**Determining the prevalence of Attention Deficit-Hyperactivity Disorder (ADHD) in patients with bipolar disorder- type one (BID) within their remission phase**

Running title: Prevalence of Attention Deficit-Hyperactivity Disorder and bipolar disorder

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**Abstract**

**Introduction :** There has been several studies participated on the subject of the relationship between Bipolar disorder and ADHD during the recent years, which in most of them the rate of these two companionship had been reported as noticeable, for a estimation of 22- 90%. The goal of this study is to determine the prevalence of ADHD in patients with Bipolar disorder type I.

**Materials and Methods:**

In this Cross-sectional study, 152 patients with Bipolar disorder type I that were been referred to psychiatric clinic of Tehran psychiatric Institue for a better observation and treatment, were chosen. Two questionnaires, Wenders’ for childhood ADHD and conners’ for adulthood ADHD were filled for patients.

**Results:**

102 patients (67%) were male and 50 were female. The age average of patients at the time of our study (with the minimum of 17 and maximum of 76) was 33.5 (SD=10.9). The prevalence of ADHD in our total patients was 11.8%. 46 people (30.9%) had a history of childhood ADHD. 21 persons had adult ADHD which only 3 of these 21 mentioned a history of childhood ADHD( which means 18 people of our adulthood ADHD had no history of childhood ADHD).

**Conclusion:**

This study showed a high comorbidity of ADHD and BID, which was similar to the results of other studies.

**Keywords:**

Attention deficit hyperactivity disorder (ADHD) ; Comorbidity ; Bipolar disorder type I (BID) ; Childhood; Adulthood

**Introduction**

ADHD is the most common psychiatric disorder among children that 3- 5% of children suffer from it (1). This frequency is even greater among boys, in comparison with girls (2).

This problem is characterized by pervasive states, like either significant difficulties of inattention or hyperactivity and impulsiveness or a combination of the two. In comparison to children of their own age, school dropout, antisocial behaviors during school years and public excommunication even after school is more popular (1).

Among all mood disorders, Bipolar disorder type I ( BID) is said to be the most sever one, which seems to have equal prevalence in the two genders. The disorder affects on 1% of society and due to its recurrence, uncontrollable patients manners during the patient’s disease episodes ( 3,4 ).

There have been plenty of studies done on the relationship between comorbidity of ADHD and BID, as the result this comorbidity has been reported in a range of 22-90% (4).

In a recent study in America, 57-100 % of children with BID were ADHD(3).

Sing et al study on children and teenagers in December 2006 in university of Cincinati in America, showed that the prevalence of ADHD in BID children is about 85% and reversely, the prevalence of BID in ADHD children was reported 22% (4).

Robertson et al study on 44 BID patients in Canada , 30 Unipolar patients and 45 normal people (as the group of control) , showed a comorbidity of 68% between ADHD and BID and a comorbidity of 10% between ADHD and Unipolar disorder (5).

Hamrin et al study in 2001 in Yale university , reported a comorbidity of 22- 90% between BID and ADHD (6).

Scheffer in 2007 in Kanzas university , reported two disease comorbidity more prevalent than general population and even more prominent in kids and younger adults, comparing to older ages. In this study also, there has been an overlook on the overlap between diagnostic criteria of both BID and ADHD (7).

Biederman’s study on similar pathophysiology of both initiation and progression of these two diseases, as well as their familial and phenomenological resemblance. This study has also estimated the prevalence of ADHD in biologic family members of BID patients to be 88% (8).

Nierenberg et al study in 2003 in Pennsylvania on 1000 adult patients with BID, showed the rate of childhood and adulthood of ADHD to be 9.5% in this group, 14.7% in bipolar men and 5.8% in bipolar women (3).

In Wilens et al study in Harvard university on 75 BID patients, reported a prevalence of 20% for ADHD. In this study people with any history of chronic medical diseases, any history of mental retardation, any organic brain problem or any history of alcoholism or drug abuse were excluded from the study. Patients had an age range of 18 to 59 and the two groups of having and not having ADHD had no significant difference in their sex, age and socioeconomic status (9,10).

Due to these two disorders , therapeutic drug interference, that ADHD improves and BID worsens through this stimulant drugs, studies on the rate of their comorbidity and their therapeutic treatment alternatives seems absolutely necessary. In addition, because of the resemblance of the diagnostic criteria for these two disorders and the resulted possibility for one’s misdiagnosis for the other, a revisal on these criteria should be considered as a research priority. Finally under the circumstance of deteriorating ADHD symptoms in presence of BID and its growing disabling side effects for patients, diagnosis the concurrence of these two diseases can have an essential impact on both prognosis and therapy management of these patients. So, by considering the fact of having not enough precise statistical studies on the prevalence of ADHD in BID patients in Iran, we decided to give it a shut within this study.

