The prevalence of metabolic syndrome and its associated factors in long-term patients in a specialist psychiatric hospital in South Africa

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Abstract
Objective: The aims of this study were to determine the prevalence of metabolic disorders in long-term psychiatric patients, and the relationship between known risk factors and these metabolic disorders. **Method:** All psychiatric in-patients ≥18 years, who had been admitted ≥six months were invited to participate. Eighty-four patients participated. They were interviewed, examined, measured and blood tests conducted to determine several demographic and clinical variables including age, gender, weight, blood pressure and fasting blood glucose. **Results:** The prevalence of the metabolic disorders were: metabolic syndrome 32%, hypertension 32%, diabetes mellitus 8%, cholesterol dyslipidaemia 32%, triglyceride dyslipidaemia 29%, low density lipoprotein (LDL) dyslipidaemia 50%, overweight 37%, and obesity 24%. Black African and female patients were more likely to have metabolic syndrome. Female patients were more likely to have cholesterol dyslipidaemia and obesity. Hypertension was associated with age. Ninety-six percent of patients with dyslipidaemia were newly diagnosed during the study. Three out of the seven previously diagnosed diabetic patients had raised fasting blood glucose levels. **Conclusion:** The prevalence of metabolic syndrome falls towards the lower limits of the expected prevalence rate. Race and gender showed a moderate statistical association with metabolic syndrome. There is a lack of screening for dyslipidaemia in this setting. Diabetic patients should be referred to specialist diabetic clinics for better monitoring and control.

Keywords: Metabolic syndrome; Psychiatric patients; Risk factors; Prevalence; South Africa

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Introduction

Patients with severe mental illness (SMI) have excessive mortality rates compared to the general population, consistently across settings and over time.[1,2,3] The major causes of death in psychiatric patients are cardiovascular disease (CVD), respiratory diseases and infections.[3-5] Metabolic disorders such as metabolic syndrome, hypertension, diabetes mellitus, dyslipidaemia and obesity are associated with cardiovascular disease and mortality.[6-10]

There is a moderate to high prevalence of these metabolic disorders in patients with SMI: the prevalence of metabolic syndrome in patients with schizophrenia ranges from 25% to 60% in American and European studies.[11-14] Metabolic syndrome is also prevalent in other psychiatric disorders; e.g., in bipolar disorder it ranges from 8% to 59%.[15,16] Twenty percent of schizophrenia patients in the CATIE study presented with hypertension at study baseline.[17] Correll estimated the prevalence of hypertension in schizophrenia to be 19%-58% and in bipolar disorder 35%-61%.[14] The CATIE study revealed 11% prevalence of diabetes in schizophrenia patients at study baseline.[17] Cross-sectional studies reveal a prevalence of diabetes in patients with schizophrenia of 10%-15% and bipolar disorder of 8%-17% respectively.[14] Dyslipidaemia prevalence in patients with SMI ranges from 23% to 69%, with schizophrenia patients having higher levels.[14] Nasrallath et al. found a prevalence of 47,3% for triglyceridaemia in the CATIE study.[18] The prevalence of obesity in one study of bipolar patients was 35,4%.[19] Correll estimated the prevalence of obesity amongst patients with schizophrenia to be 45%-55%.[14]

However, most of these studies were conducted in developed countries and there is a dearth of knowledge about how the prevalence of metabolic disorders might vary in

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developing countries.[20,21] Therefore, the first aim of the study was to determine the local prevalence of these metabolic disorders in long-term psychiatric patients.

Many studies like CATIE have found a significant association between some second-generation antipsychotics (SGA) and weight gain, diabetes mellitus and dyslipidaemia.[22-28] However, the contribution of other variables including first-generation antipsychotics (FGA), mood stabilisers and antidepressants in the development of metabolic disorders has also been recognised.[29-34] Unmodifiable risk factors (age, ethnicity, gender and family history) and modifiable ones (level of functioning, smoking history, dietary intake and obesity) in psychiatric patients have also been associated with metabolic disorders.[35-37] Therefore, the second aim of the study was to determine whether these risk factors could be associated with metabolic disorders in long-term psychiatric patients.

