SUBSTANCE ABUSE IN PATIENTS WITH CO-MORBID ADHD

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ABSTRACT

Objective: To study the tendency of occurrence of attention-deficit hyperactivity disorder (ADHD) with substance abuse.

Design: A cross-sectional, hospital based study.

Place and Duration of study: The study was carried out at Lady Reading Hospital and Khyber Teaching Hospital, Peshawar, Pakistan from 4th April 2012 to 29th August 2012.

Subjects and Methods: A sample of 110 adult patients with 53 heroin dependents, 23 THC, 15 opium, 11 poly drug and 8 alcohol dependents were analyzed that whether they were ADHD and that childhood problem continues to manifest symptoms in adults. For retrospective assessment of childhood ADHD, the Wender Utah Rating Scale (WURS) as well as the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) symptom checklist for ADHD was used. The Conners' Adult ADHD Rating Scales (CAARS) was used to assess the persisting symptoms of ADHD in adults.Patient diagnosed with drug and alcohol dependence according to DSM-IV were included in the study whereas patient co-morbid with any other psychiatric illnesses were excluded.

Results: Heroin dependent showed 41.5% (WURS) and 37.7% (DSM-IV diagnostic criteria), whereas THC validated 34.7% (WURS) and 30.4% (DSM-IV), opium demonstrated 46.6% (WURS) and 40% (DSM-IV), poly drug dependence established 63.6% (WURS) and 54.5% (DSM-IV) and alcohol dependent showed 50% (WURS) and 37.5% (DSM-IV) indicated evidence of retrospective ADHD affliction in childhood. CAARS was presented in 35.8% heroin dependent, 34.7% THC, 46.6% opioid, 33.3% poly drug dependence and 37.5% alcohol dependent; and exhibited a substantiation of ADHD persistent in adulthood. The difference between the mean score of WURS and CAARS of ADHD patients were significantly greater ($P = 0.029$), than the normal patients.

Conclusions: These results revealed that ADHD is a risk factor associated with substance dependence, expressed in the form of heroine, THC, opioid, alcohol dependence and also in poly drug dependence.

Key words: Attention-deficit/hyperactivity disorder, Wender Utah Rating Scale, Conners' Adult ADHD Rating Scale

INTRODUCTION

The attention deficit hyperactivity disorder (ADHD) is one of the most common neuropsychiatric disorders affecting 3% to 6% of children[1] and almost 5% of adults[2]. Across population, Prevalence rates vary from 2.2% to 16.1% in clinical versus community cohorts. Its frequency has been reported as high as 34% ADHD in clinical setting in Pakistan[3]. There was a myth for many years that the disorder remits during adolescence, but it is now well established that it can be experienced by a patient in adulthood as well. There is a bidirectional overlap between ADHD and drug abuse and dependence[4] and affect 27% of adult population[5]. The co-occurrence of ADHD and addiction is very common. Previous studies have shown that adults with ADHD are a risk for substance use disorder (SUD) and almost 52% of adult had a lifetime history of SUD[2, 3]. The co-morbidity between ADHD and SU shows relativity and relevant to research and clinical development in psychiatry, pediatrics and psychology[5]. The diagnosing and specific risk factor associated with SU within ADHD may lead to a better targeted pharmacotherapy and psychotherapeutic treatments for both the disorders upon expression at early

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stage of their lives[7, 8]. Higher rates of ADHD have been reported in patients having SUD relative to controls[9, 10]. 15% to 25% adults with SUD history have been estimated to have ADHD[9]. Studies have conducted in juvenile adolescents for assessing ADHD and other disorders in substance abusing groups had overrepresentation of ADHD[10, 11]. ADHD predominates from 15% to 25% in individuals with SUD[12, 13]. Two studies showed that the 24% of 201 inpatients[14] and 10% cocaine abusers for drug detoxification treatment had ADHD[15]. The treatment of ADHD is usually done with stimulants like methylphenidate, amphetamine etc., with the behavioral therapy of the patient and family counseling.