**Materials and Methods:**

This is a cross-sectional observational study done on all type one BID patients who had been referred to psychiatric clinic of Iran mental hospital, during their remission phase for a better therapy and management.

Study sample, sampling method and inclusion criteria:

Our study sample includes 152 patients with BID who had been referred to psychiatric clinic of Iran mental hospital during their remission phase, between March 1th to February 18th 2009 . Our sampling method was sequential and our sample was available.

Methodology:

Two questionnaires, Wender’s for childhood ADHD and Conners for adulthood ADHD were filled by our 152 patients. These two questionnaires are international which their accuracy and validity is internationally recognized. Wender’s questionnaire contains 5 options and it is scored from one to five. Conners questionnaire contains 4 options and is scored from zero to three. The total score is required to be more than a certain number to confirm ADHD diagnosis. Patients’ demographic information were also questioned and registered.

Our inclusion and exclusion criteria include lines below:

1. The patient should at least have the experience of one period of mania (According to DSM-IV Criteria) registered in his/her medical files, so the diagnosis of BID could be confirmed.
2. Within the last two months, the patient should have no clear sign of active BID. In other words, the patient should have passed the last two month in complete remission.
3. The patient should have no history of epilepsy, mental retardation or any special neurologic disorder.
4. The patient should have no history of any recent drug abuse or alcoholism within the last one month.
5. The patient should have no chronic medical problem that could possibly explain his/her maniac symptoms.
6. The patient should be informed, convinced and satisfied to participate in our study.
7. Some patients were not eligible for our study, so they were eliminated.

Data collection:

1. Wenders’ questionnaire for children with ADHD and conners’ questionnaire for adults with ADHD
2. A checklist for patients’ demographic information

Data analysis:

Our data was analyzed by SPSS-14 analytic software. We used mean, standard deviation (SD) and range as our statistic indicator for our quantitative data and incidence and prevalence for our quantitative data. To show make our quantitative and qualitative data related, we used t-test. P-value < 0.05 is significant.

To regard morals within our research process, exact information about the research method, its goals and how it is done was given to our patient participants, their questions were answered, and finally a testimonial was filled by them all, as a sign of awareness and satisfaction. All patients’ private information would be safe with our researchers.

**Results:**

In this study,152 BID patients who were been referred to our clinic were closely observed. 102 were men (67%) and 50 were women (33%). Their age average was 33.5, with the maximum of 76 and minimum of 17. (SD=10.9). There were 11 people in the range of 17 to 20 (7.2%), 60 people between 20 to 30 (39.5%) and 31 aged more than 81 (53.3%). Other patients’ demographic information is mentioned in table-1. The average age of BP initiation in all our patients was 25.21± 6.64 (Mean± 2.SD). This data in the group with presence of ADHD was 25.42± 6.33. In this study 93 people (61.2%) had no history of any childhood or adulthood ADHD, 46 (30.9%) only with childhood ADHD, and 21 (13.8%) with adulthood ADHD, only 3 of these 21 with no history of childhood ADHD (which means 18 people had both childhood and adulthood ADHD). The history of childhood ADHD presence according to sex was 29 men (76.3%) and 9 women (23.7%). The history of adulthood ADHD according to sex was 7 men (58.3%) and 5 women (41.7%). So both childhood and adulthood ADHD was more prevalent with men (p value>0.05). The history of childhood ADHD according to marital status was 15.8% in the group of singles and 15.1% in the group of married patients. The history of adulthood ADHD according to marital status was 19 patients (50%) in singles and 19 patients (50%) in the group of married patients. So, marital status showed no significant difference in the two group (p-value >0.05). The history of childhood ADHD according to occupational status was 26 patients (68.4%) in the unemployed and 12 patients (31.6%) in the employed group. The history of adulthood ADHD according to occupational status was 8 patients (66.7%) in the unemployed and 4 patients (33.3%) in the group of employed patients. So, there was no significant difference according to patients’ employment status (p-value>0.05).

Therefore, there was no significant difference in connection of factors like marital status, occupational status and level of education and having ADHD, neither in patients with history of childhood ADHD, nor in patients with no history of childhood ADHD (p-value>0.05) (Table.2) .

The prevalence of other mood disorders like attention-memory problems, hyper activity and restlessness, impulsive emotional liability and self-concept problems in our sample study was serially 10.5%, 5.9%, 11.8% and 11.7%.

**Discussion:**

However, in our study this data was 30.9% for childhood ADHD and 13.8% for adult ADHD. In our study, 90% of patients with both adulthood ADHD and BID, had also a history of childhood ADHD (18 patients of 21). This data is reported 46% (11 patients) in Wilens study (9).