Although screening guidelines for these disorders have been recommended due to the significance of metabolic disorders in causing CVD, the guidelines are still not widely applied, even in developed countries.[38,39] Clinicians tend to rely on a patient's presentation of worrying symptoms/signs or in the case of in-patients, routine monthly blood pressure checking before investigating or treating these disorders. As a result, opportunities to detect and treat metabolic disorders may be missed. Therefore, the third aim of the study was to make preliminary recommendations regarding screening for hypertension, diabetes mellitus, cholesterol dyslipidaemia and triglyceride dyslipidaemia in long-term psychiatric patients.

Method

Study design

This study was a cross-sectional quantitative study of the prevalence of metabolic disorders in long-term psychiatric patients, and the demographic and clinical factors associated with these disorders.

Setting

Weskoppies Hospital in Pretoria is a specialist psychiatric hospital that admits referred patients with various psychiatric disorders. Some of these patients have been hospitalised for more than six months for various reasons – including treatment-resistant mental illness and severely challenging behaviour.

Study population and sampling

All long-term patients at Weskoppies in November 2009, who had been admitted for six months or longer, were considered for the study. Forensic and long-term patients under the age of 18 years were excluded. There were around 290 such patients in the hospital at the beginning of the study. Due to the Department of Health's drive to de-institutionalise patients and the 2009 national general strike, a significant number of long-term patients had to be discharged from the hospital. Eventually ninety patients were personally invited to participate. Six of them refused to participate in the study or rescinded their consent during the data collection stage, so in the end 84 patients participated. The study was conducted between November 2009 and August 2011. The data was collected by the first two authors.

Definition of metabolic disorders

The following metabolic disorders were selected for study: metabolic syndrome, hypertension, diabetes mellitus, cholesterol dyslipidaemia, low-density lipoprotein (LDL) dyslipidaemia, triglyceride dyslipidaemia, overweight, and obesity. Patients were defined as having a particular metabolic disorder if they had a documented diagnosis and treatment for the disorder and/or met criteria for particular definitions of the disorder, as shown in Table I.[40-44]

Outcome measures

The investigators interviewed the participants, studied their hospital files, physically examined the participants and took

Table I: Definitions of the metabolic disorders

Metabolic syndrome *NCEP-ATP III[40]	Three or more of the following five risk factors: fasting blood glucose ≥5.6 mmol/l (100 mg/dl), BP ≥130/85 mmHg, fasting triglyceride ≥1.7 mmol/l (150 mg/dl), high-density lipoprotein cholesterol <1.03 mmol/l (40 mg/dl) in men and <1.29 mmol/l (50 mg/dl) in women, waist circumference >102 cm in men and waist circumference >88 cm in women.
Hypertension 2003 European Society of Hypertension (ESH) – European Society of Cardiology (ESC)[41]	Systolic blood pressure ≥140 mmHg and diastolic blood pressure ≥90 mmHg.
Diabetes mellitus The 1998-1999 European Diabetes Policy Group's definition of diabetes[42]	Confirmed fasting venous plasma glucose level above or equal to 7,0 mmol/l (>125 mg/dl)
Total cholesterol dyslipidaemia[43]	Total cholesterol >5.2 mmol/l
Triglyceride dyslipidaemia[43]	Triglycerides >1.7 mmol/l
Low density lipo-protein (LDL) cholesterol dyslipidaemia[43]	LDL cholesterol >3.4 mmol/l
Overweight[44] WHO definition	Body mass index (mass/height^2) ≥25
Obesity[44] WHO definition	Body mass index (mass/height^2) ≥30

*National Cholesterol Education Panel-Adult Treatment Panel

blood samples. The following information was obtained from the files and the patient interview: age, ethnicity, smoking history, family history of metabolic disorders, primary psychiatric diagnosis, psychiatric co-morbidities, current general medical conditions, current psychotropic medication and current physical medication. All long-term patients had been allocated previously into low- and high-functioning wards after having been assessed by the hospital's occupational therapists in the context of months and years of attending occupational therapy. So, based on the wards to which they were allocated, the investigators recorded whether the participants were low- or high-functioning.

