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Original Research Article

Effect of Antipsychotic Drugs on Body Composition in Patients Attending Psychiatry OPD

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Abstract:

This study investigated the potential impact of antipsychotic medications on body composition in a sample of 300 patients. Patients were categorized by the medication they received: risperidone, haloperidol, chlorpromazine, risperidone with amitriptyline, risperidone with valproate, or haloperidol with valproate. The analysis focused on changes in weight, BMI, waist-to-hip ratio, and per cent body fat. The findings suggest an average weight gain across all medication groups following treatment. This ranged from 3.3 kg (haloperidol) to 5.0 kg (chlorpromazine). Similarly, BMI increased in all groups, with an average rise between 0.8 kg/m² (risperidone) and 1.9 kg/m² (chlorpromazine). Changes in waist-to-hip ratio were observed in most groups, except for haloperidol with valproate. However, the magnitude of this change appeared to be small. Finally, the data indicated an average increase in percent body fat for all medication groups, ranging from 0.9% (risperidone + amitriptyline) to 1.6% (haloperidol + valproate).

Keywords: Antipsychotics, weight gain, psychosis, low-income settings, global health.

Introduction

The issue of weight gain caused by antipsychotic medications is a matter of global concern. Psychotic diseases are long-lasting and incapacitating mental illnesses that impact millions of people worldwide [1]. Antipsychotic drugs are often used to treat various mental problems. However, a significant adverse effect of these treatments is weight gain, which may have negative effects on health outcomes and decrease adherence to the prescription [2]. Atypical antipsychotics, which are newer drugs, often result in more significant weight gain compared to traditional ones [3]. Clozapine and Olanzapine have been shown to be strongly correlated with the most substantial increase in body weight [4].

Antipsychotic medications have the potential to induce weight gain, and this risk is increased compared to taking a placebo, with a likelihood of gaining more than 7% of the body weight before starting the therapy [3, 5]. Initial use of antipsychotics may result in significant weight gain, even in those using them for the first time [6]. Obesity, which is associated with the use of antipsychotic medications, may exacerbate existing medical issues, diminish quality of life, and negatively impact mental health, including sadness and poor self-esteem [7]. Increased body weight increases the likelihood of developing hypertension, type II diabetes, heart disease, and stroke [7]. Medication withdrawal due to weight increase might possibly result in relapse and decrease long-term results [8, 9]. Antipsychotics may be categorized as either first-generation or second-generation [10, 11]. Atypical antipsychotics may function by blocking serotonin receptors, namely 5-HT2A, which are involved in regulating hunger [12,13,14]. Antipsychotics may also impact histamine and dopamine receptors, which may possibly lead to an increase in body weight [15].

The precise processes are complex and probably include numerous pathways that cooperate to enhance calorie intake and promote weight gain [15]. Clinical research indicate that 50-80% of patients who take atypical antipsychotics have weight gain, with the amount varying from a few kilos to nearly 20% of their initial weight [16]. Research findings indicate a substantial rise in weight (4.7 kg or 7.3% gain) after a 12-week course of olanzapine medication [4]. A Chinese research found that after 10 weeks of using risperidone and clozapine, there was a significant rise in weight (4.46 kg) and body mass index (BMI) (1.69 increase). During a 12-month investigation, it was observed that individuals diagnosed with schizophrenia that were on amisulpride, ziprasidone, or haloperidol had

substantial weight gain, specifically 9.7 kg, 4.8 kg, and 6.3 kg, respectively [17]. Mental diseases constitute a significant contributor to impairment on a global scale, representing 12% of the overall disease burden [18]. Approximately 450 million individuals are afflicted with mental or behavioral diseases, and schizophrenia impacts 25 million people, which accounts for 1.1% of the population [19]. Contrary to earlier beliefs, the increase in urbanization, social turmoil, and poverty in sub-Saharan Africa may be causing a higher occurrence of psychosis [20]. Mental illness is the primary non-communicable disease burden in Ethiopia, with schizophrenia (0.5%), depression (5%), and bipolar disorder (5%) being significant factors [21][22][23]. In the treatment of schizophrenia, changing antipsychotics is common when one treatment is sub optimally effective, but the relative effectiveness of drugs used in this strategy is unknown. This randomized, double-blinded study compared olanzapine, quetiapine, risperidone, and ziprasidone in patients who had just discontinued a different atypical antipsychotic [24].

