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Original Research

Lifetime Prevalence of Attention-Deficit Hyperactivity Disorder in Young Adults: Examining Variations in the Socioeconomic Gradient

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Key Words: attention-deficit hyperactivity disorder, lifetime prevalence, young adult, socioeconomic status, socioeconomic gradient, childhood-limited, urban–rural, psychostimulant

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Objective: It has only recently been accepted that attention-deficit hyperactivity disorder (ADHD) persists into adulthood. Accordingly, less is known about adult diagnostic and treatment prevalence. We aimed to determine the lifetime prevalence of ADHD diagnosis and psychostimulant prescriptions for young adults in the province of Manitoba and to explore how diagnosis differs according to sociodemographic characteristics and age at diagnosis; and to investigate whether a socioeconomic gradient exists within young adults with a lifetime ADHD diagnosis, as well as the variables that moderate the gradient.

Methods: Using the Manitoba Population Health Research Data Repository, our cross-sectional analysis used 24 fiscal years of data (1984/85 to 2008/09) and included all adults aged 18 to 29 during 2007/08 to 2008/09 in Manitoba (n = 207 544) who had a lifetime diagnosis of ADHD (n = 14 762). Regression analyses tested for differences in rates by sex, region, age, age at diagnosis, and socioeconomic status.

Results: Lifetime prevalence for ADHD diagnosis (7.11%) and psychostimulant prescriptions (3.09%) differed according to sex, region, and age. In contrast to previous Manitoban research on childhood ADHD, the socioeconomic gradient for ADHD diagnosis was not found in young adulthood. When region was accounted for, a small negative gradient in the urban population and a positive gradient in the rural population were evident. People from the highest income quintile were significantly less likely to be diagnosed before age 18, compared with other income quintiles.

Conclusions: Given the high lifetime prevalence of ADHD in Manitoban young adults and significant socioeconomic correlates for diagnosis, further investigation into the trajectory of this relatively unexplored population is recommended.

Prévalence de durée de vie du trouble de déficit de l'attention avec hyperactivité chez les jeunes adultes : examen des variations du gradient socioéconomique

Objectif : Ce n'est que récemment qu'il a été convenu que le trouble de déficit de l'attention avec hyperactivité (TDAH) persiste à l'âge adulte. Conformément, nous en savons moins sur la prévalence du diagnostic adulte et du traitement. Nous avons cherché à déterminer la prévalence de durée de vie du diagnostic de TDAH et des prescriptions de psychostimulants pour les jeunes adultes de la province du Manitoba, et à explorer comment le diagnostic diffère selon les caractéristiques sociodémographiques et l'âge au moment du diagnostic. Nous voulions aussi rechercher s'il existe un gradient

socioéconomique chez les jeunes adultes ayant un diagnostic de TDAH de durée de vie, ainsi que des variables qui modèrent le gradient.

Méthodes : À l'aide de la réserve des données de recherche sur la santé de la population du Manitoba, notre analyse transversale a utilisé les données de 24 exercices financiers (1984-1985 à 2008-2009) et incluait tous les adultes de 18 à 29 ans durant les années 2007-2008 à 2008-2009 au Manitoba (*n* = 207 544) qui avaient un diagnostic de TDAH de durée de vie (*n* = 14 762). Les analyses de régression vérifiaient les différences des taux selon le sexe, la région, l'âge, l'âge au diagnostic, et le statut socioéconomique.

Résultats : La prévalence de durée de vie du diagnostic de TDAH (7,11 %) et des prescriptions de psychostimulants (3,09 %) différait selon le sexe, la région, et l'âge. Contrairement à la recherche antérieure au Manitoba sur le TDAH pédiatrique, le gradient socioéconomique du diagnostic du TDAH était introuvable chez les jeunes adultes. En tenant compte de la région, un modeste gradient négatif de la population urbaine et un gradient positif de la population rurale étaient évidents. Les personnes du quintile de revenu le plus élevé étaient significativement moins susceptibles d'être diagnostiquées avant l'âge de 18 ans, comparativement aux autres quintiles de revenu.

Conclusions : Étant donné la prévalence élevée de durée de vie du TDAH chez les jeunes adultes manitobains et les corrélats socioéconomiques significatifs pour le diagnostic, nous recommandons plus de recherche sur la trajectoire de cette population relativement inexplorée.

