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The Socio-Demographic and Clinical Profiles of Adult ADHD Patients in a University Hospital in Oman

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Abstract

Objectives: Although typically considered a condition affecting children, scientific evidence has shown that 30–50% of those diagnosed with ADHD in childhood continue to suffer from this condition after the age of 18. This study sought to address the gap in the literature, and to describe the socio-demographic and clinical characteristics of ADHD patients in a sample of adult patients attending an outpatient clinic at a tertiary care hospital in Oman, and to evaluate their association with the different subtypes of the disorder. **Methods:** Data from adult patients with ADHD from the outpatient clinic at Sultan Qaboos University Hospital (SQUH), Muscat, Oman, were retrospectively collected from medical records from January 2018 to April 2020. Socio-demographic characteristics, clinical profiles and psychiatric co-morbidities were examined. **Results:** This study included 100 adults who fulfilled the standard diagnosis of ADHD, with 54% (n=54), and 46% (n=46) from the inattentive and combined subtypes, respectively. It was found that ADHD was more prevalent among males (64.0%) compared to females (36%), with the inattentive subtype being more predominant among females. The ADHD patients with the inattentive subtype were associated with co-morbid substance use disorders (OR=11.29, $P = 0.049$), personality disorders (OR=7.96, $P = 0.017$), and major depressive disorder (OR=15.94, $P = 0.002$) compared to patients with the predominantly combined subtype. **Conclusion:** This study from Oman echoes the findings

from the current literature, that adult patients with ADHD commonly have co-morbid psychiatric disorders, leading to significant functional impairment. Psychiatric co-morbidities must be identified and urgently treated, to allow for better clinical and functional outcomes in adult patients with ADHD.

Keywords: ADHD, co-morbidity, hyperactivity, Oman, psychiatry

Advances in Knowledge

- This is the first report from Oman and the GCC region focusing on ADHD among adults.
- Compares the clinical characteristics of patients from the Middle East to those from the West.
- Explores a new area of research and encourages further studies among similar cohorts.

Application to Patient Care

- As a new and adult-only ADHD service in Oman, awareness is increasing about this condition among patients and clinicians.
- Further expansion of services, as the result of this study, have clearly indicated the complexity of the co-morbidities presenting in those with adult ADHD.

Introduction

Attention deficit hyperactivity disorder (ADHD) is a common childhood neurodevelopment disorder, which manifests as inattention, hyperactivity and impulsivity with a persistence of at least six months in at least two settings (e.g. school, home and/or social situations).¹ These clinical symptoms must have an impact on social, academic or occupational functioning to warrant a clinical diagnosis of ADHD. According to the Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM-5),¹ the symptoms of inattention are evident in children in their schoolwork as the child fails to pay close attention to details and makes repetitive careless mistakes, gets easily distracted and has difficulty sustaining attention, whereas the symptoms of hyperactivity and impulsivity include difficulty remaining seated in the classroom, fidgeting, blurting out answers before questions have been completed and difficulty waiting their turn in activities or games. However, the presentation of ADHD symptoms among adults differs from that in children, as the cluster of symptoms related to hyperactivity reduce over time and manifest as restlessness. Moreover, inattention as a

symptom in adults with ADHD may manifest as difficulty in meeting deadlines at college or work, or forgetting appointments.^{2,3} The DSM-5 outlines three subtypes of ADHD: primarily hyperactive and impulsive, primarily inattentive, and combined. Each of these subtypes is distinguished by a set of clinical symptoms in the diagnostic criteria.

Research has shown that 30–50% of those diagnosed with ADHD in childhood continue to experience the core symptoms of the condition after the age of 18.⁴ Many adults come into contact with mental health services for the first time as adults with symptoms of ADHD. In the United States, the prevalence of adult ADHD is estimated to be more than 4%.⁵ Men are generally more likely to be diagnosed with ADHD than women, with a male to female ratio of approximately 3:1 in clinical samples, and with women presenting predominantly with the inattentive subtype of ADHD.⁶ As with children with ADHD, many adults with ADHD are diagnosed with co-morbid psychiatric disorders, such as: mood and anxiety disorders, personality disorders, and substance use disorders.⁷ Many undiagnosed ADHD cases in adults present when they come into contact with mental health services due to other psychiatric disorders, and treating the co-morbid condition requires treatment independent from that of ADHD.⁸

The adult ADHD clinic at the Sultan Qaboos University Hospital (SQUH) was started as a pilot project to cater to the needs of the adults with symptoms of ADHD, as well as to help those using the service aimed at younger individuals' transition to the adult ADHD services.⁹ This study sought to address the current gap in the literature as no studies from Oman, or its neighbouring countries, have compared the clinical characteristics of patients from the Middle East to those from the West, or examined the psychiatric co-morbidities among adult ADHD patients. Examining potential associations is essential for diagnostic precision and accuracy, and to achieve better clinical and functional outcomes.