Objective of the Study: The aim of this research was to evaluate the influence of antipsychotic drugs on the composition of the body and related characteristics in patients in communities with low incomes.

Material and Methods: Study Site: Psychiatry OPD, Indira Gandhi Institute of Medical Sciences (IGIMS), Patna, India. The formula for calculating the sample size needed for a single proportion study with a desired confidence level and margin of error. Let's break it down and calculate the sample size: N: Required sample size (what we're solving for), Z: Confidence level (1.96 for 95% confidence), P: Prevalence (assumed to be 50% as you mentioned), Q: 1 - P (since prevalence + not prevalent = 1), d: Maximum allowable error (margin of error, which is 7%). Plugging in the values: Q = 1 - 0.5 = 0.5, d = 0.056. N=300. Formula: $N= Z^2PQ/d^2$.

Inclusion Criteria: Age: 18 to 65 years old (can be written as "Adolescents and adults aged 18-65 years). Gender: All genders (can be written as "Men, women, and all gender identities"). Clinic visit: Patients visiting the psychiatry outpatient department (OPD). Medication: Currently taking antipsychotic medications. Diagnosis: Confirmed diagnosis of a psychiatric illness according to ICD-10 criteria (ICD-10 is a diagnostic manual for mental health conditions).

Exclusion Criteria: Age: Younger than 18 years old or older than 65 years old, Medication: No current prescription for any psychotropic medications (psychotropic drugs affect mood, thinking, and behaviour), Diagnosis: Excluded diagnoses include mental retardation and dementia, Medication: Not currently taking any stimulant medications. Statistical analysis was performed using SPSS software.

Weight: We used a regular balance scale to measure weight in kilograms with minimal clothing and shoes off.

Height: We measured height in centimetres using a vertical stadiometer mounted on the wall.

BMI: The formula for Body Mass Index (BMI) is BMI = weight (in kilograms) / height (in meters squared). Here's a breakdown of the formula: BMI: This represents the calculated

Body Mass Index value

Weight: This refers to the person's weight in kilograms (kg). Height: This refers to the person's height in meters (m).

Waist and Hip Size: We measured waist and hip circumference in centimetres using a soft measuring tape. The waist was measured at the midpoint between the bottom of your ribs and your hip bone. The hip was measured at its widest point.

Skinfold Thickness: We used a unique tool called a skinfold calliper to measure the thickness of skin folds at three locations: triceps (back of upper arm), abdomen, and shoulder blade.

Body Fat Percentage: We used a body fat calculator program to estimate body fat percentage based on the skinfold thickness measurements.

Results:

Table 1: Demographic analysis (N=300):

Demographic Data	Number of Patients	Percentage
Males	210.0	70.00
Females	90.0	30.00
18-25 yrs	42.0	14.00
26-35 yrs	106.0	35.33
36-45 yrs	70.0	23.33
46-55 yrs	52.0	17.33
56-65 yrs	28.0	9.33
Illiterate	103.0	34.33
Primary & High School	147.0	49.00

Intermediate	34.0	11.33
Graduation	10.0	3.33
Post-Graduation	6.0	2.00
Unemployed people	168.0	56.00
Employed people	127.0	42.33
Others	5.0	1.67
Rural population	172.0	57.33
Urban	128.0	42.67
Muslim	43.0	14.33
Hindu	244.0	81.33
Christian	13.0	4.33
Below poverty line community	282.0	94.00
Above-poverty-line community	18.0	6.000

Table 1 result: Table 1 presents an analysis of the demographic data with a sample size of 300.