While ADHD is often cited as one of the most commonly diagnosed mental health disorders in children, much less is known about diagnostic and treatment prevalence rates of ADHD in adults. One American study estimated a point prevalence of 4.4% with a nationally representative sample of adults 18 to 44 years of age.[1] Another survey of employed citizens from 10 countries prepared by the World Health Organization found an overall adult ADHD point prevalence of 3.5%.[2] Kessler et al[3] found lifetime prevalence rates of 7.8% for 18- to 29-year-olds and 8.1% for 18- to 44-year-olds using the US National Comorbidity Survey Replication data. As adult ADHD research has been given relatively little attention within Canada, epidemiologic findings on adult ADHD using Canadian data are critically relevant.

Past research with the Manitoban child population found a socioeconomic gradient in ADHD diagnoses and treatment in urban areas, with children from the lowest income areas having the highest rates.[4,5] Such research has yet to be done with an adult population. Understanding whether such a gradient exists for young adults with ADHD could have important implications. As previous research has found that diagnosis is associated with multiple secondary symptoms that impact health, quality of life, and productivity,[6–8] very poor health and social outcomes in this subpopulation would be anticipated if young adults from lower SES backgrounds are more likely to receive ADHD diagnoses. Such findings would strengthen the argument for enhancing

Abbreviations

ADHD	attention-deficit hyperactivity disorder
DA	dissemination area
DPIN	Drug Program Information Network
ICD-9-CM	International Statistical Classification of Diseases and Related Health Problems, Ninth Revision, Clinical Modification
ICD-10-CA	International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Canada
SES	socioeconomic status

Clinical Implications

- Similar to research from the United States, the lifetime prevalence of ADHD found in our Canadian study was substantial (7.11%), such that Canadian health care providers should be prepared to identify and provide treatment for ADHD across the lifespan.
- The socioeconomic gap for ADHD diagnosis found in previous studies with child populations appears to dissolve in young adulthood, lending support to a childhood-limited model of ADHD and SES.
- Young adults with ADHD may require increased educational or health services when they are trying to make a successful transition into post-secondary education or employment.

Limitations

- The correlational design does not allow for inferences of causality about the socioeconomic gradient, although it still provides important relational information about the variables.
- It is possible that some young adults who were diagnosed with ADHD as children were not captured in the databases used in our study, particularly those in rural areas.
- Our study only captures prevalence of young adults diagnosed with or treated for ADHD, rather than prevalence of all diagnosed and undiagnosed young adults with ADHD.

education and health programs in lower SES regions to promote environments that improve the management of this disorder.

Our study aimed to investigate lifetime diagnosis and treatment prevalence of ADHD in Manitoban young adults, as well as the association with several demographic variables. This analysis adds to the literature on ADHD with relation to diagnosis, psychostimulant prescriptions, SES, sex, age, age at diagnosis, and region of residence. Additionally, it furthers Canadian research in this area by considering whether the socioeconomic gradient in urban areas for people diagnosed or treated with ADHD persists into young adulthood, whether variables such as region of residence, age, and age at diagnosis are moderators of the gradient, and whether more resources need to be specifically allocated to young adults with ADHD living in low-income areas.

Methods

Data Sources

The Manitoba Population Health Research Data Repository housed at the Manitoba Centre for Health Policy at the University of Manitoba contains a collection of databases that includes records for virtually all contacts with provincial health care services, based on universal coverage. An encrypted identifier allows for linkages across databases and years of data. The health data in the Repository have been studied extensively and validated for research.[9–11]

Specific data files used in our study included physician claims, hospital discharge abstracts, prescription medications, a population registry, and Canadian census data. The physician claims file includes an ICD-9-CM diagnosis code, recorded to the third digit. Most Manitoban physicians are reimbursed through fee-for-service, with the remainder submitting evaluation claims. About 7% of visits to emergency departments and services from some salaried and sessional physicians are missing from this file, as are visits prior to 2006 to nurses at nursing stations, which occur mostly in remote northern communities.[12] The absence of nursing station data may lead to undercounting of ADHD services for youths residing in remote communities, although the numbers are small relative to the population of the province as a whole. Hospital discharge abstracts contain up to 25 ICD-9-CM or ICD-10-CA diagnostic codes. The DPIN contains records of prescriptions given to Manitoban residents for use out of hospital. All prescriptions filled in pharmacies or hospitals (for outpatients) are recorded in the DPIN. These claims are coded using numeric patient identifiers, drug identification numbers, or Anatomical Therapeutic Chemical Drug Classification System numbers. The population registry was used to determine residence, age, and sex of study subjects. Canadian census data were used to derive area-level income information.