The following procedures were undertaken for further measurements:

- Waist circumference: A tape measure was used to measure the abdominal circumference halfway between the 12th rib and the iliac crest.
- Body weight was measured in kilograms using Sunbeam©bathroom scales with patients wearing light clothing and no shoes. These weight measurements were taken in the morning before breakfast.
- Height was determined using the wall-mounted measuring tape in the various wards and the participants were not wearing shoes.
- Systolic and diastolic blood pressure (BP) measurements were taken using an electronic device and an appropriate-size cuff. A single reading of BP was used to diagnose hypertension for the purposes of this study. Participants were allowed to rest before measurements were taken and they were seated when the BP was taken.
- Blood samples were collected for fasting glucose and lipid profile after a minimum overnight fast of eight hours. The National Health Laboratory Services unit in Pretoria conducted the blood sample analyses.
- Specific variables (gender, age, ethnicity, psychiatric diagnosis and smoking) that had adequate frequencies were tested for association with all the metabolic disorders defined in Table I. The investigators divided the frequency of selected metabolic disorders into controlled, uncontrolled and newly diagnosed categories for interpretation. A controlled disorder was defined as a previously diagnosed disorder for which the patient did not meet the criteria for the disorder when the study was conducted.

Statistical analysis

Descriptive statistics were used to describe the study population as well as the prevalence of the metabolic disorders. The ages of the patients with or without particular metabolic disorders were compared using Mann-Whitney-U tests because of the skewed distribution of the population with respect to age. Continuous variables were measured using the methods described above and the patients were then divided into categories depending on whether they met criteria for the definition of the various metabolic disorders or not (Table I), and whether the disorders were controlled (previous history of the disorder but currently not meeting the criteria) or uncontrolled (previous history of the disorder and still meeting criteria for the disorder). These categorical, derived variables were then analysed using the appropriate tests, e.g., Chi–square or Fisher's Exact tests. The level of significance used was $p<0.05$.

Ethics

This study received ethics approval from the Faculty of Health Sciences Research Ethics Committee before it was commenced (Protocol 174/2009). The hospital management agreed to the carrying out of the study at Weskoppies Hospital. Written or verbal informed consent was obtained before participation. Verbal consent was obtained from those participants who were illiterate. All participants read or had the patient information leaflet explained to them, in the presence of a nurse familiar with the patients. The nurses acted as witnesses that proper informed consent was obtained from all the participants who took part in the study. Participants' capacity to give informed consent was specifically assessed in the context of their mental illness by evaluating their understanding of the study and their ability to communicate a clear choice, despite their mental illness. Patient confidentiality was maintained by using numbers instead of names on the study-specific data sheets. Two of the investigators, the 3rd and 4th authors, were trained and certified in Good Clinical Practice (GCP), which was sufficient in terms of the local Research Ethics Committee's requirements for descriptive studies, and ICH-GCP guidelines were followed.

Results

Table II describes the characteristics of the study population. The mean age was 41 years (median 40.5; SD 11.017; range 21-73 years). The patients were on a range of medication, as seen in Table III. Only four patients were on a single psychotropic drug of any kind. Most of the patients were on a combination of psychotropic medications. Almost all the patients on FGA were on high potency FGA rather than low-potency drugs. Thirty-five patients were on SGA. The measurements of the clinical entities used to determine the prevalence of the metabolic disorders are recorded in Table IV. The mean body mass index (BMI) (kg/m^2) of this population was 27.1.

The prevalence of the metabolic disorders is displayed in Figure 1. Amongst the patients with metabolic syndrome, 59% were on high-potency antipsychotics (flupenthixol, zuclophenthixol and haloperidol), 44% were on clozapine,

