Original Article

Diabetes and Hypertension Among Patients with Psychiatric Illnesses Attending Outpatient Services in a Tertiary Mental Health Centre: A Cross-sectional Study from South India

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ABSTRACT

Background: High burden of comorbid physical non-communicable diseases (NCDs) is observed in patients with psychiatric illnesses. However, little attention is paid to physical illnesses of this patient population. This study evaluated the self-reported frequency of physical NCDs in patients with psychiatric illnesses, current involvement of psychiatrists in managing these NCDs and association of NCDs with socio-demographic and clinical factors.

Materials and Methods: This cross-sectional study was conducted in out-patient department of a tertiary mental health centre in southern India. Consecutive adult patients (N=450) fulfilling the study's inclusion criteria were interviewed regarding comorbid physical NCDs including diabetes and hypertension, and aspects related to their diagnosis and treatment. Psychiatric diagnoses and psychotropic treatment information was obtained from electronic patient records maintained at the centre.

Results: Overall frequency of any physical NCD was 24.9%, with diabetes and hypertension reported by 15.8% and 8.7% of patients, respectively. Patients with diabetes or hypertension were more likely to be older, have a family history of diabetes/hypertension, or psychiatric illness for at least 5 years or longer. Less than 8% of patients with diabetes or hypertension were treated for their physical NCD by psychiatrists. Forty patients with elevated BP (≥140 and/or ≥90 mmHg) or at risk for hypertension were identified while conducting physical examination as part of the study.

Conclusion: Diabetes and hypertension are common physical NCDs in patients with psychiatric illness. Therefore, it is important that psychiatrists be aware of and identify patients who are at risk for such NCDs.

Keywords: Psychiatric Disorders, Physical Disorders, Non-Communicable Diseases, Diabetes, Hypertension, Frequency

Running Title: Physical comorbidities in psychiatric outpatients

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There is a large body of evidence demonstrating that patients with mental illnesses have greater physical health morbidity,[1,2,3] with 60% of premature deaths amongst these patients attributed to physical illnesses such as cardiovascular and pulmonary diseases.[4] Furthermore, patients with severe mental illnesses have a shorter lifespan compared to the general population.[5,6] The increase in morbidity and mortality in patients with schizophrenia is partly explained by a higher prevalence of modifiable risk factors such as

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lack of exercise, obesity, alcohol misuse, smoking, and unemployment.[7,8] While these factors are related to the patient and their lifestyle choices, there also differences in and concerns around the access, utilization and provision of quality health care that patients with mental illnesses receive for their physical health. This contributes to poor physical health outcomes in this group of patients.[9,10,11] With respect to medications given to treat psychiatric illnesses, second generation anti-psychotics likely alter glucose metabolism and cause weight gain, thereby worsening the risk for metabolic syndrome (MetS) and cardiovascular diseases in these patients.[12,13] Finally, a major health system-specific issue such as the fragmentation between mental health and primary health care has exacerbated the growing problem of physical comorbidities and premature mortality in patients with mental illnesses.[4]

The Clinical Antipsychotic Trials of Intervention Effectiveness (CATIE) study examined the effectiveness of different antipsychotic medications in over 1400 patients with schizophrenia across different sites.[10] Apart from measuring psychiatric outcomes, this study also assessed physical health indicators. Diabetes was seen in 11% of patients, while MetS and impaired fasting glucose were observed in 40% and 25% of patients, respectively. The most important finding of the CATIE study, apart from revealing at least 40% or higher rates of untreated diabetes, hypertension or hyperlipidemia, was that psychiatrists tended to ignore life-threatening, treatable medical conditions in patients presenting for treatment with schizophrenia. These results highlight the need for increased attention and basic monitoring of cardiovascular risk factors in this psychiatric population.[10]

A few studies in India have measured the prevalence and correlates of physical comorbidities such as diabetes, hypertension and/or MetS in patients with mental illnesses being treated at tertiary psychiatric centers. MetS was prevalent in 35%-38% of psychiatric inpatients in a tertiary care center in northern India, a rate higher than that observed in the general population.[14,15] In an out-patient psychiatric facility, hypertension and diabetes were amongst the most common physical illnesses with prevalence rates of 29.1% and 10%, respectively.[16] In a study in Assam, almost 30% of patients with schizophrenia presented with MetS, and risk factors for developing MetS were female gender, smoking, family history of chronic NCDs and use of atypical antipsychotics.[17] However, these studies had several limitations such as a smaller sample size[14,17], or significant number of patients dropping out of the study or unwilling to participate.[16]

It is widely agreed that lifestyle risk factors largely explain the excess morbidity and mortality in persons with mental illness. However, it is noted all over the world, that screening and assessment of physical health problems remains poor, even in developed countries. A crowded mental health services often does not provide the necessary opportunity to screen and assess physical health conditions by a mental health team. However, a simple screening and history of physical health conditions can provide valuable information to monitoring and treatment of crucial physical parameters.