Study Population, Study Period, and Definitions

Our study used longitudinal, population-based data (that is, 24 fiscal years of data from 1984/85 to 2008/09), which included all adults aged 18 to 29 years in the province of Manitoba during 2007/08 to 2008/09 (n = 207 544) with a lifetime diagnosis of ADHD (n = 14 762). All statistical analyses employed were cross-sectional. Prevalence of diagnosis was determined from physician visits and hospitalizations, using the ICD-9-CM of 314 (hyperkinetic syndrome of childhood) or the ICD-10-CA code of F90 (termed hyperkinetic disorders). In addition, people who had 2 or more prescriptions for a psychostimulant and no diagnosis for conduct disorder, narcolepsy, or catalepsy were classified as having a diagnosis of ADHD.[4,13]

The following independent variables were captured using 2 fiscal years of data (2007/08 to 2008/09): sex; urban and rural regions of residence (determined by municipal and postal codes during the 2007/08 to 2008/09 study period, with urban referring to residents of Winnipeg and Brandon and rural referring to all other residents of Manitoba); age (calculated from date of birth); age at diagnosis (calculated as the first time during the lifespan that a diagnosis of ADHD was made); and SES (based on income). To measure SES, an area-level average household income (grouped into quintiles) measure was aggregated according to the Census DA (about 400 people). DAs were ranked from poorest to wealthiest, and then grouped into 5 income quintiles, with about 20% of the population in each quintile.

Data Analysis

Regression analyses examined both unadjusted and adjusted prevalence of lifetime ADHD diagnosis and treatment. Lifetime prevalence was calculated by dividing the number of people with diagnoses or prescriptions by the total population relevant for the measure. Single outcome Poisson regression analyses were conducted to test if there were significant differences in unadjusted prevalence rates. A Poisson distribution assumes that the mean and the variance are equal, and it is ideal for modelling both rate and count data, for which a nonnormal error distribution would be expected.

The adjusted regression analysis used a diagnosis of ADHD as the dependent variable and sex, region of residence (that is, urban or rural), age group, and SES as base model independent variables. Poisson regression analysis was initially attempted with each model. However, negative binomial regression analysis was primarily used due to significant overdispersion of the data (that is, variance larger than the mean) and poor model fit. Goodness of fit was assessed using the ratio of model deviance to degrees of

freedom, which tests equality of the mean and the variance. The significance of each of the variables in the model was assessed using likelihood ratio tests, and the significance of the estimates for each level within all variables was assessed via chi-square test contrasts.

A series of sequential models were tried, with interactions added separately to the base models, because of a priori theoretical findings that supported the main effects, in conjunction with fewer past studies supporting all of the interactions.

Both total population and urban only regression modelling were conducted because income quintile rates have been found to consistently differ between urban and rural regions in previous research on ADHD in Manitoba.[5] Rural data are more likely to have inconsistencies owing to incomplete data from nursing stations, reduced access to particular health professionals, and more within-area heterogeneity in SES. Also, use of a 3-level age group variable (that is, 18 to 21, 22 to 25, and 26 to 29) was tried to determine whether this would have an impact on model fit. However, neither urban-only modelling nor use of a 3-level age group variable had a significant impact on model fit, thus these results are not reported here.

Results

Lifetime Prevalence

The overall lifetime prevalence of ADHD diagnosis for Manitoban young adults aged 18 to 29 in the 2008/09 fiscal year was 7.11%, with 14 762 young adults having an ADHD diagnosis out of a total provincial young adult population of 207 544. Table 1 shows lifetime prevalence rates for ADHD diagnosis according to sex, region, age group, SES, SES by region, and psychostimulant prescriptions. It should be noted that while 2 or more psychostimulant prescriptions were used in the definition of ADHD in our study, only 3.3% of the ADHD cohort were exclusively captured in this manner. For SES, a small percentage (0.7%) of people with ADHD could not be categorized because their postal codes were not linked to an income quintile (that is, Not Found). In all subsequent analyses of SES, these observations were excluded.