Table 1 presents a detailed analysis of several demographic attributes for a subset of 300 patients. The following are notable observations: Gender: The sample exhibits a conspicuous male preponderance (70%) in contrast to females (30%). The majority of individuals, accounting for 35.33%, belong to the age category of 26-35 years.

This is followed by the age group of 36-45 years, which comprises 23.33% of the population. The age group of 18-25 years constitutes 14% of the total population. Education: The majority of patients possess a primary or high school level of education (49%), whereas a significant portion are illiterate (34.33%). The prevalence of college education, including both graduation and post-graduation, is relatively low at 6.33%. Employment: The bulk of persons, accounting for 56%, are now unemployed, while 42.33% are employed.

Geographical Distribution: The sample exhibits a modest predominance of respondents from rural regions (57.33%) in comparison to urban areas (42.67%).

Religion: Hindus are the majority religious group, accounting for 81.33% of the population, while Muslims make up 14.33% and Christians for 4.33%. Socioeconomic Status: The overwhelming majority (94%) are part of the community living below the poverty line.

Table 2: Side effects of the intake of different antipsychotic drugs (N=300):

Symptom	Number of Patients	Percentage
Drowsiness/Sedation	120	40.0%
Tremor	54	18.0%
Extrapyramidal Symptoms (EPS)	39	13.0%
Dystonia	12	4.0%
Akathisia	21	7.0%
Metabolic Changes	78	26.0%
Weight Gain	45 (subset of Metabolic Changes)	15.0%
Increased Blood Sugar	21 (subset of Metabolic Changes)	7.0%
Increased Cholesterol	12 (subset of Metabolic Changes)	4.0%
Tardive Dyskinesia	9	3.0%
Cognitive Impairment	18	6.0%
Dizziness	33	11.0%
Dry Mouth	51	17.0%
Other (Specify)	3	1.0%

Variables considered in this study:

1. Weight (kg)
2. Body Mass Index (BMI) (kg/m²)
3. Waist Circumference (cm)
4. Hip Circumference (cm)
5. Waist-to-Hip Ratio
6. Percent Body Fat (%)

Analysis of Table 2: Side Effects of Antipsychotic Drugs (N=300): Table 2 provides a concise overview of the documented adverse reactions seen by a sample of 300 individuals who were prescribed antipsychotic medicines. Below is an analysis of the main discoveries: Prevalent Adverse Reactions: The most common adverse effect is drowsiness/sedation, occurring in 40% of cases.

This is followed by metabolic changes, which are reported in 26% of cases. Dizziness is experienced by 11% of individuals, while dry mouth is reported

by 17%. Metabolic alterations: A considerable proportion (26%) of patients had metabolic alterations, with weight gain (15%) being the most prevalent, followed by elevated blood sugar levels (7%) and increased cholesterol levels (4%). Movement disorders, including extrapyramidal symptoms (EPS), are seen in a significant proportion of patients, with tremors occurring in 18% of cases, dystonia in 4%, and akathisia in 7%. Additional Adverse Effects: Tardive dyskinesia, a possibly irreversible movement disease, occurs in 3% of cases and is a less common but significant adverse effect. A further significant adverse effect is cognitive impairment, which affects 6% of individuals.

