CODEN [USA]: IAJPBB ISSN: 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES

http://doi.org/10.5281/zenodo.4587740

Available online at: http://www.iajps.com ***Research Article***

ASSOCIATION BETWEEN PSYCHIATRIC DISORDERS AND ANEMIA AMONG LATE ADOLESCENTS AND ADULTS IN Al-Madina Al-Monawarah, KSA

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Abstract

Background *:The prevalence of mental illness in Saudi Arabia as high as 48%[1]. Recently, a growing body of research has investigated the possible association between anemia and psychiatric disorders due to the role of iron in cognitive and emotional functioning [2].We investigated the association between psychiatric disorders and anemia in the Al-Madina Al-Monawarah region of Saudi Arabia.*

Methods*: We conducted a cross-sectional study on adult and late adolescent patients with psychiatric disorders in the Outpatient Department (OPD) who were following in the Al-Amal Complex for Mental Health and Addiction In Al-Medina. The collected data included demographic characteristics, clinical diagnosis, and the complete blood count (CBC) profiles of the patients. SPSS version 22 was used for data entry and analysis.*

Results*: We included 282 patients with psychiatric disorders. The majority of the patients were males (54%) with a mean age of 35.13 ± 13.1 years. Almost 72% of the patients were treated as outpatients at the time when first CBC test was done, and the most common conditions were schizophrenia (46.5%). According to their CBC profiles for total sample, 64 patients (22.7%) had anemia. Our analysis showed that patients with schizophrenia and brief psychotic disorders were more likely to be anemic than patients with other types of psychiatric disorders ($p < 0.001$).*

Conclusion*: In conclusion, the prevalence of anemia among patients with psychiatric disorders was 22.7%. Moreover, patients with schizophrenia brief psychotic disorders had statistically significant higher prevalence of anemia.*

Keywords: *Association, psychiatric disorders, anemia, schizophrenia, brief psychotic disorders*

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Please cite this article in press Rahma Othman Alfouti et al., ***Association Between Psychiatric Disorders And Anemia Among Late Adolescents And Adults In Madinah, KSA.,*** *Indo Am. J. P. Sci, 2018; 05(12).*

INTRODUCTION:

Iron is important for all living organisms. It plays an essential role in many processes in the body, including metabolic processes. In addition, it is an essential component of important body structures, such as hemoglobin, myoglobin, and many enzymes necessary to cellular metabolism, DNA replication, and repair [3]. Iron plays a crucial role in the development of many systems in the body, including the central nervous and endocrine systems, and myelination of white matter during development of the brain requires an adequate amount of iron [4].

Iron levels in the body are maintained by a balance between absorption and losses, which is regulated by absorptive cells in the proximal small intestine. Moreover, the absorption of iron can vary according to the needs of the body. Long-term iron deficiency leads to iron deficiency anemia, which has potential adverse consequences [5].

Iron deficiency occurs when there is a decrease in total iron in the body. Anemia is very common, and it is prevalent among people of all ages and races. In fact, it is the most common nutritional disorder in the world. Anemia is a major problem in developed countries and also affects a large number of people in developing countries [6].

A report from the World Health Organization (WHO) stated that "24.8% of the world's population are anemic, mainly due to iron deficiency anemia" [7]. In Saudi Arabia, the WHO reported that 32.3% of non-pregnant women of child-bearing age are suffering from anemia [8].

AlQuaiz conducted a hospital-based study and found that 37% of females in Riyadh suffer from anemia, with 7–14-year-old girls being the most affected [9]. Another study conducted in Jeddah reported a prevalence of iron deficiency anemia (IDA) 23%, Also reported that anemia was found to be more prevalent in students 10 to 12 years of age than in younger age groups [10].

Iron plays an important role in the myelination of white matter and the development and functioning of the different neurotransmitter systems. Thus, iron deficiency results in significant psychiatric complications. Previous studies have shown that there is a relationship between IDA and psychiatric disorders, including unipolar depressive disorder, anxiety disorder, schizophrenia, and bipolar disorder [2].

The WHO estimates that psychiatric and neurologic disorders will account for 15% of the total burden of all diseases in the year 2020 [11].