SUBJECTS AND METHODS

Two-hundred and thirty eight consecutive patients admitted in Psychiatry ward of Lady Reading Hospital and Khyber Teaching Hospital Peshawar for drug detoxification were included in the study. All the patients were analyzed through an extended clinical semi-structured interview to collect socio-demographic, drug use related clinical data and also the non-ADHD psychiatric diagnoses by the use of a semi structured diagnostic interview previously validated against the Structured Clinical Interview for DSM-IV-TR[13-15]. Patients evaluated in the hospitals were also assessed for ADHD, using DSM-IV criteria and a structured interview provided by Biederman J[2, 4]. Adult patients with various drug and alcohol dependence gave their consent to participate in this study as in-patients at the Drug Abuse Treatment Center, Lady Reading Hospital Peshawar. At a clinical interview, all 110 patients (109 males and 1 female) met the diagnostic criteria required for heroine, THC, opium, poly drug dependent and alcohol dependence according to Diagnostic and Statistical Manual of Mental Disorders (DSM-IV). The examination was performed only after a 10-day detoxification therapy as it was imperative that the patients were no longer suffering from any withdrawal symptoms. Exclusion criteria included any other concurrent illnesses. Approval for this study was given by the Institutional Review and Ethics Board, Lady Reading Hospital, Peshawar.

The Wender Utah Rating Scale (WURS) and the DSM-IV symptom checklist for ADHD served as investigating instruments for the retrospective assessment of the presence of ADHD in childhood. Furthermore, the DSM-IV criteria were used to divide the patients into diagnostic sub-groups (inattentive type, impulsive type, combined type). The Conners' Adult ADHD Rating Scales (CAARS, ShortVersion) were used to assess persisting ADHD symptoms in adulthood as a part of a comprehensive intake valuation battery.

Statistical Analyses

We analyzed demographic differences between groups, using chi-square tests for categorical variables and comparisons of proportion and for the comparison of proportions. The unpaired t-test was used to compare means between two groups; 38.5%, patients with ADHD showed a marked tendency towards substance abuse when compared to those patients without ADHD (55.7%) ($P = 0.029$). A principal components analysis using varimaxrotation was performed on the 25 test items of WURS and 25 items of CAARS-S. The number of factors retained was determined by examination of the screen plot and use of the Kaiser-Guttman rule (i.e., eigenvalues greater than 1.0). Cronbach's alpha was calculated as a measure of internal consistency on all the items of WURS and CAARS-S resulting from the factor analysis in Wender Utah and Conners rating scales.

RESULTS

The total sample comprised of 109 male and 1 female patients with an average age groups of 37.5 ± 9.8 years. The socio-demographic data have been presented (Table 1).The mean score of 61-items of WURS and 26-items of CAARS-S were calculated but we arbitrarily chose 25-items of WURS and 25-items of CAARS-S showing the greatest mean difference between the patients of ADHD and normal.

Table 1: Socio-demographic data of the patients

Socio-demographics	ADHD
Number of Patients, n	110
Males/Females, n	109/1
Age (Mean ± SD)	37.5 ± 9.8
Employed n (%)	61 (55.9)
Married n (%)	37 (33.6)
Divorced n (%)	3 (2.7)

Total sample comprised of 53(48.1%) heroin dependent, 23(20.9%) THC dependent, 15(13.6%) opium dependent 11(10%), poly drug dependent 8(7.2%) alcohol dependent. As shown in figure 1.

Figure 1

Graph displaying the total number of drug dependents included in the study.

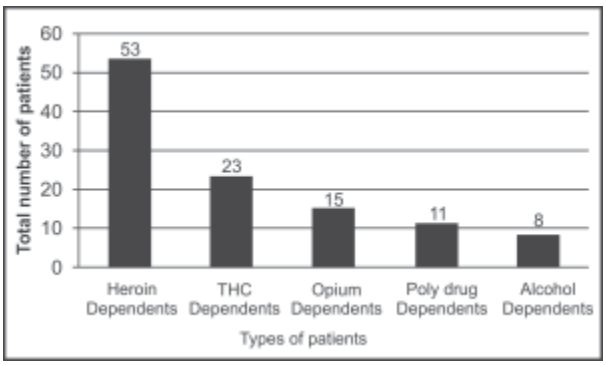

Table 2: Total IV users in the sample (n=31, affected n=21)