Figure 1: Prevalence of metabolic disorders

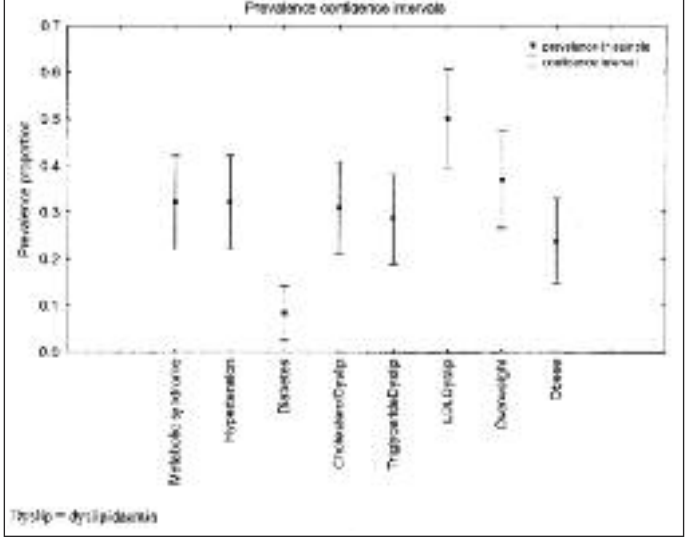

Table II: Demographic and clinical profile of the study population

	Variable	*n*	%
Gender	Male	50	60
	Female	34	40
Age	<45 years	52	62
	>45 years	32	38
Ethnicity	Black	44	52
	Caucasian	35	42
	Asian	3	4
	Mixed race	2	2
Level of functioning	Low	44	52
	Medium	31	37
	High	9	11
Psychiatric disorders[1]	Schizophrenia	37	44
	Other psychotic disorders	13	16
	Cognitive disorders (including mental retardation)	23	27
	Mood disorders	10	12
	Substance related disorders	8	10
	Anxiety disorders	1	1
	Personality disorders	6	7
	Other disorders	14	17
Existing general medical condition (GMC)[1]	Hypertension	16	19
	Diabetes mellitus	6	7
	Hypercholesterolemia	0	0
	Hypertriglyceridaemia	2	2
	HIV/AIDS	9	11
	Epilepsy	20	24
	Stroke	3	4
	Hypothyroidism	1	1
	Other medical conditions	13	16
	No medical condition	35	42
Smoking history	Present and past history	51	61
	Absent history	33	33
Family history of general medical condition	Hypertension	14	17
	Diabetes mellitus	12	14
	High cholesterol[2]	4	5
	Stroke	5	6
	Heart attack	7	8
	Family history of GMC	25	30
	Unknown family history of GMC	41	49
	No family history of GMC	18	21
Physical medication[1]	Antihypertensives	17	20
	Hypoglycaemics	7	8
	Statins	3	4
	Thyroid treatment	1	1
	Other including multivitamins and antiretroviral	38	45
	No physical medication	34	41

[1]Patients may have had co-morbid psychiatric disorders or general medical conditions, as well as been on more than one physical medication.
[2]This colloquial term refers to the inappropriate increase in the three different types of lipids – namely cholesterol, triglycerides, and low-density lipo-protein.

and 52% were on sodium valproate. Amongst the seven patients diagnosed with diabetes mellitus, only two were on clozapine whilst six were on sodium valproate. The difference in median age between patients with and without hypertension – i.e., higher in hypertensive patients – was statistically significant (p=0.001).

Table V displays associations between the metabolic disorders and specific demographic or clinical variables. Only two participants of mixed ethnic origin participated in this study. Due to this very small sub-sample size they were not

Table III: Median doses and duration of psychotropic medication use

		n	*Median dose (mg)*	*Median duration (months)*
First generation antipsychotics (FGA)	Haloperidol	18	5	36
	Trifluperazine	7	15	36
	Sulpiride[1]	2	625	48
	Fluphenazine	4	62.5	44
	Flupenthixol	18	60	15.5
	Zuclopenthixol	25	400	13
	Chlorpromazine[1]	2	187.5	19.5
Second generation antipsychotics (SGA)	Risperidone	10	5,5	7
	Clozapine	25	350	26
Mood stabilisers	Sodium valproate	48	1600	36
	Lithium	3	1000	27
	Carbamazepine	18	800	35.5
Antidepressants	Fluoxetine	15	40	36
	Citalopram	4	20	11
	Bupropion	1	50	7
Benzodiazepines	Clonazepam	20	1,5	25.5
	Oxazepam	16	15	21
Anti-androgens	Cyproterone acetate	11	300	24
Anticholinergics	Orphenadrine	40	150	36
	Biperidine	14	6	19

[1]Sulpiride and chlorpromazine are low-potency FGA

included in the comparative analyses of the derived categorical variables. Instead we focused on the larger Black African and Caucasian groups. Black African patients were 2.6 times more likely to have metabolic syndrome than Caucasian patients. Female patients were 2.5 times more likely to have metabolic syndrome than male patients.

The frequencies of controlled, uncontrolled and newly diagnosed cases of hypertension, diabetes mellitus, cholesterol dyslipidaemia and triglyceride dyslipidaemia are recorded in Table VI. A greater proportion of newly diagnosed dyslipidaemia cases (96%) were found compared to newly diagnosed hypertensive cases (41%) and diabetic cases (14%).

It was not possible to determine association patterns between psychotropic drugs and metabolic disorders because of the small sample sizes for specific drugs or drug groupings. It was also not possible to test for associations between metabolic disorders and family history of metabolic disorders because 49% of the patients did not know such a history.