When all diagnoses across the lifespan were considered for those identified by diagnostic codes only (that is, excluding those who were identified by prescription claims only), 82.09% of the ADHD cohort were diagnosed prior to age 18 and not afterward, 5.13% were diagnosed at or after age 18 and not before, and 12.79% received diagnostic codes for ADHD both before and after age 18.

Socioeconomic Gradient

Across all analyses, the best adjusted model included sex, region (urban or rural), 6-level age group, income quintile, and a region by SES interaction. The deviance to degrees of freedom ratio for this model was 1.04, and the likelihood ratio statistics showed that all independent variables were significant. Table 2 provides the regression coefficient contrast estimates, including a significant linear trend for the region of residence by income quintile interaction.

To test for an interaction between income quintile and age at diagnosis in childhood, compared with young adulthood (that is, diagnosed before age 18, compared with diagnosed between ages 18 to 29), logistic regression modelling was used within the ADHD cohort only. As evidenced by the nonsignificant linear trend ($P = 0.06$) in Table 3, the relation between age at diagnosis and income quintile did not form a linear gradient pattern, but more of an inverted U-shaped pattern, with those in Q3 (middle income) being the most likely to be diagnosed under age 18 years. When Q3 was used as the reference category, there were no statistically significant differences between the rates of first diagnosis in childhood within the first 4 income quintiles; however, the rate for the highest income quintile (Q5) was significantly lower than all other income quintiles (OR = 0.783; $P = 0.004$). In other words, people from the very highest income quintile were significantly less likely to be diagnosed before age 18, compared with other income quintiles. Table 3 also shows that males were significantly more likely than females to be diagnosed before age 18, and both males and females living in urban areas were significantly less likely to be diagnosed before age 18 than those living in rural areas.

Discussion

Lifetime Prevalence

The lifetime prevalence of ADHD in Manitoban young adults (7.11%) is in scope with, but slightly lower than, the 7.8% found by Kessler et al,[3] using American epidemiologic data with the same age range. While the methods in both studies may underestimate true prevalence, it is important to note that the methods used in Kessler et al's study were very different. Kessler et al[3] used in-person, structured diagnostic interviews that identified only people who recall and acknowledge ADHD symptoms during their lifetime, while our study identified only those who have received ADHD diagnosis or treatment in the public health system.

The sex ratio of 2.67:1 is close to other adult ADHD research that has demonstrated a 2:1 ratio.[1] Consistent with previous Manitoban research on ADHD,[4,13] lifetime prevalence was higher in urban regions of residence, compared with rural areas. Lifetime prevalence incrementally decreased with increasing age group, in a gradient pattern. Despite past research that does not support the existence of any significant age trends in adult ADHD,[1] these results suggest that, perhaps as a function of the overall increase in the

Table 1 Attention-deficit hyperactivity disorder (ADHD) prevalence by sociodemographic variables

Variable	People with ADHD, *n*	General population, *n*	Lifetime prevalence (per 100 people)	95% CI
Sex				
Male	10 803	104 856	10.30	10.11 to 10.50
Female	3959	102 688	3.86	3.74 to 3.98
Region				
Urban	10 182	125 309	5.57	5.41 to 5.73
Rural	4580	82 235	8.13	7.97 to 8.28
Age group, years				
18 to 19	4733	51 962	9.11	8.85 to 9.37
20 to 21	2638	32 640	8.08	7.78 to 8.40
22 to 23	2380	32 003	7.44	7.14 to 7.74
24 to 25	1959	31 028	6.31	6.04 to 6.60
26 to 27	1693	30 331	5.58	5.32 to 5.85
28 to 29	1359	29 580	4.59	4.36 to 4.85
SES				
NF	109	715	15.24	12.64 to 18.39
Q1	2881	43 653	6.60	6.36 to 6.85
Q2	2910	41 285	7.05	6.80 to 7.31
Q3	2842	39 991	7.11	6.85 to 7.37
Q4	2931	40 472	7.24	6.98 to 7.51
Q5	3089	41 428	7.46	7.20 to 7.72
SES by region				
NF	109	715	15.24	12.64 to 18.39
R1	785	17 498	4.49	4.18 to 4.81
R2	832	16 184	5.14	4.80 to 5.50
R3	902	16 017	5.63	5.28 to 6.01
R4	944	15 597	6.05	5.68 to 6.45
R5	1101	16 747	6.57	6.20 to 6.97
U1	2096	26 155	8.01	7.68 to 8.36
U2	2078	25 101	8.28	7.93 to 8.64
U3	1940	23 974	8.09	7.74 to 8.46
U4	1987	24 875	7.99	7.64 to 8.35
U5	1988	24 681	8.05	7.71 to 8.42
Psychostimulant treatment				
Ever received	6403	207 544	3.09	3.01 to 3.16
During childhood	5202	207 544	2.51	2.44 to 2.57
During adulthood	1490	207 544	0.72	0.68 to 0.76
During childhood only	4913	207 544	2.37	2.30 to 2.43
During adulthood only	1201	207 544	0.58	0.55 to 0.61