In our study, we aimed to evaluate the frequency of physical non-communicable diseases (NCDs) such as diabetes, hypertension, chronic lung disease, heart disease and chronic kidney disease, as elicited from information gathered among patients with psychiatric disorders at an out-patient mental health center and measures of anthropometric and blood pressure indices. In addition, we evaluated the extent to which psychiatrists at the out-patient mental health centerelicited information and participated in management of physical comorbidities in this patient population. Finally, we assessed the association of these physical NCDs with socio-demographic and clinical factors, psychiatric diagnoses, and psychotropic medications.

MATERIAL & METHODS

Study site, design and participants: The current study was conducted among patients seeking psychiatric care at the out-patient facility of the Schizophrenia Research Foundation (SCARF) in Chennai, India. It was a cross-sectional observational study, carried out between July 2017 and November 2017.

Male and female patients aged 18 years and above with known psychiatric illness and being treated at SCARF were consecutively selected for the study during their visit. Those who consented to be part of the study were included, irrespective of the type of psychiatric diagnosis, duration of psychiatric disease, type of comorbid physical NCD(s) or use of psychotropic medications.

Sample size estimation: We used the method outlined by Naing et al. to estimate sample size.[18] The sample size was estimated using the formula: $n=Z2^*P^*(1-P)/d^2$, where n is sample size, Z is Z statistic for a level of confidence (we used Z value of 1.96 for 95% confidence level), P is the expected prevalence or proportion (in proportion of one; if 20%, P = 0.2), and d is precision (in proportion of one; if 5%, d = 0.05). Based on a pilot study of 91 patients, we estimated prevalence of atleast 1 NCD to be 30.8%. Using this estimate in the above formula, we obtained a sample size of 328 patients.

Data collection: A survey questionnaire was developed based on the WHO STEP-wise approach to surveillance methodology, a standardized method to collect, analyze and disseminate data on risk factors for NCDs, especially in low-to-middle income countries.[19] The questionnaire included socio-demographic characteristics, current psychiatric diagnoses, duration of psychiatric disease, use of psychotropic medications, known medical history of physical NCDs such as hypertension, diabetes mellitus, heart disease, chronic lung disease, or renal disease, details on how/where these comorbidities were diagnosed, pharmacological management of these comorbidities and the associated treatment duration. Further, information on family history of psychiatric illness or physical NCDs and lifestyle such as diet modifications, physical activity, smoking and alcohol intake were collected. Anthropometric measurements such as height, weight, waist and hip circumference were performed using a non-stretchable tape. Blood pressure (BP) was measured in the right arm using standard cuffs fitted with a mercury sphygmomanometer in sitting position.

Patients were interviewed in the local language by a trained medical doctor and responses to the interview were patient-reported or caregiver-reported in case the patient was absent. Psychiatric diagnoses of the patients were obtained from their electronic medical records available at the outpatient center. These diagnoses had been previously recorded by the treating psychiatrist at the time of patient registration and treatment initiation. Diagnostic categories were identified by the treating psychiatrist based on ICD-10 codes F01-F99 and used for analysis.[20] Psychotropic medications prescribed to the patients were recorded based on their prescriptions. For the analysis, these medications were classified into four categories, namely patients taking: (1) one antipsychotic (either first- or second-generation); (2) more than one type of antipsychotic; (3) antipsychotic medications combined with other psychotropic medications (eg. benzodiazepines, mood stabilizers, anti-depressant drugs, anti-epileptics drugs, anticholinergics); and (4) other medicines or combinations which do not fall in the first three categories (eg. Combinations based on mood stabilizers, benzodiazepines and/or anti-depressants).

Data analysis: STATA (release 15.1, Texas, USA: Stata Corp) was used for all statistical analyses. Statistical differences in the socio-demographic and clinical characteristics between patients with and without diabetes/hypertension were tested using Chi-square test or Fisher's exact test (as appropriate) for categorical data and Student's t-test or Mann-Whitney test (as appropriate) for continuous data. Similarly, the association of diabetes/hypertension with different psychiatric diagnoses and the use of various psychotropic medications were tested using a Chi-square test or Fisher's exact test (as appropriate). A p-value less than 0.05 was considered statistically significant.