Discussion

The study population of long-term in-patients consisted mostly of Black African and male patients with psychotic disorders and mental retardation. A fair proportion had single- or multiple pre-existing general medical conditions and the majority were either low- or medium functioning.

Table IV: Anthropometric and biochemical profile of the study population

	Mean	*Median*	*Minimum*	*Maximum*
Systolic blood pressure (mmHg)	120.5	120	90	160
Diastolic blood pressure (mmHg)	76.9	77	58	96
Waist circumference (cm)	96.2	95.3	61	140.1
Height (cm)	168.2	169	147	192
Weight (kg)	76.0	77.5	45	108
Body mass index	27.1	26.2	17.4	44.4
Fasting blood glucose (mmol/l)	4.9	4.6	3.5	9.6
Fasting high density lipoprotein (mmol/l)	1.03	0.9	0.5	2.6
Fasting low density lipoprotein (mmol/l)	2.94	2.8	1.1	5.1
Fasting total cholesterol (mmol/l)	4.3	4.3	1.8	7
Fasting triglycerides (mmol/l)	1.48	1.3	0.6	4

Table V: Associations between metabolic disorders and specific variables

Metabolic disorder	*Variable tested*	*Odds ratios (CI)*	*p values*	*Interpretation*
Metabolic syndrome	Race Gender	2.57 (1.58-3.55) 2.50 (1.56-3.44)	0.059 0.053	Black patients more likely Female patients more likely
Hypertension (Mann-Whitney U test)	Age	N/A	0.001	Median age of patients with hypertension (50) is significantly higher than the median age of patients without hypertension (37)
Diabetes (Fisher's exact test)	Race	Cannot be calculated: zero cell frequency	0.016	Black patients more likely
Cholesterol dyslipidaemia	Gender	2.22 (1.28-3.16)	0.095	Female patients more likely
LDL dyslipidaemia	Psychiatric disorder	2.62 (1.56-3.68)	0.079	Schizophrenia patients most likely
Obesity	Gender Smoking History	10.22 (9.00-11.45) 4.09 (3.03-5.15)	<0.0001 0.007	Female patients more likely Smokers less likely to be obese

Table VI: Number of patients with specific metabolic disorders

	Total n	*Controlled*	*Uncontrolled*	*Newly diagnosed*
Hypertension	27	13	3	11
Diabetes mellitus	7	3	3	1
Hypercholesterolaemia	26	0	0	26
Hypertriglyceridaemia	24	1	1	22

Metabolic syndrome

The prevalence of NCEP-ATP-III-defined metabolic syndrome in this study of 32% falls towards the lower limits of expected prevalence amongst patients with SMI and is lower than the baseline prevalence of metabolic syndrome in the CATIE study of schizophrenia patients.[11] Possible explanations for this could be the higher usage of high-potency FGA compared to SGA and zero usage of olanzapine in this study population. Compared to SGA and low-potency FGA, high-potency FGA are not as strongly associated with three of the five criteria needed to define NCEP-ATP-III metabolic syndrome (weight gain, hyperglycaemia, low high-density lipoprotein).[45-47] It would be inappropriate to compare our findings to the general population in South Africa because the few studies available had been done in medical patients, corporate executives and university students; and NCEP guidelines were not used.

Nonetheless, the prevalence of metabolic syndrome in this study is still significant, considering that it falls within the range of other studies that have been conducted in developed countries where SGA usage is more prevalent. Several reasons could account for this finding. Psychotic and mood disorders can independently lead to metabolic abnormalities.[48,49] Clozapine, which was used in almost a third of the patients, is a leading risk factor for metabolic derangements.[29,45] High-potency FGA are not without weight-gain and glucose-regulation abnormalities.[25] Furthermore, polypharmacy involving two or more SGA has been associated with metabolic syndrome, though not independently.[50] Polypharmacy requires the inclusion of a FGA, advanced age and the diagnosis of schizophrenia or bipolar disorder to be significantly associated with metabolic syndrome.[50] Perhaps polypharmacy of multiple drugs like FGA, SGA and mood stabilisers that contribute to metabolic syndrome in this study population may best explain our findings but future appropriately designed studies are needed to provide more definitive answers.

Although several general population studies have found that older patients have a greater odds ratio of having metabolic syndrome, in this heterogeneous study population no statistically significant age difference existed between those who had metabolic syndrome and those who did not.[51,52] This lack of association between age and metabolic syndrome could have been the result of our study having only four patients above the age of 60.