NF = not found (people for whom income quintiles could not be determined from Census data because they were registered under the Manitoba Public Trustee, or residents of various care facilities, areas reporting no income in the Census, new neighborhoods, or from dissemination areas with populations of less than 250 [owing to suppression]); Q1 to Q5 = income quintiles, with Q1 being the lowest and Q5 the highest;
R1 to R5 = rural income quintiles, with R1 being the lowest and R5 the highest; SES = socioeconomic status;
U1 to U5 = urban income quintiles, with U1 being the lowest and U5 the highest

Table 2 Regression coefficient estimates of attention-deficit hyperactivity disorder diagnosis

Model effect	Estimate	RR	95% CI	χ^{2a}	*P*
Sex					
Male	0.99	2.69	2.59 to 2.79	2799.69	<0.001
Female	Reference	—	—	—	—
Age group, years					
18 to 19	0.72	2.05	1.93 to 2.18	537.05	<0.001
20 to 21	0.60	1.82	1.70 to 1.94	315.56	<0.001
22 to 23	0.51	1.66	1.55 to 1.78	221.14	<0.001
24 to 25	0.33	1.39	1.30 to 1.49	87.15	<0.001
26 to 27	0.20	1.22	1.14 to 1.32	30.58	<0.001
28 to 29	Reference	—	—	—	—
Region of residence by income quintile					
Rural					
Q1	–0.37	0.69	0.63 to 0.76	62.91	<0.001
Q2	–0.23	0.79	0.72 to 0.87	25.68	<0.001
Q3	–0.13	0.87	0.80 to 0.95	8.94	0.003
Q4	–0.07	0.93	0.86 to 1.02	2.34	0.13
Q5	Reference	—	—	—	—
Linear trend	0.30	1.35	1.26 to 1.45	74.70	<0.001
Urban					
Q1	0.10	1.11	1.04 to 1.18	9.94	0.002
Q2	0.11	1.11	1.05 to 1.19	11.06	0.001
Q3	0.06	1.06	0.99 to 1.13	3.08	0.08
Q4	0.01	1.01	0.95 to 1.08	0.13	0.72
Q5	Reference	—	—	—	—
Linear trend	–0.10	0.91	0.86 to 0.95	17.21	<0.001

RR = relative risk; Q1 to Q5 = income quintiles, with Q1 being the lowest and Q5 the highest

[a] *df* = 1

Table 3 Odds ratios for logistic regression modelling of age at diagnosis (under age 18) within the attention-deficit hyperactivity disorder cohort

Effect	OR (95% CI)	*P*
Sex		
Female	Reference	—
Male	2.329 (2.015 to 2.691)	<0.001
Region of residence		
Urban	Reference	—
Rural	1.327 (1.127 to 1.563)	0.001
Income quintile		
Q1	1.245 (1.002 to 1.547)	0.048
Q2	1.233 (0.992 to 1.532)	0.06
Q3	1.453 (1.155 to 1.827)	0.001
Q4	1.195 (0.963 to 1.484)	0.11
Q5	Reference	—
Linear trend	0.86	0.06

Q1 to Q5 = income quintiles, with Q1 being the lowest and Q5 the highest

diagnosis of ADHD in Manitoba during the years (that is, a cohort effect),[4,13] lifetime diagnostic rates for young adults in Manitoba in 2008/09 decrease with age.