Another study in Saudi Arabia demonstrated that 16% to 59% of secondary school students experience symptoms of significant mental distress. Thus, addressing the mental health needs of this age group is of utmost importance in ensuring a healthy and productive Saudi population [12].

Because studies on the relation between anemia and psychiatric disorders are still limited in Saudi Arabia, we conducted this study to demonstrate the association between IDA and various psychiatric disorders in late adolescents and adults in Medina, KSA.

The objective if this study was to determine the prevalence of anemia among psychiatric patients and the associated factors. And to study the effect of anemia in the development of psychiatric disorders.

SUBJECTS AND METHODS:

This a cross-sectional study that was conducted in Al-Amal Complex for Mental Health and Addiction In Al-Medina. Monawarah Kingdom of Saudi Arabia during the period from 1/4/2016 to 30/7/2018. AL-Amal Complex is the only psychiatric hospital in the city that provides psychiatric care and accepts referral from other health centers.

The study population included all patents with psychiatric disorder male and female patents with psychiatric disorders, from 17 years old and older. We excluded children, adolescents, and people with good mental health. The study included 282 cases selected from the records of the hospital during the period from from 1/4/2016 to 30/7/2018.

We used data from patient files for patients with psychiatric disorders in the Al-Amal Complex for Mental Health and Addiction In Al-Medina. The data included information on age, sex, diagnosis, complete blood count (CBC), white blood cell count (WBC), red blood cell count (RBC), hematocrit (Hct), hemoglobin (Hbg), mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), mean corpuscular hemoglobin concentration (MCHC), red cell distribution width (RDW), platelet count, and mean platelet volume (MPV) for each patient.

The statistical analysis program (SPSS v.22) was used for data entry and analysis as well as other necessary statistical methods to achieve the objectives of the study. We used Chi square test and P value was 0.05.

Official permission was obtained from the scientific ethical committee of Taibah University and from the Ethical Committee of Scientific Research in Al-Madinah Al-Monawarah. This study is cross-sectional study that involves reviewing patient files, so ethical approval was also

obtained from the Al-Amal Complex for Mental Health and Addiction In Al-Medina. Privacy and confidentiality of the patients and their information was ensured.

RESULTS:

In the present cross-sectional study, we included 282 patients with psychiatric disorders. The majority of patients were males (54%) with a mean age of 35.13 ±13.1 years. Almost 72% of the patients were treated as outpatients while the most commonly encountered was schizophrenia (46.5%). According to CBC profile, 64 patients from the total number (22.7%) had anemia; otherwise, the CBC profile was unremarkable (**Table 1 & 2**).

Table 1: Demographic characteristics of the included patients

Variables	**Patients (N = 282)**
Age (years), Mean (SD)	35.13 (13.1)
Male, No (%)	153 (54.3)
Marital Status, No. (%)	
- Single	147 (52.1)
- Married	89 (31.6)
- Divorced	38 (13.5)
- Widow	8 (2.8)
Patient Status, No. (%)	
- outpatient	205 (72.7)
- inpatient	77 (27.3)
Diagnosis, No. (%)	
- Mood disorders	69 (24.5)
- Anxiety and dissociative disorders	6 (2.1)
- Affective disorders	39 (13.9)
- Brief psychotic disorder	7 (2.5)
- Mental disorders due to known physiological conditions	10 (3.6)
- Intellectual disabilities	3 (1.1)
- Mental and behavioral disorders due to psychoactive substance use	16 (5.7)
- personality disorders	1 (0.4)
- Schizophrenia	131 (46.5)

Table 2: CBC profiles of the included patients

Variables	**Patients (N = 282)**
RBCs count, Mean (SD)	4.94 (2.2)
Hemoglobin, Mean (SD)	14.14 (2.2)

HCT, Mean (SD)	39.64 (7.1)
MCV, Mean (SD)	83.54 (6.9)
MCH, Mean (SD)	30.99 (16.6)
MCHC, Mean (SD)	35.58 (4.2)
RDW, Mean (SD)	14.27 (2.8)
WBCs count, Mean (SD)	7.39 (3.1)
WBC differential (lymphocyte %), Mean (SD)	36.35 (11.04)
WBC differential (MID %), Mean (SD)	9.14 (2.9)
WBC differential (GRA %), Mean (SD)	52.9 (12.1)
Platelet count, Mean (SD)	289.9 (80.7)

We used International Classification of Diseases and Related Health Problems (ICD 10) codes to classify mental disorders.