Female patients' greater odds ratio of having metabolic syndrome in this study is similar to findings from other studies that show a higher prevalence of metabolic syndrome among female schizophrenic patients under the NCEP-ATP-III definition, but dissimilar to the CLAMORS study that found no gender difference.[11,12] In this study, Black African patients were more likely to have metabolic syndrome than Caucasian patients, whereas in Bermudes et al.'s study of psychiatric in-patients, it was found that Caucasian patients were more likely to have metabolic syndrome compared to African-American patients.[13] The CATIE study found that Black African male patients had the least association with metabolic syndrome compared to female patients of any race.[11] Nasrallath noted from the same study that Non-White men were more likely to be treated for diabetes mellitus and dyslipidaemia than Non-

White women.[18] These complex and conflicting results highlight the knowledge that population-specific factors may influence association patterns of metabolic syndrome and, hence, the need to acquire population-specific data on metabolic disorders in developing countries.

Hypertension

The prevalence of hypertension in this study was within the expected range amongst patients with SMI, but it was higher than that seen in sub-Saharan African general populations.[57] Osborn et al. did not find that hypertension was more common in patients with SMI.[54] Antipsychotic drugs may worsen hypertension through weight gain but this may be offset by a hypotensive effect through adrenergic blockade.[55] Future studies will have to test this study's finding against a comparable general-population sample and/or psychiatric-patient sample in other settings in South Africa.

There was no gender association with hypertension in this study, unlike in the CLAMORS study which found that male patients were more likely to have hypertension.[12] There was no association between race and hypertension in our study despite hypertension being more prevalent in urban South African Black Africans compared with the national rate.[56] However, in keeping with studies in the general population, there was a significant age differential between those patients who had hypertension and those without it, with older patients more likely to have hypertension.[57] Further research should determine if the clinical profile of long-term psychiatric patients with hypertension is similar to that of other psychiatric patients or members of the general population with hypertension, so as to inform the development of screening guidelines.

Forty-one percent of the hypertensive cases in this study were newly diagnosed, which compares to most studies in Sub-Saharan Africa that show a detection rate of less than 40%.[57] The control of hypertension in this study was better than could be anticipated from other studies in the general population – including the general population of Africa – which showed that 50% or less of hypertension in known patients is adequately treated.[57,58] The good control in this study should be viewed in the context of assured in-patient compliance. Clinicians should bear in mind that treatment of hypertension does not imply adequate control, especially where compliance is not supervised.

Diabetes mellitus

The prevalence of diabetes in this study was similar to that found in most studies of mentally ill patients. Several reasons including mental illness itself could account for this prevalence.[48] In this group of diabetic patients, the almost uniform use of sodium valproate could have led to the emergence of weight-gain associated diabetes mellitus. All of the diabetic patients were overweight and two were obese. Other possible reasons include psychotropic drugs like clozapine (n=1) and depot antipsychotics (n=2) which have been associated with hyperglycaemia.[59-61]

There were an equal number of patients with controlled (n=3) and uncontrolled diabetes (n=3). What may seem like a small number of patients with uncontrolled diabetes mellitus should be viewed in the light of the greater risk of long-term complications in mentally ill patients because of the physiological changes affecting carbohydrate metabolism in many psychiatric conditions.[62] This higher risk of chronic complications occurs against the background of lower rates of regular HbA1c monitoring in mentally ill patients.[63] Perhaps there is a need to register mentally ill patients with diabetes to a dedicated diabetic clinic so that better monitoring and control of their diabetes can take place.

Dyslipidaemia

There is limited data on the effects of FGA on lipid levels and most of the studies investigating the effects of SGA on lipid levels have been uncontrolled case series studies and have been carried out over short-term periods, which makes interpretation of this study's findings difficult. Nevertheless, the prevalence of triglyceride dyslipidaemia and total cholesterol dyslipidaemia in this study occupies the lower end of the estimated range of prevalence for dyslipidaemias in psychiatric patients apart from LDL cholesterol.[14] There may be several reasons for this reduced prevalence: non-use of olanzapine and quetiapine in this study population; relatively low levels of obesity in this study; and high levels of high-potency drug use in this setting.[64] However, the following caveats should be noted: clozapine carries a high relative risk of dyslipidaemia; other drugs like beta-blockers and sodium valproate can also cause elevated triglyceride levels; and dyslipidaemia can occur independently of weight gain.[65-67] These provisos may help account for the considerable prevalence of dyslipidaemias in this study population.