Regarding SES, the results revealed a subtle, positive gradient pattern for ADHD diagnosis by SES (that is, increasing prevalence with increasing SES). This relation is likely driven by a stronger, positive gradient pattern in the rural population, which can also be observed in Table 1. While previous research with child populations has found a negative socioeconomic gradient pattern,[4,5,14] it appears that this pattern may dissipate by young adulthood for Manitoban young adults, particularly in urban areas. For age at diagnosis, the majority of the ADHD cohort (about 95%) received their first diagnosis prior to age 18, which is consistent with previous research and the conceptualization of ADHD as a disorder that originates in childhood.[3]

As can be observed in Table 1, the lifetime prevalence for psychostimulant treatment in Manitoban young adults is 3.09%. Further, 10.09% of the ADHD cohort in this

study received psychostimulant treatment in adulthood, and 8.14% of the ADHD cohort received psychostimulant treatment exclusively in adulthood. Perhaps these relatively high rates correspond with the findings in the literature that psychostimulants not only facilitate the dopaminergic transmission that is disrupted in adults with ADHD but also specifically improve executive functioning, which is one of the characteristic deficits of ADHD across the life course.[15–19]

Overall, the socioeconomic gap for ADHD diagnosis found in previous research with Manitoban child ADHD populations[4] appears to dissolve into young adulthood, as our study found only a small negative gradient in the urban population and a positive gradient in the rural population. These results are consistent with the childhood-limited model of ADHD and SES described by Chen et al,[20] in which inequalities in early life diminish with age.

Age at diagnosis did not interact with SES in a gradient pattern, although people from the very highest income quintile were found to be significantly less likely to be diagnosed before age 18, compared with all other income quintiles. As past Canadian research has found that post-secondary attendance, and particularly university attendance, is more likely in people from higher-income families,[21] perhaps ADHD diagnosis in young adulthood is more likely in the highest income quintile owing to the considerable academic demands required to graduate from high school and succeed in college or university. In other words, the higher diagnosis rates beyond age 18 for the highest income young adults may correspond with a need to address any barriers to completion of post-secondary education. This correlation is also of interest in the context of a previous research finding that those diagnosed with ADHD in adulthood have less comorbid antisocial personality disorder and substance use disorders and are less functionally impaired than those diagnosed in childhood.[22] Further, while our study does not provide information on the relation between SES and university attendance, further investigation of this relation would be helpful in light of recent research on increasing medical and nonmedical psychostimulant prescription use amongst post-secondary populations.[23]

The finding that females were significantly more likely to be diagnosed after age 18 than males corresponds with other research that has found that women report higher levels of current ADHD symptoms in adulthood, compared with men,[24] perhaps because they are more likely to have the inattentive subtype of ADHD, which often takes longer to be identified and diagnosed.[25,26] Finally, results indicated that people living in urban areas were significantly more likely to be diagnosed after age 18 than those living in rural areas, which may be caused by the greater proportion of medical specialists in urban areas, which then enables young adults living in these areas to have greater access to such specialists, and, accordingly, to be more likely to be diagnosed regardless of age.[4]

Strengths of our study include the following: population size (that is, essentially the entire population of Manitoban young adults who were residents of Manitoba during the study period); linkage between the multiple databases (that is, hospital, physician, and pharmaceutical claims, Census, and the population registry data); use of longitudinal data on diagnosis over time; capacity to identify age at first diagnosis; use of previously validated methods for measuring ADHD diagnosis and treatment rates and measures[4,13,27–29] and investigation of a previously unexplored population with this data set. As discussed by Jutte et al,[30] additional benefits to the use of linked administrative data include reduced reliance on self-report, possibility of comprehensive follow-up as well as flexibility in defining the study period owing to the ongoing collection of data, relatively low expense for conducting research because the information is already collected for other purposes, and the inclusion of underrepresented ethnoracial and socioeconomic groups.