Types of Indications	No.	%age	Heroin users	THC users	Opium users	Poly-drug dependence	Alcohol users
HBV	5	23.8%	Present N=3	Present N=1	Absent	Present N=1	Absent
HCV	13	61.9%	Present N=7	Absent	Present N=3	Absent	Present N=3
HIV	3	14.2%	Present N=1	Absent	Absent	Present N=2	Absent
Total N (%)	21	100% approx.	11(52.3)	1(4.7)	3(14.2)	3(14.2)	3(14.2)

Total IV-users in the sample were 31 and affected were 21 (67.7): HBV 5 (23.8%), HCV 13 (61.9%), and HIV 3 (14.2%) respectively. Their distribution in different addiction is shown in Table 2.

Heroin dependent showed 41.5% (WURS) and 37.7% (DSM-IV diagnostic criteria), whereas THC validated 34.7% (WURS) and 30.4% (DSM-IV), opium demonstrated 46.6% (WURS) and 40% (DSM-IV), poly drug abuse established 63.6% (WURS) and 54.5% (DSM-IV) and alcohol dependent showed 50% (WURS) and 37.5% (DSM-IV) indicated evidence of retrospective ADHD affliction in childhood. CAARS was presented in 35.8% heroin dependent, 34.7% THC, 46.6% opioid, 33.3% poly drug abuse and 37.5% alcohol dependent respectively.

Scree-test and eigenvalues greater than one, exclusion of factor loadings less than 0.30, factors loading greater than 0.30 not on more than one factor. A varimax rotation yielded the four factors: (1) inattention/memory problems, (2) hyperactivity/restlessness, (3) impulsivity/emotional liability, and (4) problems with self-concept[28]additionally, an ADHD index and indices for DSM-IV subscales (DSM-IV: predominantly inattentive, predominantly hyperactive-impulsive, combined subtype) can be obtained[10]. Test-retest correlations range between 0.81 (impulsivity/emotional lability) and 0.88 (problems with self-concept). Construct-validity with WURS reached moderate to satisfying correlations of 0.31 (inattention problems) to 0.68 (impulsivity/emotional la-

Table 3: Attention deficit hyperactivity disorder diagnosed with Wender Utah Rating Scale (WURS-k), DSM-IV symptom check-list for ADHD and Conners' Adult ADHD Rating Scales (CAARS) [n=110]

Type of Addicts n (%)	DSM-IV n (%)[1]	Inattentive type, n (%)	Hyperactive-impulsive type, n (%)	Combined type, n (%)	WURS, n (%)[2]	CAARS, *n* (%) (DSM-IV pos, *n* =)[3]
Heroin addicts 53(48.1)	20 (37.7)	2 (10)	11 (55)	7 (35)	22 (41.5)	19 (35.8)
THC addicts 23(20.9)	7 (30.4)	2 (28.5)	1 (14.2)	4 (57.1)	8 (34.7)	8 (34.7)
Opium addicts 15(13.6)	6 (40)	5 (83.3)	—	1 (16.6)	7 (46.6)	7 (46.6)
Poly drug addicts 11(10)	6 (54.5)	—	1 (16.6)	5 (83.3)	11 (63.6)	5 (33.3)
Alcohol addicts 8(7.2)	3 (37.5)	—	2 (66.6)	1 (33.3)	4 (50)	3 (37.5)

[1]WURS = The Wender Utah Rating Scale (WURS-k) indicates ADHD with a score of more than 30.

[2]CAARS = Conners Adult ADHD Rating Scales (the analysis is conducted to indicate subject's current state).

[3]DSM-IV = Diagnostic and Statistical Manual of Mental Disorders (a score higher than six in the first nine items indicates attention problems: a score higher than six in the last nine items indicates hyperactivity).

Table 4: Showing addiction with and without co-morbid ADHD.

Addicts	Addiction with ADHD (n, %)	Addiction without ADHD (n, %)
Heroin addicts 53(48.1)	19 (35.8)	34 (64.1)
THC addicts 23(20.9)	8 (34.7)	15 (65.21)
Opium addicts 15(13.6)	7 (46.6)	8 (53.3)
Poly drug addicts 11(10)	5 (33.3)	6 (54.5)
Alcohol addicts 8(7.2)	3 (37.5)	5 (62.5)

bility). Criterion validity with a semi-structured interview for adult ADHD yielded a sensitivity of 81% and a specificity of 83% [32].52 (47.2%) of the patients achieved the cut-off e"50 in the WURS and, therefore, fulfilled the criteria for ADHD symptoms in childhood.