Methods

This is a retrospective cohort study which was conducted among adult patients diagnosed with ADHD in an outpatient clinic at Sultan Qaboos University Hospital (SQUH), Muscat, Oman. We included all patients between the ages of 18 and 60 who attended the clinic over a two-year period from January 2018 to April 2020, who had a full psychiatric evaluation and fulfilled the diagnostic criteria of adult ADHD based on the DSM-5.¹⁰ The diagnosis requires the presence of a set of clinical symptoms for a specific period, and impact the social,

academic or occupational function. The cohort of patients in this study were a mixture of those who were either diagnosed for first time before the age of 18, but continued to experience the symptoms into adulthood, as well as patients who accessed the service for the first time after the age of 18. Similarly, some of the adults with ADHD were parents or first-degree relatives of children with ADHD that were never diagnosed due to lack of awareness. Patients who had co-morbidities of intellectual disability, epilepsy and autism spectrum disorders were excluded from the study.

Socio-demographic and clinical variables

The following variables were obtained from each patient: age, sex, marital status (single, married and divorced), and educational level, and occupation, history of substance misuse, family history of ADHD, history of suicidal attempt and forensic history. The psychiatric co-morbidities were classified as: bipolar affective disorder, schizophrenia, obsessive compulsive disorder, major depressive disorder, anxiety disorder and personality disorder. The presenting symptoms were explored to determine the subtype of the ADHD: predominantly inattentive presentation, predominantly hyperactive-impulsive presentation or a combined presentation.

Statistical analysis

Descriptive statistics were used to explore the profiles of the patients with ADHD, according to their demographic and clinical variables. First, univariate comparison was carried out between the ADHD subtypes (inattentive/hyperactive and impulsive versus combined), evaluated using the chi-square/Fisher's exact test and the Mann-Whitey U test to reveal the association and differences between the demographic and clinical variables. Following this, multivariate logistic (enter) regression was used. In the regression model we used the following significant variables: gender, age of diagnosis, co-morbid substance use disorders, personality disorders, major depressive disorder, anxiety disorder, sleep wake disorders and history of suicidal, in an attempt to identify the risk factors associated with ADHD subtypes while adjusted by each other. Data were analysed by the Statistical Package for the Social Sciences (SPSS), version 23.0 (IBM SPSS Inc. Chicago, IL, USA), set at a 5% level of significance.

Ethics approval

Ethics approval was granted by the College of Medicine and Health Sciences at Sultan Qaboos University, Muscat, Oman (MREC 2260). The study was conducted as per the Declaration of Helsinki and the American Psychological Association with regards to ethical human research, including confidentiality, privacy and data management.

Results

Table 1 shows the results for the demographic and clinical characteristics of the patients. Data from 100 adult patients who had ADHD were collected, of which 54 (54%) had the inattentive subtype, and 46 (46%) were classified as the combined subtype. Of this sample, ADHD was noted to be more prevalent among males (64.0%) compared to females (36%), and the average age of patients was 22.6 (standard deviation [SD] =6.4) years. Approximately 80% (n=79) of the adult patients with ADHD had a school education, with 21% having dropped out of school. The average age of ADHD diagnosis was 13.8 (SD=3.0) years. Depression was the most commonly associated co-morbidity among the ADHD patients (28%), followed by anxiety (23%), personality disorders (18%), sleep wake disorders (15%) and substance use disorders (10%). More than 50% (n=52) of the study participants had family members with an ADHD diagnosis. A small percentage of them had a history of suicidal attempts (9%) and forensic records (6%). With regards to medication, 62% had been prescribed methylphenidate stimulant therapy and 38% had received non-stimulant therapy.

Table 2 presents the bivariate (unadjusted) and multivariate (adjusted) regression analyses of the results. The multivariate analysis indicated that some demographic and clinical characteristics were demonstrating significant association with adult ADHD, specifically for the inattentive subtype. The model had a good-fit according to the Hosmer-Lemeshow goodness-of-fit test ($R^2=1.934$, $P=0.963$), Nagelkerke R^2 was 0.676, and the overall predicting power (sensitivity=0.852, specificity=0.848) was 0.850. For adult patients with ADHD, women were 14 times (OR=14.47, $P < .001$) more likely to be diagnosed with the inattentive subtype compared to male patients. Patients with the inattentive subtype were significantly associated with co-morbid substance use disorders OR=11.29, $P = 0.049$), personality disorders (OR=7.96, $P = 0.017$), and major depressive disorder (OR=15.94, $P = 0.002$), as compared to patients with predominantly combined subtype.

