Neutropenia among psychiatric in-patients

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ABSTRACT

الهدف: دراسة معدل قلة العدلات لدى المرضى النفسيين.

الطريقة: تم إجراء دراسة استعادية وأخذ عينة ملائمة من المرضى المنومين في مجمع الأمل للصحة النفسية – الرياض – المملكة العربية السعودية ما بين الفترة يناير حتى ديسمبر لعام 2004 م. كان عدد المرضى 51 مريض (48 ذكر و 3 أنثى) و معدل العمر 34 عام (52–18) عام.

النتائج: لقد وجد هناك فارق كبير بين معدل قلة العدلات لدى العامة، والمشار إليه في الدراسات العالمية السابقة، وبين المرضى النفسيين المنومين خلال هذه الدراسة (12.8 حالة / مليون شخص / عام، 26400 حالة / مليون مريض نفسي / عام).

خاتمة: تشير هذه الدراسة إلى عرضة المرضى النفسيين لحدوث قلة العدلات.

Objectives: To explore the frequency of neutropenia in psychiatric patients.

Methods: We conducted this study by retrospectively taking a convenient sample from patients who were admitted to Al-Amal Complex for Mental Health (ACMH), Riyadh, Saudi Arabia from January to December 2004. Fifty-one patients (48 men and 3 women), with a mean age of 34 years (18-52 years) were included.

Results: We found that there is a large difference between the rates of neutropenia in the general population (12.8 cases/million persons/year), obtained from international studies, and in psychiatric inpatients included in our study (26400 cases/million psychiatric patients/year).

Conclusion: Psychiatric patients are more vulnerable to develop neutropenia.

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Neutropenia is known as a decrease in the absolute neutrophil count (ANC) to less than 2000-1500 cells per mm^3. Although there are plenty of studies[1-3] targeting the frequency of neutropenia in the general population, still there is limited information for psychiatric patients. However, the available studies,[1-3] illustrate the range of neutropenia from 3.4-12.8 cases per million persons per year. The frequency of drug-induced neutropenia is one case per million persons per year, and it has been found that neutropenia occurs more commonly in females than in males. Furthermore, elderly individuals have a higher frequency rate than younger individuals. Since the rate of neutropenia in the psychiatric population is unknown, this study was setup to explore such frequency.

Methods. The study was conducted in April 2005 to explore the frequency of neutropenia in the psychiatric population by taking a convenient sample from those admitted in year 2004 to Al-Amal Complex for Mental Health (ACMH), Riyadh, Saudi Arabia. To check the frequency of neutropenia among both general and psychiatric patients, Medline and EMBASE searches were carried out twice: at the start, and at the end of the study, and it was found that neutropenia occurs in the range of 3.4-12.8 cases per million persons per year. We were unable to find any studies concerned with the frequency of neutropenia in psychiatric patients. After receiving approval from the Ministry of Health's ethics approval committee, we used the data from the information center in ACMH, to retrospectively

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scan all the admissions (psychiatry & addiction) in 2004. Subjects included are adult, psychiatric patients admitted to ACMH in 2004. We excluded pediatrics and outpatients. A data collection sheet was designed to collect information regarding the possible causes or factors that affect the development of neutropenia in our sample, and the information was gathered by checking the inpatient file data.

The results of each item were added individually, and data were entered into computerized Statistical Package for Social Sciences (SPSS) (version 12.0.0, SPSS Inc., USA) for analysis. The analysis included frequencies of results for each variable. Results were compared according to data type (quantitative or qualitative) and the appropriate statistical procedure (Students t test and Chi square tests were performed) was chosen for such comparisons.

Results. A total of 1966 patients were admitted to ACMH in 2004. Laboratory records of hematology results were used to identify those patients who developed neutropenia during their hospital stay, and we found 51 cases (38 addiction patients, and 13 psychiatry), with 69 (53 addiction, 16 psychiatry) neutropenia episodes. A neutropenia episode was defined (according to ACMH laboratory standard criteria, using the Cell-Dyn 3700, counting machine) as neutrophil count less than 2000 cells per mm^3, following the World Health Organization criteria. An interruption period of at least 2 weeks is required to count a new neutropenia episode. The mean age of addiction patients was found to be 27 (5.4) years, and for psychiatry patients was 38 (10.8) years. The most common diagnosis in addiction patients was substance-induced psychosis (60%), while schizophrenia with 69% of patients dominates in psychiatry patients. The rest of the patient characteristics are shown in **Table 1**.

Table 1 - Characteristics of patients with neutropenia.

