Research Article Volume 3, Issue 1

Body Mass Index Changes of Patients on Antipsychotics: A Comparison between Typical and Atypical Antipsychotics

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Received: 26 January 2019; **Accepted:** 06 February 2019; **Published:** 10 February 2019

Abstract

Objectives: The study was designed to assess and compare the changes in the body mass index of patients on typical and atypical antipsychotics in a tertiary hospital in Nigeria.

Materials and Methods: Consenting psychiatric patients who were antipsychotic naive before the commencement of the study and who attended the hospital between February 2014 and October 2014 were enlisted in the study. The SCAN and a socio-demographic questionnaire were administered to the subjects. BMI of each subject was calculated before the administration of antipsychotic and after 1 month, 2 months and 3months intervals.

Results: 138 out of 140 subjects enlisted in the study were analyzed. The mean BMI changes derived were 23.7461 ± 3.58270, 25.0074 ± 3.99667, 25.960 ± 4.24540 and 27.1261 ± 4.66810. The atypical antipsychotics caused relatively higher mean BMI increases more than the typical ones and the mean BMl differences between the two groups of antipsychotic users is consistently statistically significant (df=l, F=48.354, p=0.000, df=I, F=51.082, P=0.000, df=I, F=77.451, p=0.000).

Conclusion: Considering the invaluable role of antipsychotics in the treatment of psychiatric patients, non-pharmacologic interventions are highly recommended to help control the weight of patients on antipsychotic treatment.

Keywords: Antipsychotic; Typical; Atypical; Body mass index; Weight gain

1. Introduction

Evidence abounds that there is increasing global prevalence and trends of overweight among people of several nations and this poses a myriad of health consequences, reduced quality of life and poor drug compliance as well as an increased risk of premature illness and death latter in life [1, 2]. Excess adiposity is well documented as one of the principal health threats and is a major risk factor for type 2 diabetes, hypertension, cardiovascular and cerebrovascular disease [3]. The global nature of the obesity epidemic has been formally recognized by the World Health Organization in 1997 [4]. Weight gain is a well documented serious side effect of antipsychotic therapy and many studies have tried to assess the impact of the various types of antipsychotic on the weight of those taking them [5-7]. However, most of these studies were carried out in the developed world. There is a paucity of similar studies in the undeveloped world of which Nigeria is a part. It is also known that there is obvious genetic and racial differences in the cytochrome P450 drug metabolizing enzymes of Caucasians compared to non-Caucasians [8, 9].

In the light of the foregoing, this study aims at evaluating the body mass index changes of patients on antipsychotic therapy in a tertiary hospital in Nigeria. The comparison between the typical and atypical antipsychotics was done. It is expected that results from this study will not only add to our knowledge about the pharmacodynamics of these medications but it will guide clinicians in prescribing them to patients and provide a reliable data which will enable health care policy makers enunciate more patient friendly policies with respect to making available the best medications.

2. Subjects and Method

This prospective cross-sectional study was conducted at the psychiatric clinic of the Madonna University Teaching Hospital over an eight month period, from February 2014–October 2014.

2.1 Instruments

For this study, the instruments used are as follows:-

1. The Schedule for Clinical Assessment in Neuropsychiatry (SCAN), interview schedule, version 2.1
2. Socio-demographic questionnaire

The Schedule for Clinical Assessment in Neuropsychiatry (SCAN), interview schedule, version 2.1 is an excellent instrument for diagnosing psychiatric disorders based on the ICD 10 diagnostic criteria [10]. A questionnaire containing socio-demographic variables, prepared by the researchers was administered to each subject.

2.2 Procedure

Before the commencement of the study, approval of the ethical committee of the institution was sought and informed consent obtained from the subjects enlisted into the study. All psychiatric patients placed on antipsychotic treatment for the first time were included in the study while all those who have been on antipsychotics before the

commencement of the study were excluded. All psychiatric patients who attended the clinic within the study period and consented to the study were included in the study.