Female patients were more likely to have cholesterol dyslipidaemia compared to males, which was probably on the basis of an increased rate of obesity amongst the women in this study.[68] LDL dyslipidaemia was significantly associated with schizophrenia, possibly since 50% of LDL-dyslipidaemia-afflicted patients were taking sodium valproate and 32% were taking clozapine. The prevalent use of sodium valproate in these patients with schizophrenia is an area of concern that deserves further study.

The great majority of our patients were newly diagnosed with hypercholesterolaemia and hypertriglyceridaemia and, therefore, not on treatment for these disorders. Two studies on schizophrenia and bipolar patients found non-treatment rates of 88% and 58% respectively.[18,69] Given the risk of acute coronary events in patients with dyslipidaemia, the investigators suggest that long-term patients should be screened for dyslipidaemia irrespective of gender or psychiatric disorders.[70] The frequency of this testing may need to be determined through prospective studies because of financial constraints in public-mental-health-care settings.

Weight gain

Considering that most of our patients had schizophrenia, the prevalence of 24% for obesity is lower than would be anticipated from studies on schizophrenia patients.[14] This study also found a lower mean BMI compared to the CATIE study BMI of 30.[11] Once again the higher usage of high-potency antipsychotics could account for this finding. In-patients also tend to have a lower calorie diet compared

to out-patients and, except for the severely ill patients, many long-term patients attend occupational therapy away from the wards, thereby undertaking some daily exercise in the form of walking. Still, this rate is higher than that found in the world population study of 2005.[71] Reasons for this finding could include polypharmacy with drugs that can cause weight gain like clozapine, risperidone, depot antipsychotics, mood stabilisers and antidepressants.[22,72-74]

This study could not associate a low- or medium level of functioning with overweight/obesity, which is contradictory to findings from general-population studies.[75] There was a significant association between female gender and obesity, which is in keeping with other studies on weight gain.[24] However, it should be borne in mind that associations between weight gain and various demographic/clinical variables are complex and dynamic and are compounded by genetic factors, so every psychiatric patient should be regarded as being at risk of weight gain.[76,77]

Strengths and limitations

This project investigated the prevalence of metabolic syndrome in long-term psychiatric patients who are less frequently studied for these metabolic disorders compared with newly diagnosed patients. This study investigated several variables, apart from psychotropic drugs, which can also influence the prevalence of metabolic disorders in patients with SMI.

There are several limitations to the study. The study was retrospective and cross-sectional, so confounding variables could not be controlled and definitive causation factors could not be determined. Moreover, the sample size was too small for some variables to be tested for associations and for multivariate analyses to be carried out. Furthermore, the use of different cut-offs for the criteria of metabolic syndrome and diagnostic tests for some of these disorders (for example, diabetes) might have yielded higher prevalence rates in some ethnic groups.[78] In addition, the restricted use of NCEP-ATP-III-defined metabolic syndrome limited comparison to other studies. Finally, the prevalences were not standardised for age, race, or gender.

Conclusion

The long-term patients in this study are at high risk for cardiovascular disease given the prevalence of metabolic syndrome, hypertension, dyslipidaemia and overweight/obesity. There is a need to monitor long-term psychiatric patients for these metabolic disorders. The following recommendations might help in developing feasible and pertinent monitoring guidelines for developing countries:

Patients with SMI on multiple drugs should be tested regularly for metabolic syndrome, especially Black African and female patients.

Prospective studies should be conducted to determine the association between specific psychotropic drugs and metabolic syndrome in developing countries.

Older long-term patients with SMI should be monitored closely for hypertension, and hypertensive patients should be monitored regularly for optimal control of hypertension.

Diabetic patients need to be registered with the local diabetic clinic or endocrine clinic and attend there regularly to optimise their glycaemic control, or at least have regular HbA1c tests conducted.

All long-term psychiatric patients should be tested regularly and treated as needed for dyslipidaemias, as there is a high prevalence of these disorders in long-term patients. The optimal frequency of testing might be determined by future studies.

The considerable prevalence of metabolic disorders in this study necessitates rigorous implementation of existing screening guidelines whilst country-specific guidelines are being researched and developed.

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