The correlation matrix was subjected to principal axis factoring, yielding 11 factors with eigenvalues greater than 1.0. Conners et al. decided on an orthogonal rotation to obtain independent factors of inattention, hyperactivity, and impulsivity. Since it is unlikely that these three dimensions are totally unrelated, we did not limited our analyses to varimax rotation, but also used oblique rotations. Items were eliminated from further analyses if they failed to load above 0.30 on any one factor, or if they loaded greater than 0.30 on more than one factor.

The first factor accounted for 12.91% of the total variance. The eight items that loaded on this factor were related to inattention/distractability (Cronbach's a 0.82). The second factor explained 8.12% of the total variance. The five items loading on that factor tapped on problems with self-concept (Cronbach's a 0.75). The third factor accounted for 4.82% of the variance and the four items loading on it are related to emotional instability (Cronbach's a 0.77). The fourth factor explained 4.27% of the total variance with six items related to impulsivity (Cronbach's a 0.71). Five items loaded on the fifth factor that explained 2.25% of the total variance, tapping on hyperactivity (Cronbach's a 0.87). The sixth factor accounted for 2.36% of the total variance and the six items loading on it are related to sensation seeking (Cronbach's a 0.67).

DISCUSSION

This study comprised of sample of adults admitted in psychiatry ward seeking detoxification treatment for heroin, THC, opium, alcohol and poly drug dependence and to study whether they wereADHD in childhood and this disorder is persisting in adulthood or not.Results of this study suggest that the four factors: inattention/memory problems, hyperactivity/restlessness, impulsivity/emotional liability, and problems with self-concept characterize the WURS and CAARS-S. These four factors are found in both the retrospective childhood and the adult assessment in the corresponding instruments. These factors helped: in distinguishing ADHD from non-ADHD, associate patients with a clinical diagnosis of drug and alcohol addiction co-morbid with ADHD, and do better to identify adults who do not have ADHD. In addition to poor specificity of WURS[30], the underlying factor structure suggests that WURS can measures depression and conduct problems, which are not specific to the DSM-IV ADHD classification. Another possible reason for the low specificity of the WURS may be a response bias on the part of patients evaluated in an ADHD specialty clinic; this is more probable in adult patients, who are unlikely to have parents available as informants regarding childhood behavior[11]. Other studies of symptom clusters in children with ADHD support two factors: inattention and hyperactivity-impulsivity[31, 32].

The finding that these four factors are the best discriminator in adults is consistent with the evolution of ADHD over the lifespan from mixed to more predominantly inattentive and hyperactive. This finding also highlights that the cognitive symptom domain is perhaps the most important to consider when evaluating a general psychiatric population for presence of ADHD. Our investigations showed significantly high values for the hyperactive and the combined types. The isolated inattentive type was under-represented. The over-representation of the hyperactive type in this group reflects those individuals willing to take on a higher risk. Patients categorized under the inattentive type most likely use the substance primarily for recreational purposes and later on became dependent.

To the extent that patients seeking evaluation specifically for ADHD may have a preconceived notion that this diagnosis applies to them, they may be inclined to endorse items that they feel would support such a diagnosis. This tendency may represent yet another limitation of a self-report measure when used to assess for symptoms (both retrospective and current) of ADHD.

The results of this study confirm that a high percentage of the drug and alcohol-dependent patients admitted in psychiatry fulfilled the diagnostic criteria of DSM-IV for the presence of ADHD. Retrospectively, a high percentage of these patients could be diagnosed as having had ADHD in childhood, which, in some cases, persisted into adulthood. Heroin dependent showed 41.5% (WURS), THC 34.7% (WURS), opium 46.6% (WURS) and

poly drug dependent 63.6% (WURS) and 54.5% (DSM-IV) and alcohol dependent showed 50% (WURS) respectively indicated evidence of retrospective ADHD affliction in childhood. CAARS was presented in 35.8% heroin dependent, 34.7% THC, 46.6% opioid, 33.3% poly drug dependent and 37.5% alcohol dependent respectively.