Discussion

The current study evaluated the clinical subtypes of adult patients with ADHD and its association with psychiatric co morbidities in Oman. This is the first report from this region to highlight the clinical characteristics of adult patients with ADHD. In this study, the majority of patients were male, with a male-to-female ratio of approximately 1.8:1; this is in line with the general consensus that men are more likely to be diagnosed with ADHD, with higher male-to-female ratios found among clinical compared to population-based samples.¹¹ This ratio discrepancy tends to decrease with an increase in age.^{12,13} A study among children with ADHD in Oman reported a male-to-female ratio of 3.6:1, further cementing the aforementioned trend.¹⁴

Evidence has shown that there is a sex variation with regards to the subtypes of ADHD, with women being more commonly diagnosed with the inattentive subtype, whereas male patients are usually diagnosed with the hyperactive/impulsive or combined subtype.¹⁵ Findings from the current study were consistent with the existing literature, of the 36 female patients diagnosed with adult ADHD, 83% (n=30) were diagnosed with the inattentive subtype (OR=14.47, $P < .001$), and 17% (n=6) had the combined subtype. Although male patients are commonly diagnosed with the combined or hyperactive/impulsive subtype of ADHD during childhood, data derived from a longitudinal study indicated that the natural trajectory of the condition leads to a decline hyperactivity symptoms over time, with inattention and impulsivity remaining significantly present.¹⁶ Interestingly, in the current study, none of the patients was diagnosed with the predominantly hyperactive/impulsive subtype of ADHD, in agreement with the currently emerging evidence that this particular subtype of ADHD is very rare among adults, raising doubts to its validity.¹⁷

It is known that ADHD affects the educational and socioeconomic outcomes of those affected.¹⁸ In the current clinical sample, 21% did not complete their high school diploma, which supports existing literature from Oman that school dropout is one of the negative ramifications of ADHD.¹⁴ Moreover, presence of a psychiatric co-morbidity is the rule rather than the exception in patients with ADHD, leading to greater clinical and functional impairment.¹⁹ During childhood, ADHD is highly co-morbid with oppositional defiant and conduct disorder, anxiety and mood disorders, as well as specific learning disorder.²⁰ In adults with ADHD, it is estimated that 80% have at least one co-morbid psychiatric disorder.

Despite that, ADHD remains under diagnosed and undertreated in the adult population.²¹ comparably; findings of the current study strongly suggest that ADHD in adults is highly co-morbid with other mental health disorders. In this study, 10% of the adult patients with ADHD had substance use disorders (SUD) and, although its association was significant (OR=11.29, $P = 0.049$), the prevalence was lower compared to the current literature,²² which can be explained by the modest sample size of our study. Personality disorders were reported in 18% of the participants in this study (OR=7.96, $P = 0.017$), consistent with another study from this field.²³ Furthermore, depression is highly prevalent among adult ADHD patients, with a prevalence of 16-31%, resulting in an increased illness severity and functional impairment.²⁴

The results of this study confirms that, as 28% of the patients were diagnosed with co-morbid major depressive disorder, (OR=15.94, $P = 0.002$). The strength of the study is that it examined all adult patients attending the only ADHD clinical service in the country, the first study of its kind in the Arabian Gulf to explore the clinical profile of adult ADHD and its associated psychiatric co-morbidities. The limitations consist of a relatively small sample size and the probably chance that adults with milder symptoms of ADHD who may not have accessed the tertiary hospital service might have been missed. In addition, due to the small sample size, the associated factors that were identified in the logistic analysis were not used to assess determinants.

Conclusion

The main findings in our study showed that women were more likely to be diagnosed with the inattentive subtype of ADHD compared to male patients. Patients with the inattentive subtype of ADHD were significantly found to have other co-morbid mental health conditions, such as substance use disorders, personality disorders and major depressive disorder, as compared to patients with predominantly the combined subtype. Therefore, psychiatric co-morbidities must be identified and treated vigilantly for better clinical and functional outcomes in adult patients with ADHD.

Conflict of Interest

The authors declare no conflicts of interest.