One study limitation is the correlational design, which does not allow for any inferences of causality, although still provides important relational information about the variables. Also, pharmaceutical data from the DPIN network are not available until 1995/96, so some psychostimulant prescriptions for the ADHD cohort were not captured, particularly for the oldest individuals. However, the use of 24 fiscal years of data to capture diagnostic codes and 14 years of data to capture treatment codes should reduce the impact of this limitation. In addition, it is possible that some young adults who were diagnosed with ADHD as children were not consistently captured in the databases used in this study owing to data representation concerns (for example, northern communities that use nursing stations instead of hospitals or health offices with physicians, or those diagnosed by psychologists). Also, this study only captures prevalence of those diagnosed and (or) treated with ADHD, rather than prevalence of all diagnosed and undiagnosed individuals. However, much of the rural health data are captured in these data sets and administrative data offer the unique opportunity to observe the rates of diagnosis and treatment that are occurring. As discussed by Jutte et al,[30] it is possible that having used an individual-level measure would have provided greater accuracy in measuring SES in our study, although previous research has shown that small-area data from the Census are highly correlated with individual-level SES information.[31] Further, some researchers suggest that asset-based measures of SES, such as income, may be more sensitive to detecting gradients over time because they are more prone to fluctuate.[32]

The findings from our study provide a wealth of support for further research into this population. First, given the high lifetime prevalence of ADHD, additional research on health and social outcomes throughout the lifespan would be critically informative. Further, it would be helpful to know whether any adverse health and social outcomes for people diagnosed with ADHD form a socioeconomic gradient, even though our study found that the socioeconomic gradient for ADHD diagnosis appears to dissipate into adulthood. As our study was cross-sectional in nature, a longitudinal analysis of ADHD diagnosis and secondary outcomes could help elucidate more information on the temporal relation between ADHD diagnosis, treatment, secondary outcomes, and potentially related covariates, such as SES. Finally, in light of the relatively high rates of psychostimulant use in the adult ADHD population, it would be helpful to investigate the relation between psychostimulant use (for example, age at first treatment and continuity of treatment) and health and social service use outcomes. This type of analysis could provide a greater understanding of the role that treatment has on secondary outcomes.

Conclusions

Our study offers lifetime prevalence rates of ADHD diagnosis and treatment for young adults within the Canadian population. It also provides further information regarding the manner in which the socioeconomic gradient for lifetime ADHD diagnosis persists into young adulthood and factors that impact socioeconomic disparities in diagnosis (that is, region of residence and age at diagnosis). Such knowledge is important because adult ADHD research has been given relatively little attention within Canada, yet it is ultimately necessary for the development of policies and practices that will enhance the health status of all Canadian adults living with ADHD.

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nova scotia health authority

PSYCHIATRIST,
OPERATIONAL STRESS INJURY CLINIC

DALHOUSIE UNIVERSITY
FACULTY OF MEDICINE
Department of Psychiatry

Training and Experience:

Fellowship in Psychiatry, Royal College of Physicians and Surgeons of Canada, or equivalent as determined by the Dept. of Psychiatry; eligible for licensure with the College of Physicians and Surgeons of Nova Scotia. Experience with work-related psychological stress and trauma (e.g. Post-traumatic Stress Disorder, and other anxiety disorders; Depression; Chronic Pain) an asset. Experience working with assessment of police, veterans and/or Canadian forces members with operational stress injuries including anxiety, mood, and substance use is an asset.

Roles and Responsibilities:

- To be attending or consultant physician to ambulatory patients in the Operational Stress Injury Clinic.
- Conduct, order or ensure appropriate multi-axial psychiatric assessments, appropriate psychosocial and laboratory investigations, and pharmacological and psychosocial treatment interventions as per current standard practice.
- Take part in a psychiatry on-call schedule as required within the clinical program unless specifically exempted.
- Share in the short-term coverage of other services as needed during holidays or illness of other members of staff.

Clinical duties:

- As directed by the Clinical Director and in keeping with the standards set out in the document "Veterans Affairs Canada Standards for OSI Clinics"
- Clinical direct and indirect care as part of an interdisciplinary OSI service delivery model
- Clinical "desk-side" teaching and didactic education
- Clinical administration
- Include on-call service
- Involve supervision of junior staff including residents and clinical clerks
- Perform research as required

Educational Duties:

Didactic teaching at the undergraduate, postgraduate and continuing medical education level as determined in discussion with the Director of Medical Education, Department of Psychiatry.

Dalhousie University is an Affirmative Action employer.

Please send your application with a current curriculum vitae and the names and addresses of three referees to:

Dr. Scott Theriault
Dalhousie University
Department of Psychiatry
8th Floor, Abbie J. Lane Building
5909 Veterans' Memorial Lane
Halifax, NS B3L 2E2
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