Ethics: The study obtained all required ethical approvals from the Institutional Review Board at SCARF and informed consent was taken individually from all participants.

RESULTS

Sociodemographic and clinical characteristics of the study population

A total of 450 patients fulfilling the inclusion criteria were included in the analysis. As shown in Table 1, mean age of the entire sample population was 40.8 years, with mean age comparable between males and females. Males represented 44% of the study population. Mean body mass index (BMI) and mean blood pressure (BP) of the study population was 27.3 kg/m2 and 118.8/74.7 mmHg, respectively. A large proportion of patients did not smoke (90.9%) or consume alcohol (95.8%). Approximately one-third of the patients had a family history of psychiatric illnesses (32.7%), while 63.3% of patients had a family history of diabetes/hypertension (Table 1).

Table 1. Demographic characteristics and information on physical illness of the study population

Characteristic	Overall N=450	Male N=198	Female N=252
Age, mean±SD (years)	40.8 ± 12.2	39.8 ± 12.2	41.7 ± 12.1
Family history of any physical NCD	285 (63.3)	122 (61.6)	163 (64.7)
Smoking	46 (10.1)	46 (23.2)	0 (0)
Alcohol	19 (4.2)	16 (8.1)	3 (1.2)
BMI, mean±SD (kg/m^2)[$]	27.3 ± 5.1	25.8 ± 4.4	28.2 ± 5.2
SBP, mean±SD (mmHg) [#]	118.8±16.0	121.9 ± 16.7	116.5 ± 15.1
DBP, mean±SD (mmHg)[#]	74.7±10.8	77.4 ± 11.9	72.7 ± 9.3
Diabetes	71 (15.8)	27 (13.6)	44 (17.5)
Hypertension	39 (8.7)	11 (5.6)	28 (11.1)
Diabetes and hypertension	20 (4.4)	5 (2.5)	15 (5.9)

(All data expressed as n (%), unless otherwise indicated. [$]Overall N=311, Males N=124, Females N=187 as data on height and weight were missing from some patients; [#]Overall N=400, Males N=171, Females N=229)

Majority (62.2%) of patients had their psychiatric illness for at least 5 years or longer, with 63.8% of patients being treated for less than 5 years at SCARF. Upon classifying patients based on their psychiatric diagnoses, 64.4% had schizophrenia, schizotypal and delusional disorders, 21.2% with mood (affective) disorders and 5.8% had neurotic, stress-related and somatoform disorders. Majority of patients (68.6%) in the entire sample population were taking combinations of antipsychotics with other psychotropic medications, 14.3% were prescribed non-antipsychotic medications or their combinations,12.7 % were taking one antipsychotic and 4.5% were prescribed more than one antipsychotic.

Reported frequency of physical NCDs and associations with sociodemographic and clinical variables

The overall reported frequency of any physical NCD was 24.9%. Specifically, the frequency of diabetes mellitus, hypertension, chronic lung disease, heart disease, and kidney disease were 15.8%, 8.7%, 2.0%, 1.5% and 1%, respectively. As the number of patients with self-reported presence of heart disease, lung disease or kidney disease was negligible, our analyses focused on patients with diabetes and/or hypertension. As shown in Table 2, 46.5% of patients with diabetes had the condition for less than 5 years while 54.6% of patients with hypertension had the condition for at least 5 years or longer. More than 85% of patients with diabetes or hypertension were undergoing treatment for their physical NCD. Twenty patients (4.4%) had both diabetes and hypertension.

Table 2. Prevalence of diabetes and hypertension, their treatment status and durationof treatment

	n (%)
Diabetes	71 (15.8)
Duration of Diabetes	
<5 years	38 (53.5)
≥5 years	33 (46.5)
Patients undergoing treatment for Diabetes	62 (87.3)
Duration of Diabetes treatment	
<5 years	32 (51.6)
≥5 years	30 (48.4)
Hypertension	39 (8.7)
Duration of Hypertension	
<5 years	16 (41.0)
≥5 years	22 (56.4)
Patients undergoing treatment for Hypertension	36 (92.3)
Duration of Hypertension treatment	
<5 years	14 (38.9)
≥5 years	22 (61.1)
Patients with both Diabetes and Hypertension	20 (4.4)

Age, presence of a family history of any physical NCD and duration of psychiatric illness of ≥5years were significantly associated with the presence of diabetes or hypertension (p<0.05, Table 3).Schizophrenia, schizotypal and delusional disorders were most prevalent among patients with diabetes or hypertension, and combinations of antipsychotics with other psychotropic medications were predominantly prescribed to patients with these physical NCDs. No association was observed between the psychiatric diagnosis or psychotropic medications with the presence of diabetes or hypertension (Table 3).