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Table 1: Demographic and clinical characteristics of Adult ADHD (N=100)

	N (%)		N (%)
		ADHD subtypes	
Gender		Inattentive	54 (54.0)
		Combined	46 (46.0)
		Comorbidity	
Female	36 (36.0)	Substance use disorders	10 (10.0)
Male	64 (64.0)	Psychosis	1 (1.0)
Marital status		Bipolar affective disorder	3 (3.0)
Single	92 (92.0)	Personality disorders	18 (18.0)
Married	8 (8.0)	Major depressive disorder	28 (28.0)
Job		Anxiety disorder	23 (23.0)
Unemployed	5 (5.0)	Obsessive compulsive disorder	3 (3.0)
Employed	19 (19.0)	Sleep wake disorders	15 (15.0)
Student	76 (76.0)	Family history of ADHD	52 (52.0)
Educational level		History of self-harm / suicidal attempt	9 (9.0)
School drop-out	21 (21.0)	History of forensic record	6 (6.0)
High school diploma	66 (66.0)	History of hospital admission	6 (6.0)
Higher education	13 (13.0)	Name of the Medication	
Age (years)		Methylphenidate	62 (62.0)
Median [Range]	20.0 [18-47]	Atomoxetine	19 (19.0)
Mean \pm SD	22.6 \pm 6.4	Other medication	19 (19.0)
Age of diagnosis (years)			
Median [Range]	13.0 [6-21]		
Mean \pm SD	13.8 \pm 3.0		

Data shown as number with percentage except for age

Table 2: Analysis of ADHD subtypes in the association/difference of demographic and clinical measurements

	ADHD		Univariate ^a	Multivariate ^d	
	Inattentive	Combined	P-value	OR	P-value
N	54	46			
Female	30 (55.6)	6 (13.0)	<0.001	14.47	<0.001
Male (ref)	24 (44.4)	40 (87.0)			
Marital status					
Single	51 (94.4)	41 (89.1)	0.465 ^b		
Married (ref)	3 (5.6)	5 (10.9)			
Job					
Unemployed	4 (7.4)	1 (2.2)	0.375 ^b		
Employed	9 (16.7)	10 (21.7)	0.619		
Student (ref)	41 (75.9)	35 (76.1)			
Educational level					
Below high school diploma	11 (20.4)	10 (21.7)	0.728 ^b		

High school	35 (64.8)	31 (67.4)	0.762 ^b		
Higher education (ref)	8 (14.8)	5 (10.9)			
Age (years)					
Median [Range]	21.5 [18-47]	19.0 [18-47]	0.548 ^c		
Age of diagnosis (years)					
Median [Range]	13.0 [6-21]	14.0 [10-20]	0.006 ^c	1.25	0.05
Mean \pm SD	13.0 \pm 2.9	14.8 \pm 2.9			
Presence of Comorbidity					
Substance use disorders	2 (3.7)	8 (17.4)	0.041 ^b	11.29	0.049
Psychosis	0 (0.0)	1 (2.2)	0.460 ^b		
Bipolar affective disorder	1 (1.9)	2 (4.3)	0.593 ^b		
Personality disorders	14 (25.9)	4 (8.7)	0.025	7.96	0.017
Major depressive disorders	25 (46.3)	3 (6.5)	<.001	15.94	0.002
Anxiety disorders	18 (33.3)	5 (10.9)	0.008	2.6	0.271
Obsessive compulsive disorders	1 (1.9)	2 (4.3)	0.593 ^b		
Sleep wake disorders	13 (24.1)	2 (4.3)	0.006	6.28	0.1
Family history of ADHD	26 (48.1)	26 (56.5)	0.404		
History of Suicidal attempt	1 (1.9)	8 (17.4)	0.011 ^b	0.018	0.146
History of Forensic record	2 (3.7)	4 (8.7)	0.410 ^b		
History of admission in a psychiatric unit	4 (7.4)	2 (4.3)	0.684 ^b		
Name of the Medication					
Methylphenidate	37 (68.5)	25 (54.3)	0.146		
Atomoxetine	7 (13.0)	12 (26.1)	0.095		

ADHD, Attention Deficit Hyperactivity Disorder; a, Chi-square test; b, Fisher's exact test; c, Mann-Whitney U test; OR, Odds ratio; d, logistic (enter) regression (Hosmer & Lemeshow test: chi-square=1.934, p=0.963; Nagelkerke R² = 0.676; Sensitivity=85.2%, Specificity=84.8%, overall=85.0%); *, p<0.05