In most of recent studies the prevalence of adulthood ADHD is estimated to be 1- 6 % (10,11).

In Robertson et al study, it is reported that 68% out of BID patients and 10% out of unipolar patients are also known cases of ADHD (5).

In Nierenberg’s et al studies, the comorbidity of ADHD with BID has been reported 14.7% for male patients and 5.8% for female patients (overall of 9.5%) (3).

In our study, the most of ADHD and BID comorbidity was detected in male patients. This result is similar to those studies which have reported ADHD to be 2 to 3 times more prevalent with boys (10). In our study , no significant relationship between sex and ADHD was detected.

There are several hypothesis mentioned in different studies to explain this high comorbidity of BID and ADHD. One states that because ADHD symptoms become clinical earlier than BID does, it can mimic mania of puberty symptoms. Testing the validity of this statement by Sachs et al showed that the incidence of ADHD symptoms could be considered as early alarming symptoms for BID initiation (12). In our study however, 61% of BID cases had no history of ADHD.

Winokur et al study showed that 21% of patients with BID also mention a history of childhood ADHD, this ratio is reported to be 4% in normal group (13).

Nierenberg also proved this idea that comorbidity of BID and ADHD can be highly related to age of BID incidence (3). In this study all BID patients fulfilled 13% of all ADHD criteria, reversely 5% out of all patients started symptoms of both BID and ADHD in after aged 18. This result means that presence of childhood ADHD could be considered as an alarming sign for adulthood BID incidence. This was on the other hand, not observed in our study. We could find no significant relationship between BID incidence and a past history of ADHD in our patients. The average age of BP symptoms initiation in patients with no history of past ADHD was 25.21± 6.64 (Mean± 2 SD). This data in patients with past history of ADHD was 25.42 ± 6.63.

Limitations and suggestions:

1. This study had no control group, so our results could not be compared to a group of control.
2. Other multi-centered studies, with larger sample size, is highly recommended.
3. Past medical history of patients might not have been closely studied due to patients’ oblivion.
4. Due to the overlap of diagnostic criteria as well as their treatment interference, cohort studies is needed to better explain and distinguish their symptoms, age of incidence, pathophysiology, risk factors and therapeutic alternatives of these two diseases.

Explanations:

This study is academically registered with registration number of 11191in Tehran university of medical science, as a professional thesis to accomplish a diploma in course of psychology.

**Conclusion:**

The prevalence of BID and ADHD comorbidity is high and almost similar to other studies. There is no difference in age of BID symptoms initiation between patients with past history of ADHD and patients with no history of ADHD in the past.

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Table.1: Patients' demographic information

|  |  |
| --- | --- |
| Prevalence (%) | Patients demographic information |
| 73(48%)  79(52%) | Marital status:  Single  Married |
| 51(33.6%)  82(53.9%)  19(12.5%) | Level of education:  Grade 5 of elementary school  Diploma  Higher |
| 101(66.4%)  51(33.6%) | Occupational status:  Unemployed  Employed |
| 12(8%)  140(92%) | Prevalence of first episode of BID in patients:  Less than 18 years old  More than 18 years old |
| 102(67%)  50(33%) | Sex:  Male  Female |

Table.2: Prevalence of childhood and adulthood ADHD according to patients demographic information

|  |  |  |  |
| --- | --- | --- | --- |
| Childhood and adulthood ADHD together | Adulthood ADHD | Childhood ADHD | Patients demographic information |
| 8(88.9%)  1(11.1%) | 7(58.3%)  5(41.7%) | 29(76.3%)  9(23.7%) | Sex:  Male  Female |
| 2(22.2%)  5(55.6%)  2(22.2%) | 4(33.3%)  7(58.3%)  1(8.3%) | 13(34.2%)  20(52.6%)  5(13.2%) | Level of education:  Grade 5 of elementary school  Diploma  Higher |
| 5(55.6%)  4(44.4%) | 10(6.6%)  11(7.2%) | 19(50%)  19(50%) | Marital status:  Single  Married |
| 5(55.6%)  4(44.4%) | 8(66.7%)  4(33.3%) | 26(68.4%)  12(31.6%) | Occupational status:  Unemployed  Employed |

Chart.1: Sex distribution of the study sample

Chart.2: Age distribution of the study sample

Chart.3: Marital status distribution

Chart.4: Occupational distribution of the study sample

Chart.5: Level of education distribution of the study sample

Chart.6: Frequency of childhood and adulthood ADHD in BID patients

Chart.7: Frequency of attention-memory problems of the study sample

Chart.8: Frequency of hyperactive restlessness of the study sample

Chart.9: Frequency of impulsive emotional liability of the study sample

Chart.10: Frequency of self-concept problems of the study sample