Our analysis showed that patients with brief psychotic disorders and Schizophrenia were more likely to be anemic than other types of psychiatric disorders ($p < 0.001$). (**Table 3**).

Table 3: Association between anemia and clinical diagnosis

Variables	**Anemic (N = 64)**	**Normal (N = 218)**	**P-value**
Diagnosis, No (%)			
Anxiety and dissociative disorders	1 (1.5)	5 (2.3)	<0.001
Bipolar Affective disorders	22 (34.4)	86 (39.4)	
Brief psychotic disorder	7 (10.9)	1 (0.5)	
Mental disorders due to known physiological conditions as dementia and delirium	2 (3.1)	8 (3.7)	
Intellectual disabilities	0	3 (2.3)	
Mental and behavioral disorders due to psychoactive substance use	6 (9.4)	10 (4.5)	
Neurological malignant syndrome	0	1 (0.5)	
Schizophrenia	26 (40.6)	105 (48.6)	

DISCUSSION:

According to an alarming report from the WHO (2013), psychiatric disorders have become the leading cause of disability worldwide [13], which is reflected in the increasing burden they place on healthcare systems. While there is a lack of published empirical studies that estimate the prevalence of psychiatric disorders in Saudi Arabia, previous reports indicated that the prevalence of mental illness in Saudi Arabia may be as high as 48% [14]. Recently, a growing body of evidence has suggested a possible association between anemia and psychiatric disorders due to the role of iron in cognitive and emotional functioning. In the present study, we found that the prevalence of anemia among patients with psychiatric disorders was 22.7%; moreover, patients with brief psychotic disorders and Schizophrenia were more likely to be anemic than other types of psychiatric disorders.

In concordance with our findings, Korkmaz and colleagues assessed the frequency of anemia in chronic psychiatric patients, finding that almost 25.4% of the patients suffered from anemia [15]. The authors reported that the prevalence of anemia in chronic psychiatric patients was higher than that in the general population. Another report found that the prevalence of anemia in psychiatric patients was 12.2% [16]. In line with our findings, Simsek and colleagues investigated the predictors of mental illness in a cross-sectional study of 270 Turkish women. Their results showed that anemia was a significant independent predictor of the development of mental illness. Notably, another report showed that antenatal iron deficiency anemia was associated with common mental diseases in Vietnamese women [17].

Chen and colleagues compared the prevalence of psychiatric disorders between anemic patients and healthy controls. They found that iron deficiency anemia significantly increased the risk of a wide range of psychiatric disorders, including affective, mood, and developmental disorders [2]. Similarly, Al-Ali and colleagues reported that iron deficiency anemia was more common in children with autism than in typically developing children. Another report showed that serum ferritin levels were negatively correlated with behavioral symptoms [18]. In addition, iron deficiency anemia was found to be a significant contributor to developmental disorders [6]. Finally, a recent study indicated that low serum iron is a strong predictor of the development of attention-defect hyperactivity disorder (ADHD) [19].

The exact causes of the higher prevalence of anemia in psychiatric patients and the association between anemia and specific psychiatric disorders are not fully understood. However, it is well established that iron, the main component of hemoglobin, plays an essential role in neural and emotional development due to its role in myelination and neurotransmitter synthesis [20]. Thus, iron deficiency could lead to neurodevelopmental disorders and emotional dysregulation, which has been extensively reported as the core pathogenesis in the development of bipolar and anxiety disorder [21].

We acknowledge that the present study has some limitations. The study was performed in a single center, which may affect the generalizability of our findings. Moreover, the sample size was smaller than in similar previous reports. In addition, the observational nature of the present study did not allow us to perform a regression analysis.

In conclusion**,** the prevalence of anemia among patients with psychiatric disorders was 22.7%. In addition, patients with brief psychotic disorders and Schizophrenia were more likely to be anemic than other types of psychiatric disorders. However, the type of anemia (microcytic or normocytic) was not significantly associated with the type of psychiatric disorder. Further multi-center studies are needed to confirm our findings.

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