Characteristics	Addiction patients	General psychiatric patients	Male addiction & psychiatric patients	Male psychiatric patients	Female psychiatric patients	Addiction versus psychiatric patients	Male versus female patients	Male versus female psychiatric patients
Age								
Mean	27	38	28	36	43	0.000	0.181	0.181
Median	25	34	27	34	52			
Standard deviation	5.4	10.8	6.7	8.2	13.7			
Psychiatric diagnosis (%)								
Substance induced mania	9	0	8	0	0	0.583	1.00	a
Substance induced depression	19	0	16	0	0	0.102	0.582	a
Personality cluster B	11	0	10	0	0	0.324	1.00	a
Schizophrenia	0	69	11	70	67	0.000	0.005	1.00
BAD mania	0	13	2	10	17	0.051	0.168	1.00
BAD mixed	0	6	0	0	17	0.232	0.087	0.375
Substance induced psychosis	60	13	54	20	0	0.001	0.025	0.500
Reason for requesting CBC (%)								
Routine check	70	75	75	70	40	0.764	0.054	0.008
Co-morbid infection/illness (%)								
Acute infection	6	6	5	5	17	1.00	0.311	0.375
Chronic infection	0	25	0	0	33	0.036	0.090	0.633
Acute illness	2	0	2	0	0	1.00	1.00	a
Chronic illness	26	56	30	50	67	0.036	0.090	0.633
Type of co-morbid chronic illness	29	44	21	0	100	0.077	0.001	0.008
Autoimmune	29	44	42	80	0	0.077	1.00	0.234
Neutropenia	43	0	32	0	0	0.324	1.00	a
COPD	0	11	5	20	0	0.232	1.00	1.00
Others								
Concomitant substance abuse								
Amphetamine	91	25	83	40	0	0.000	0.000	0.234
Heroin	9	0	8	0	0	0.583	1.00	a
Opiate	8	0	6	0	0	0.000	a	a
Cannabis	68	19	62	30	0	0.001	0.005	0.250
Benzodiazepine	11	0	10	0	0	0.324	1.00	a
Alcohol	32	6	29	10	0	0.052	0.328	1.00

BAD - bipolar affective disorder, CBC - complete blood count, COPD - chronic obstructive pulmonary disease,
a = No statistics computed as one of the variables is constant

Discussion. Based on the previous published frequency of neutropenia in the general population, the frequency of neutropenia in psychiatric patients was expected to be somewhere within the range of the general population, but what was striking, and from the first sight, is the large difference between the rates of neutropenia in the general population, obtained from international studies[2-5] and that for psychiatric inpatients in our study (12.8 cases/million persons/year,[2] 25940 cases/million psychiatric patients/year). Whatever the reasons, it certainly points to the vulnerability of psychiatric patients for developing neutropenia. There are many factors that characterize mentally ill subjects, for instance, the nature of the illness with the ambiguity of its pathogenesis and pathophysiology, chronicity of the disease, life style of psychiatric patients (for example, substance abuse, poor nourishment, and so forth), and role of psychotropic medications with their long-term use. One might attribute the high rate of neutropenia among this population to one or more of these factors. Considering the possible acquired causes of neutropenia, which include: nutritional deficiencies[3] such as vitamin B12, folate and copper deficiencies; use of antipsychotic medications, anticonvulsants, some benzodiazepines diazepam, and alcohol consumption,[2] obviously all or most of these factors are applicable to psychiatric patients, particularly those having chronic disorders as in our sample. However, it is known that neutropenia in the general population is predominant among women,[3] which is opposite to our findings. However, the predominance of male admission (95%) in our study might explain this skew. Moreover, males consume more alcohol, a substance that is implicated in neutropenia as mentioned above. Taking into account the role of antipsychotic agents in developing neutropenia, it is reported that males usually required higher doses of these medications compared to females,[5] again this might explain why most neutropenia is among males.

With respect to age, it is known that elderly individuals have a higher frequency rate of acquired neutropenia than younger individuals,[3] whereas the mean age of neutropenic patients in the study is below 40 years. This finding along with the early age of onset of schizophrenia and multi-substance induced psychosis, the 2 most common diagnoses among our study in psychiatric and addict patients, can this be explained by a shared or a broad pathology? With respect to medications, the 2 most taken antipsychotic drugs by the study subjects were haloperidol (30%) and risperidone (27.5%). However, this does not point to a causal linkage between these drugs and neutropenia, but rather due to availability of them in the hospital pharmacy and to the physicians' habituation in prescribing them. The rate of antidepressants usage is low (29%) compared to the use of antipsychotics (75.4%). Again, this difference is most probably due to the predominance of psychotic disorders among our sample.

As stated at the beginning, the aim of this paper was to examine the extent of neutropenia among mentally ill subjects and substance abusers. It is not possible to determine a causal relationship with a specific factor, which can be attained by another study design, namely, a prospective controlled design. Nevertheless, it illuminates the importance of regular checking for neutropenia, particularly in chronic psychiatric patients. Since neutropenia is a serious medical condition that results in a harmful outcome, the case here is worse because we are dealing with patients that tend to have a defect in their judgment and insight, and even educating them might not be enough, rather it requires involvement of other parties like a caretaker or family member. Some limitations are found that may limit the predicting ability of this study, including the retrospective design, lack of control group, and that the psychiatric diagnosis was based on physician's judgment and not on structured interview diagnostic tools. Further prospective controlled studies are needed to overcome these limitations.

References

1. Strom BL, Carson JL, Schinnar R, Snyder ES, Shaw M. Descriptive epidemiology of agranulocytosis. ***Arch Intern Med*** 1992; 152: 1475-1480.
2. Kaufman DW, Kelly JP, Jurgelon JM, Anderson T, Issaragrisil S, Wiholm BE, et al. Drugs in the aetiology of agranulocytosis and aplastic anaemia. ***Eur J Haematol Suppl*** 1996; 60: 23-30.
3. Alvir JM, Lieberman JA. Agranulocytosis: incidence and risk factors. ***J Clin Psychiatry*** 1994; 55 Suppl B: 137-138.
4. van Staa TP, Boulton F, Cooper C, Hagenbeek A, Inskip H, Leufkens HG. Neutropenia and agranulocytosis in England and Wales: incidence and risk factors. ***Am J Hematol*** 2003; 72: 248-254.
5. Seeman MV. Gender differences in the prescribing of antipsychotic drugs. ***Am J Psychiatr*** 2004; 161: 1324-1333.