Table 3. Association of sociodemographic and clinical variables with diabetes or hypertension status in patients with psychiatric illnesses

Variable	diabetes or hypertension N=90	no diabetes or hypertension N=360	p-value (Chi-squared test)
Age, mean ± SD (years)	49.7±10.8	38.6±11.5	<0.0001*
Males	33 (36.7)	165 (45.8)	
Females	57 (63.3)	195 (54.2)	0.117
BMI, mean ± SD (kg/m^2)#	27.8±5.3	27.1±5.0	0.3220
Family history of any physical NCD	69 (76.7)	216 (60.0)	0.003*
Family history of psychiatric illness	25 (27.8)	122 (33.9)	0.269
Duration of psychiatric illness			
<5 years	25 (27.8)	145 (40.3)	0.029*
≥5 years	65 (72.2)	215 (59.7)	
Duration of psychiatric treatment $			
<5 years	52 (57.8)	234 (65.4)	0.181
≥5 years	38 (42.2)	124 (34.6)	
Psychiatric diagnosis €		**0.118**	
Schizophrenia and related disorders	51 (56.7)	238 (66.3)	
Mood (affective) disorders	27 (30.0)	68 (18.9)	0.118
Neurotic, and somatoform disorders	6 (6.7)	20 (5.6)	
Others	6 (6.7)	33 (9.2)	
Psychotropic medications€			
1 antipsychotic	10 (11.1)	47 (13.1)	
>1 antipsychotic	3 (3.3)	17 (4.7)	
Combination of antipsychotics with other medications	61 (67.8)	247 (68.8)	0.675
Other medication/combinations (no antipsychotics)	16 (17.8)	48 (13.4)	

(All data expressed as n (%), unless otherwise indicated. *represents statistical significance of p <0.05; #Data missing from 139 patients; $data missing from 2 patients; €data missing from 1 patient)

Role of the psychiatrist in managing physical NCDs

In this study, we aimed to understand the role of the psychiatrist at an out-patient facility in managing patients' physical comorbidities either by themselves or by initiating referral to a general practitioner or specialist doctors. Less than 20% of patients with diabetes or hypertension were referred by the treating psychiatrist for further follow-up of the medical co-morbidity. Only a small fraction of patients (<8%) with diabetes or hypertension were treated for their physical NCD by the psychiatrist. Vast majority of patients with diabetes or hypertension in our study were undergoing treatment for these conditions at government or private hospitals/clinics.

Based on BP measurements of patients who did not self-report the presence of hypertension, we observed that 40 patients (11.1% of patients without diabetes or hypertension) had raised BP defined as ≥140 and/or ≥90 mmHg. These results suggest that this group of patients are at risk to develop hypertension or already have hypertension but are unaware and will need to be followed-up closely.

DISCUSSION:

This study is one amongst the few conducted in India to explore frequency of concurrent physical comorbidities such as diabetes, hypertension, chronic lung disease, chronic kidney disease or heart disease in a large cohort of 450 patients with a wide spectrum of psychiatric illnesses in an out-patient tertiary care setting, as elicited by a history . Approximately 25% of these patients self-reported the presence of at least one of these physical comorbidities. Diabetes was the most prevalent comorbidity, as reported by 15.8% of patients, followed by hypertension in 8.7% of patients. Psychiatrists at the tertiary care center played a limited role in management of these comorbid physical NCDs. Finally, the psychiatric out-patient facility has a potential for opportunistic screening for common physical NCDs such as diabetes or hypertension as 40 patients with elevated BP or at risk for hypertension were identified while conducting a physical examination as part of this study.