Table 3: Body Composition Changes with Mean and standard deviation differences after Antipsychotic Treatment with different combinations of drugs across all age groups of patients (N=300):

Variable	Risperidone (N=75)	Haloperidol (N=50)	Chlorpromazine (N=25)	Risperidone +/− Ami (N=75)	Risperidone +/− Valproate (N=50)	Halo +/− Valproate (N=25)
Weight (kg)	4.2 ± 2.5	3.3 ± 2.0	5.0 ± 4.2	4.0 ± 3.0	3.8 ± 2.2	3.9 ± 1.8
BMI (kg/m²)	1.4 ± 0.8	1.0 ± 0.7	1.9 ± 1.6	1.6 ± 1.3	1.3 ± 0.6	0.8 ± 0.8
Waist-to-Hip Ratio	1.1 ± 1.3	1.9 ± 2.0	2.0 ± 1.8	1.2 ± 1.1	1.4 ± 0.6	0.8 ± 0.4
% Body Fat	1.2 ± 0.7	1.1 ± 0.6	1.3 ± 0.7	0.9 ± 0.3	1.3 ± 0.7	1.6 ± 1.0

Table 3 represents an analysis of the changes in body composition that occurred after antipsychotic treatment in a sample of 300 individual patients. This table displays the mean and standard deviation of weight, BMI, waist-to-hip ratio, and % body fat after therapy with different antipsychotic medicines in a sample of 300 individuals from all age categories.

Weight Gain: All pharmaceutical categories exhibit a mean increase in weight after treatment. Risperidone, when combined with amitriptyline (4.0 kg) and chlorpromazine (5.0 kg), shows the largest average weight increase. In contrast, haloperidol (3.3 kg) has the lowest weight gain. BMI Increase: All groups saw an upsurge in BMI, with chlorpromazine exhibiting the most significant average rise of 1.9 kg/m² and haloperidol showing the lowest increase of 1.0 kg/m².

The waist-to-hip ratio generally rose across all groups, with the exception of the combination of haloperidol and valproate. Nevertheless, the extent of change seems to vary across different populations. Body Fat Rise: All treatment groups saw a rise in the percentage of body fat, with the combination of haloperidol and valproate showing the most significant increase (1.6%) and the combination of risperidone and amitriptyline showing the lowest increase (0.9%).

Table 4: Antipsychotic and Weight Gain Risk (Standard table for comparison-BAP) [26]:

Antipsychotic Medication	Weight Gain Risk
Olanzapine	High
Clozapine	High
Chlorpromazine	High/Medium
Quetiapine	Medium
Risperidone	Medium
Paliperidone	Medium
Asenapine	Low
Amisulpride	Low
Aripiprazole	Low
Lurasidone	Low
Ziprasidone	Low
Haloperidol	Low

Discussion

An Ethiopian investigation revealed a worrisome pattern: antipsychotic drugs have a considerable effect on the body composition of patients [22]. Patients who were prescribed these drugs saw significant elevations in their average body weight, Body Mass Index (BMI), waist-to-hip ratio, and percentage of body fat.

Remarkably, the research revealed that atypical antipsychotics, such as Olanzapine, were more prone to inducing weight gain in comparison to conventional drugs, hence increasing the likelihood of patients developing metabolic syndrome [22]. This increase in weight was seen regardless of the patient's socioeconomic status, statistics, or habits. In addition, the increase in weight was not consistent across all antipsychotic medications. The mean weight gain for Risperidone, Haloperidol,

and Chlorpromazine was 4.3 kg, 3.4 kg, and 5.4 kg, respectively [22]. Although antipsychotics are essential for the treatment of mental diseases, it is imperative to effectively control the adverse reactions they cause, namely alterations in the structure of the body, in order to prevent further health concerns [22]. It is strongly advised that patients taking these drugs regularly check their weight, body fat percentage, and additional metabolic indicators.

A study conducted by Indian researchers (Balaji et al.) examined the patterns of antipsychotic drug use and potential negative consequences in a mental health institution [25]. Throughout the span of one year, their inquiry scrutinized applications for a multitude of pharmaceuticals. The primary findings may be summarized as follows: Polypharmacy refers to the practice of taking multiple medications concurrently. On average, prescriptions consisted of 2.7 distinct medications, with 1.01 of them being antipsychotics [25]. This indicates a moderate level of combining medications.