The height and weight of the subjects were recorded before the commencement of treatment with antipsychotics. From this, the baseline Body Mass Index (BMI) was derived. The BMI was calculated by dividing the weight of the patient (in kilograms) by the square of his/her height (in meters). Diagnoses of their conditions were earlier made using SCAN based on the ICD 10 criteria. Each subject was given a one month appointment (for out-patients) and the BMI subsequently repeated (BMI_2) as well as for the subsequent two months (BMI_3 and BMI_4).

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2.3 Sample size estimation

Sample size was calculated using the formula of proportions $N=Z^2pq/E^2$ [11] where N=minimum sample size. Z=1.96 (standard normal deviation for 95% confidence interval level). P=Proportion of population with condition studied (10%). Q=Complementary probability (100–p)=100–10=90. E=precision required (tolerable sampling error)=5%.

$$N = \frac{1.96^2 \times 10 \times 90}{5^2}$$

$$= 138.298$$

The sample size was rounded off to 140.

The data was analyzed using the statistical package for social sciences (SPSS) at 5% level of significance and 95% conference interval.

3. Results

Out of one hundred and forty subjects (140) enlisted, 138 completed it. Table 1 shows the frequencies of the various socio-demographic and clinical variables of the subjects. The greatest percentage of the subjects were schizophrenic (43.5%), aged between 31-40 yrs (52.2%), male (69.6%), unemployed (47.8%), single (47.8%), and had secondary education (39.1%). Ninety (65.2%) of the subjects had the typical antipsychotics (Haloperidol or Chlorpromazine) prescribed for them while 48(34.8%) had the atypical antipsychotics (Risperidone or Olanzapine) prescribed for them.

Variable	**n**	**%**
Diagnosis		
Schizophrenia	60	43.5
Mood Disorder	48	34.5
Anxiety Disorder	6	4.3

Substance use disorder	24	17.4
Age (in Years)		
11 – 20	12	8.7
21 – 30	36	26.1
31 – 40	72	52.2
41 – 50	12	8.7
51 – 60	6	4.3
Gender		
Female	42	30.4
Male	96	69.6
Employment		
Unemployed	66	47.8
Unskilled	30	21.7
Skilled	24	17.4
Professional	18	13
Marital Status		
Single	66	47.8
Separated/Divorced	18	13
Married	36	26.1
Widowed	18	13
Literacy Status		
No formal Education	18	13
Primary Education	42	30.4
Secondary Education	54	39.1
Tertiary Educations	24	17.4
Antipsychotics used		
Haloperidol/Chlorpromazine	90	65.2
Risperiodne / Olanzapine	48	34.8

Table 1: Frequencies of the various sociodemographic and clinical variables.

Table 2 depicts the distribution of the mean values of the body mass index (BMI) of the subjects every month on four different occasions based on the antipsychotics used. Before the administration of antipsychotics, at the commencement of the study, the mean BMI of the subjects (BMI_1) was 23.7461 ± 3.58270. The mean BMI (BMI_2) of the subjects after one month of the use of antipsychotics was 25.0074 ± 3.99667 (the mean BMI for those on typical antipsychotics was 23.518 ± 3.46431 while for those on atypical antipsychotics was 27.8000 ± 3.40912).

After 2 months of using antipsychotics, the mean BMI (BMI_3) of the subjects was 25.9609 ± 4.24540. For those on typical antipsychotic, the mean BMI was 24.3467 ± 3.60147 while that of those on atypicals was 28.9875 ± 3.69189. After 3 months of taking antipsychotics, the mean BMI (BMI_4) of the subjects was 27.1261 ± 4.66810. For those on typical antipsychotics, the mean BMI was 25.0800 ± 3.76373 while that of atypical antipsychotic users was 30.9625 ± 3.69414.