Other studies in India have found higher prevalence rates of medical comorbidity than the prevalence observed in our study.14-17,21Singh et al. conducted a study in a setting very similar to ours, except for the fact that clinical examination and investigations were conducted to identify various physical comorbidities. Close to half the patient population (48%) had physical illnesses, with hypertension (29.1%), respiratory diseases (15%), and diabetes (10%) amongst the most common diseases.16 Although not comparable, the difference in rates observed between our study and Singh et.al. could partly be explained by the fact that we depended on patient-reported presence of the illness(es), and not clinical investigations, thereby leading to under-reported rates. It is possible that the under-reporting could be due to lack of disease awareness, communication difficulties or hesitancy. In fact, previous studies have shown that psychiatric patients have difficulties in communicating their physical illnesses to the physician.22 Furthermore, it has been suggested that such difficulties are constant and not reduced in non-acute conditions.

In our study, majority of patients with diabetes or hypertension were diagnosed with schizophrenia, schizotypal and delusional disorders. It has been well-documented that patients with schizophrenia suffer a high burden of diabetes and metabolic syndrome, and a higher prevalence compared to the general population.23 It is to be noted that an increase in well-known risk factors in these patients partially explains most of the increased risk.4 In our study, too, we identified some of these risk factors such as age, family history of diabetes or hypertension and duration of psychiatric illness of 5 years or longer, to be associated with the presence of diabetes or hypertension.

Our study showed that less than 8% of patients were being treated for diabetes or hypertension at our tertiary care center, and less than 20% of patients were referred by a psychiatrist for further follow-up with respect to management of diabetes, hypertension or other physical illnesses. These results suggest that psychiatrists need to be more aware of management of common physical comorbidities such as diabetes and hypertension in patients with psychiatric illnesses. Patients often seek treatment for symptoms of disorders that are diagnosed as co-morbid, rather than principal conditions. As a complex interface exists between such physical and mental illnesses, psychiatrists need to be trained to treat patients with these common physical conditions, and in specific, severe mental illnesses. In this manner, improved screening and early treatment of physical illnesses in psychiatric patients can significantly impact their psychosocial functioning and quality of life.

Interestingly, through monitoring of BP during a patient's visit to our OP facility, we identified as many patients at risk of hypertension with elevated BP (≥140 and/or ≥90 mmHg) as the number of patients with self-reported hypertension. In essence, this finding exemplifies the importance of regular physical examination and appropriate investigations at a tertiary psychiatric care center that in turn, can identify patients at risk of developing or already have diabetes, hypertension or MetS. Importantly, this observation highlights the potential of opportunistic screening of common physical NCDs in a psychiatric care center. In fact, a nurse-led intervention at a community mental health center resulted in 30% more patients with severe mental illness who received screening for CVD risk factors such as blood pressure, cholesterol, glucose, BMI and smoking status.24This indicates that care coordination, or integrated care programs for physical health conditions in patients with mental illnesses can better-equip health systems and be more effective in reducing unfavourable health outcomes in these patients.

In the present study, the patients were recruited from a psychiatric out-patient facility. The findings of this study cannot be generalized to the entire population as these rates were based on patient-reported presence of the physical NCD and a wide-spectrum of psychiatric diagnoses were present in our study population. Further, we are not aware of the diagnostic criteria or tests used by the medical doctor to diagnose the patient with diabetes and/or hypertension. In this study, no laboratory diagnosis to confirm of the NCDs were done as the out-patient mental health clinic caters to patients who may not be able to afford laboratory expenses. Our findings

need to be confirmed in larger community-based studies and also, by conducting clinical investigations to diagnose physical illnesses, especially in those who are at greater risk for cardiovascular disease. However, this study also demonstrates that a good clinical history for NCDs can provide valuable information to direct management of psychiatric patients, mental health professionals can be enabled to be aware of NCDs in patients and make appropriate referrals.

CONCLUSION

In conclusion, approximately 25% of patients visiting a tertiary psychiatric care center self-reported the presence of diabetes or hypertension. This study shows that physical examination andfamilial history can be helpful in detecting psychiatric patients at risk of developing physical NCDs in such a clinical setting. It is crucial for psychiatrists to increase their involvement in managing comorbid physical NCDs or for existing health systems to set up a referral path way to improve overall health outcomes for patients with psychiatric illnesses. Future studies are needed to identify potential differences that need to be incorporated while treating patients with physical NCDs based on the presence/absence of psychiatric illnesses. Studies are also required to develop a comprehensive psychosocial intervention strategy for patients with physical and mental comorbidities where lifestyle modifications are integrated within.

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CONFLICT OF INTEREST

The authors have declared no conflict of interest with respect to the research, authorship,and/or publication of this article

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