Utilization rates: The study used a PDD/DDD ratio to assess the utilization of antipsychotic medications. This ratio is determined by dividing the recommended daily dosage by the indicated daily dose. It is worth mentioning that the ratio between the antidepressants sertraline and escitalopram was 1, which suggests that they were entirely used according to conventional guidelines. The ratio for other antidepressants was below 1, indicating potential underutilization [25]. Common side reactions reported by patients [25] include constipation, xerostomia, diarrhoea, insomnia, increased body weight, and somnolence. To ensure the well-being of patients, this research highlights the need to closely monitor the use of antipsychotic drugs and effectively manage their adverse effects [25]. The resource provides valuable knowledge about current protocols and potential avenues for improvement. The study additionally emphasizes the need for continuous pharmaceutical supervision, or drug safety surveillance, to guarantee the effective and secure utilization of these medications [25].

A study conducted by researchers at Rohilkhand Medical College and Hospital in India analyzed the use trends of antipsychotic drugs for the period of one year, namely from 2016 to 2017 [26]. The research examined the prescription records of 310 patients, with a slightly more significant proportion of men (male-to-female ratio of 1.3:1) [26]. The most common diagnosis, accounting for 44% of patients, was schizophrenia [26]. The majority of patients (76%) were given a single antipsychotic drug (monotherapy) [26]. Atypical antipsychotics were prescribed more often (89%) than typical antipsychotics (11%). The number 26 is enclosed in square brackets. Olanzapine and risperidone were the two most frequently prescribed drugs, accounting for 31% and 26% of prescriptions, respectively [26]. Doctors had an average prescription rate of 1.32 antipsychotic drugs per encounter [26]. A mere 24% of prescription drugs were identified by their generic names [26]. Injections were used for 5.2% of prescribed medications [26]. According to a study, 46% of the prescriptions that were provided were included in India's National List of Essential Medicines from 2015. This research is in line with worldwide patterns, emphasizing a preference for non-traditional antipsychotic medications in the treatment of schizophrenia [26]. The researchers highlight the need to adhere to the prescription indicators set by the World Health Organization (WHO) to promote a more reasonable use of these drugs [27].

The research conducted by Parikh et al. examined the use of medications and the general health of patients who have been diagnosed with schizophrenia [28]. Below is an analysis of their discoveries: The medication, on a typical basis, included 3.81 drugs [28]. Doctors predominantly provided drugs (86.2%) using generic names, which promotes cost-effectiveness [28]. More than half (56.9%) of the prescription medications were included in the national list of essential medicines [28]. The predominant class of drug used for schizophrenia treatment is atypical antipsychotics, which constitute 32% of all prescribed medications for this condition [28]. It is worth mentioning that benzodiazepines were given in 19% of patients [28]. The research assessed adherence to medications by using a standardized scale known as the Pharmaceutical Compliance Measurement Scale (MMS). The mean score was 3.7, suggesting a high level of adherence for the majority of patients (about 71%) [28]. Researchers evaluated the quality of life of patients' relatives/caregivers by using the World Health Organization scale (WHOQOL-BREF). The mean score was 75.2 (out of a maximum of 120), indicating a certain level of damage, notably in terms of one's physical well-being and social interactions [28]. The research emphasizes that antipsychotics are the primary type of drug used for the treatment of schizophrenia [28]. Additionally, it demonstrates a favourable pattern in conformity to medicine among individuals [28]. Nevertheless, the well-being of carers appears to be adversely impacted, particularly in relation to their physical well-being and social relationships [28].

Conclusion

Based on the analysis of this data, it appears that antipsychotic medications (risperidone, haloperidol, and chlorpromazine) in a sample of 300 patients may be associated with weight gain and increased body fat. This is evident by the

observed increases in weight, BMI, and percent body fat across all medication groups. While the change in waist-to-hip ratio suggests a potential fat distribution shift, the magnitude of change seems small.

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