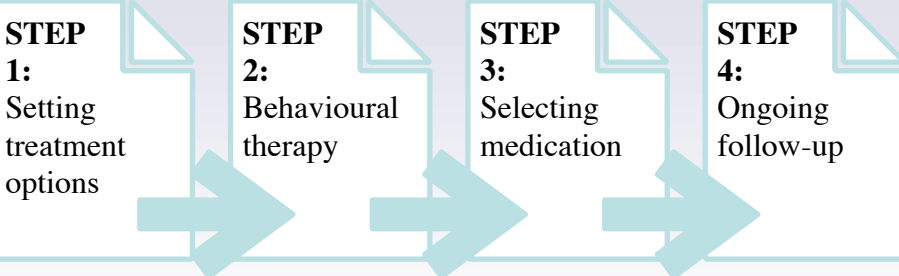
- Male gender, non-Hispanic children, prematurity, low birth weight, poor health, multiple ER visits and parental concern about weight (anorexia/obesity) showed an association with being diagnosed with ADHD.
- Single-parent household, reduced shared meals between parent and child, difficulty covering basic necessities, like food and housing, the presence of a smoker in the household and the lack of a park/playground in the neighbourhood showed an association with being diagnosed with ADHD.
- Fewer children diagnosed with ADHD within the Hispanic community were on medications.
- ADHD within the Hispanic and non-Hispanic White communities did not receive behavioural therapy as expected.
- More ADHD children within the Black community received both ADHD medications and behavioural therapy.
- Education level of the parent was not associated with a child having a diagnosis of ADHD.

DISCUSSION & CONCLUSION

The NSCH can be used to provide essential child health data so that substantive efforts, funding, and resources can be dedicated towards enhancing health policy and practise, specifically the diagnosis and treatment of ADHD. It can be beneficial in providing early education to parents whose child may be at increased risk of developing ADHD, directing adequate attention towards high-risk populations, and ensuring intervention is in place in order to prevent ADHD associated pitfalls later in life. In addition, it can help improve numerous conditions related to a child's physical and emotional well-being including, but not limited to home, family, community, school and education, access to healthcare and social context.

Figure 2

ADHD Treatment Approach. There is no known cure for ADHD, but many options exist to manage the symptoms. Treatments range from behavioural therapy to medication.



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