Condition	**n**	**Mean**	**Standard Deviation**	**Minimum**	**Maximum**
BMI(1) (before use of Antipsychotics) **Total**	138	23.7461	3.58270	17.25	32.90
BMI(2) Haloperidol/Chlorpromazine	90	23.5180	3.46431	17.50	28.30
Risperidone/Olanzapine	48	27.8000	3.40912	23.50	34.80
Total	138	25.0074	3.99667	17.50	34.80
BMI (3) Haloperidol/chlorpromazine	90	24.3467	3.60147	17.80	29.40
Risperidone/ Olanzapine	48	28.9875	30.69189	25.30	36.70
Total	138	25.9609	4.24540	17.30	36.70
BMI(4) Haloperidol/Chlorpromazine	90	25.0800	3.76373	18.20	30.00
Risperidone/ Olanzapine	48	30.9625	3.69414	26.30	38.40
Total	138	27.1261	4.66810	18.20	38.40

Table 2: Distribution of the mean values of the body mass index (BMI) of the subjects based on the antipsychotic used.

Table 3 shows the table of ANOVA values comparing the mean BMI of the two groups of antipsychotic users. The result shows that there is statistically significant difference between the two groups of antipsychotic users on the three occasions they were compared:

df=1, F=48.354, P=0.000

df=1, F=51.082, P=0.000

df=1, F=77.451, P=0.000

Condition	Sum of Squares	df	F	Significance
BMI(2) between the 2 groups of antipsychotic users	573.982	1	48.354	0.000*
BMI (3) between the 2 groups of antipsychotic users	674.212	1	51.082	0.000*
BMI(4) between the 2 groups of antipsychotic users	1083.250	1	77.451	0.000*

*significant

Table 3: Table of anova values.

4. Discussion

This study showed that there was a progressive increase in the weight of the subjects on antipsychotics. This is suggested by the raised BMI changes for both typical and atypical antipsychotics from the beginning of the treatment to the end of four months when the fourth BMI was calculated. However the atypical antipsychotics, risperidone and olanzapine caused more increase in BMI compared to the typical antipsychotics, haloperidol and chlorpromazine across board. The table of ANOVA values shows that the differences in BMIs caused by the two antipsychotic types with their use over time were consistently significant. Although many-factors including sedentary lifestyle, unhealthy food habits, genetic susceptibility and antipsychotic treatment are known causes of weight gain, antipsychotic-induced weight gain remains an important concern in the management of patients treated for psychosis [12].

The result of this study with respect to greater penchant for causing weight gain by the atypical antipsychotics compared with the typical antipsychotics is similar to results from previous studies [5, 6, 12]. Madhubhashinee et al reported that most antipsychotics cause weight gain and the risk appears to be higher with olazapine and clozapine [12].

Reports on the socio-demographic characteristics of patients on antipsychotics are conflicting. In this study, a greater percentage of the patients are males and unemployed. This is in agreement with some studies [13, 14]. Nevertheless, these studies also reported that most of the patients on antipsychotics have only primary or basic education contrary to the finding in our study, that a greater percentage of our study cohort had a secondary education. Methodological differences and the fact that the study was carried out in a referral centre (a tertiary hospital) may be explanatory.

5. Conclusion

Weight gain and obesity is a public health problem that is assuming global proportions. Considering the invaluable role antipsychotics play in the treatment of psychiatric patients, non pharmacologic interventions, such as dietary counseling, exercise programme and cognitive as well as behavioural strategies are highly recommended for patients

on antipsychotics to help control the undesirable tendency towards weight gain caused by these drugs. A greater majority of our patients were schizophrenics. This is similar to reports from other studies.

6. Authors' Contributions

Dr Chukwujekwu conceived the paper, oversaw data collection, conducted data analysis, wrote the manuscript and approved final version. Dr Olose participated in data collection and interpretation, critically revised the manuscript and approved final version. The authors declare that they have no conflict of interest.

7. Limitation

The two groups compared were not matched for age and sex. This would have helped eliminate confounding variables to the barest minimum.

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Citation: Chukwujekwu DC, Olose OE. Body Mass Index Changes of Patients on Antipsychotics: A Comparison between Typical and Atypical Antipsychotics. Journal of Psychiatry and Psychiatric Disorders 3 (2019): 006-013.