Our data provide evidence that a high percentage of alcohol-dependent patients had ADHD in childhood (23.1%), many of whom also had ADHD persisting in adulthood (33.3%). On the other side, Kessler et al found quite a high prevalence of ADHD in alcohol dependent of 4.4%.

In another study, Ohlmeier MD et al found Nicotine and Alcohol dependence in patients with co-morbid ADHD; their results confirmed retrospectively the ADHD diagnosis in childhood in 21 patients (23.1%) through DSM-IV. In 7 (33.3%) of these 21 alcohol-dependent patients who were affected by ADHD in childhood, the CAARS gave evidence of persisting ADHD also in adulthood. Additionally, the diagnostic differentiation of ADHD subtypes was undertaken according to DSM-IV. This revealed that 13 patients (14.3%) were categorized as 'inattentive type', 2 patients (2.2%) as 'hyperactive type' and 6 patients (6.6%) as 'combined type' of ADHD[27].

In an another study of Lambert NM and Hartsough CS, among current adult smokers, 35% with ADHD smoked daily as compared to 16% of the age-mate controls. The rates for cocaine dependence were 21% for participants with ADHD and 10% for age-mate controls[33].

Our study found a rather moderate rate of persisting ADHD in the entire examined group of alcohol-dependent patients. However, according to our data concerning the prevalence in childhood, ADHD can represent a considerable risk factor for the onset and development of heroin and other drug dependence as well. From a preventive standpoint, reducing the manifest psychiatric symptoms, such as in ADHD, may result in a decrease in cigarette consumption as well. Findings also indicate that ADHD accelerates the transition from substance abuse to substance dependence[2, 13]. There is also evidence that ADHD increases the risk of drug use disorders in those individuals with alcohol abuse or dependence[4, 13]. ADHD is also known to affect remission from SUD. A study was carried out with 130 adults with ADHD and SUD and 71 non-ADHD adults with SUD, and the results showed that the average time to SUD remission was more than twice as long in ADHD patients than in the control subjects (144 vs. 60 months, respectively)[9]. Studies performed on ADHD patients suggest that persisting ADHD can lead to continued misuse and abuse of substances following dependence, a longer duration of SUD and a lower rate of remission[13]. Similarly, adults with ADHD seeking treatment for substance abuse have been shown to display a more chronic and severe form of SUD along with a slower recovery from drug-dependence and SUD[6, 7, 9]. In summary, these findings indicate that ADHD influences the initiation, transition and recovery from SUD.

The high coincidence of ADHD and addiction illnesses may also be due to a number of other causes. In particular, ADHD patients suffering from hyperactivity and disturbed control impulses and patients of the combined type are known to derive a higher level of pleasure from experimentation and risk-taking concerning drugs and alcohol. It was found that hyperactive ADHD patients with drug dependence were more likely to have an additional other addictions compared to those patients with just attention disorders[16].

CONCLUSION

This study revealed that ADHD is a risk factor for multi-drug dependence and that many patients suffering from dependence may also have comorbid ADHD. With the help of CAARS, it could be demonstrated that a significant number of patients who fulfilled the diagnostic criteria of ADHD, according to DSM-IV, had persisting ADHD in adulthood. An ADHD patient poses a marked risk for the development of different types of dependence.

LIMITATIONS

Some limitations have to be taken into account that when doing psychometrics on a scale, generally the sample of subjects chosen to complete the scale should be similar to the population; the scale was written for. In this case, the intended population is adults with ADHD, but this study sampled from a normal distribution, thus psychometric statistics generated are biased by properties of the sample. Even though we assessed a large sample, this is not normative for the whole Pakistani population due to convenience and consecutive sampling. Another limitation of this study was that male participants were significantly greater than females.

There should also be comparison of self-ratings on the CAARS with performance on the Conners Continuous Performance Test (CPT-II) for further validation. Although we cross checked the information told by the patients but still the responses on the CAARS-S should also be cross-validated with ratings from close associates, friends or family members (CAARS-O).

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