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Prescribing Pattern of Psychotropic Medications in Psychiatry Outpatients at a Tertiary Care Teaching Hospital in India: A Prospective Cross-sectional Study

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Abstract

Background and Objectives: The expanding field of psycho-pharmacology is constantly seeking new and improved drugs to treat psychiatric disorders. Although psychotropic drugs have had a remarkable impact in psychiatry, their utilization, effectiveness, and side effects in the clinical practice need continuous study. The present study was thus designed to analyze the pattern of psychotropic drugs prescription in a tertiary care teaching hospital in Eastern India.tals.

Methods: A 6-month prospective cross-sectional observational clinical study was carried. The study enrolled a total of 294 cases to investigate the prescribing pattern of psychotropic medications using a predesigned format.

Findings: Major depression was found to be the most common psychiatric disorder encountered (34.69%). The number of psychotropic drugs prescribed per patient averaged 3.39. Anti-anxiety drugs were the most frequently prescribed psychotropic drugs in various psychiatric disorders. Psychotropic fixed dose combinations were present in 18.36% of the prescriptions. The majority (83.09%) of medicines were prescribed by generic names. Psychotropic drugs accounted for 69.2% of drugs prescribed from the hospital drug schedule, of which 60.2% actually dispensed from the hospital drug store free of cost. Utilization of drugs from the national list of essential medicines of India (NLEM 2011) was 45.63%.

Conclusions: This study provides a baseline data for carrying out further studies on prescribing pattern in a tertiary care unit, which would help for improving the utilization of psychotropic drugs in mental health facilities.

Keywords: Prescribing pattern, Drug Utilization, Psychotropic Medications, ATC/DDD.

Background and Objectives

Rational drug prescribing is defined as the use of the least number of drugs to obtain the best possible effect in the shortest period and at a reasonable cost [1] . Besides describing drug use pattern and prescribing behavior, measurement of drug use in the health facilities also helps in identifying the factors responsible for the practice of polypharmacy and the problems associated with it [2].

Setting standards and assessing the quality of care through performance review should become part of everyday clinical practice[3]. The study of prescribing patterns seeks to monitor therapeutic trends, evaluate and if necessary, suggest modifications in prescribing patterns so as to make medical care rational and cost effective.

Psychiatric disorders form an important public health priority. Of the top ten health conditions contributing to the Disability Adjusted Life Years (DALYs), four are psychiatric disorders [4]. Mental illness is associated with high level of health service utilization and associated costs, and in the developing countries, these costs are mostly paid by the patient. Since 1950s, psychotropic drugs

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have proliferated, and diagnosed cases have also increased. The expanding and challenging field of psychopharmacology is constantly seeking new and improved drugs to treat psychiatric disorders. In this way, psychiatrists are continuously exposed to newly introduced drugs that are claimed to be safe and more efficacious. Although psychotropic drugs have had a remarkable impact in psychiatry, their utilization in actual clinical practice, effectiveness and safety in the real-life situation needs continuous study, and is thus a topic of increasing interest in recent times [5]. Many studies from the western countries have reported the prescription patterns of various psychotropic medications, which have looked into national prescription patterns, prescription patterns in general practice, and specialist care, age, and gender differences in antipsychotic prescription, prescription patterns of anti-depressants, mood stabilizers in bipolar disorder patients, and rate of use of anti-cholinergic agents in psychiatric patients. A few surveys of prescription patterns of various psychotropics from Asian centers are available too [6, 7, 8].

As there is no sufficient data available on their use in the population of eastern India [9], the present study was carried out to analyze the patterns of psychotropic drug utilization in the Psychiatric Outpatient Department (POPD).

Methods

Study design

This is a hospital-based prospective, cross-sectional observational study. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines were used in the preparation of protocol and the manuscript [10].

Study period

The study was carried out over a period of six months in the Outpatient Department of Psychiatry in Medical College & Hospital, Kolkata, India.

Sampling

A total of 294 prescriptions were analyzed as per the WHO recommendations on conducting drug utilization study from OPD [11].

Inclusion criteria

1) Subjects who were seeking treatment at Psychiatry OPD for various psychiatric disorders and willing to participate.

2) Patients from all age groups and both sexes were included.

3) Pregnant ladies who were suffering from psychiatric disorders.

4) Those who understood the purpose of the study and were ready to provide information regarding their health status and those who signed an informed consent document.

Exclusion criteria

1) Not willing to participate;

2) Having a history of substance abuse;

3) Being judged clinically to be at a suicidal risk (too serious to be included in the study);

4) Suffering from any serious disease such as unstable coronary heart disease, heart failure, advanced kidney or liver failure;

5) Any condition resulting in severe learning disability (e.g. brain injury); and

6) Those unable to comprehend for other reasons.

Study methodology

Permission of the Institutional Ethical Committee was obtained for conducting the study. Informed consent was taken from all participants prior to their inclusion into the study. Patient related information (age, sex, and diagnosis) and drug-related information (drugs, dose, dosage form, route of administration) were recorded on a pre-structured, customized data collection sheet. The data of the patients attending the Psychiatry OPD, during the study period 1st Oct 2013 to 31st March 2014, were included. The sampling frame was fixed as ten prescriptions per day, two days a week (including one female and one male OPD) during the given sampling period. In case of OPD holidays, the prescriptions of that day were assigned to the next working day. A total of 294 cases of both sexes were analyzed. The prescriptions were analyzed for the following parameters: (1) average number of the drugs per prescription, (2) average number of the psychotropic drugs

per prescription, (3) percentage of the psychotropic drugs prescribed by generic name, (4) percentage of injectable drugs prescribed, (5) percentage of prescriptions containing psychotropic fixed dose combinations (FDC), (6) percentage of the psychotropic drugs prescribed from essential drug list, and (7) percentage of the psychotropic drugs prescribed from the hospital pharmacy. The prescribed drugs were classified according to the Anatomical Therapeutic Chemical (ATC) – Defined Daily Dose (DDD) classification. Cost of drugs prescribed from the hospital schedule was calculated based on the rate contract available in the hospital's drug store. Cost of drugs prescribed from pharmacies outside the hospital, was obtained from the CIMS-India: April-July 2014. The cost parameters calculated were average total cost per prescription, percentage of average cost due to psychotropic drugs, average cost borne by the hospital and average cost borne by the patient. For drugs purchased from the outside pharmacies, we calculated the price per 10 tablets/capsules (minimum and maximum, as per CIMS- drug index), and average monthly cost (minimum and maximum), which was equal to (PDD/ Dose per tablet) x Price per 10 tablets x 3 and Cost Index (CI) (maximum price/minimum price).

Table 1   Age- and gender- wise distribution of psychiatric disorders in a sample of prescriptions of patients (n=294) attending the psychiatry outpatient department

Age	Male		Female		Total	
	N	%	N	%	N	%
< 20	12	4.08	11	3.74	23	7.82
20-29	35	11.90	46	15.65	81	27.55
30-39	44	14.97	61	20.75	105	35.71
40-49	22	7.48	32	10.88	54	18.37
50-59	11	3.74	17	5.78	28	9.52
60-69	2	0.68	1	0.34	3	1.02
> 70	0	0	0	0	0	0
Total	126	42.86	168	57.14	294	100

PDD was calculated for the most frequently prescribed drugs in various psychiatric illnesses using the following formula:

$$PDD = \frac{\text{Quantity of drug dispensed x Strength of the drug}}{\text{Number of cases prescribed}}$$
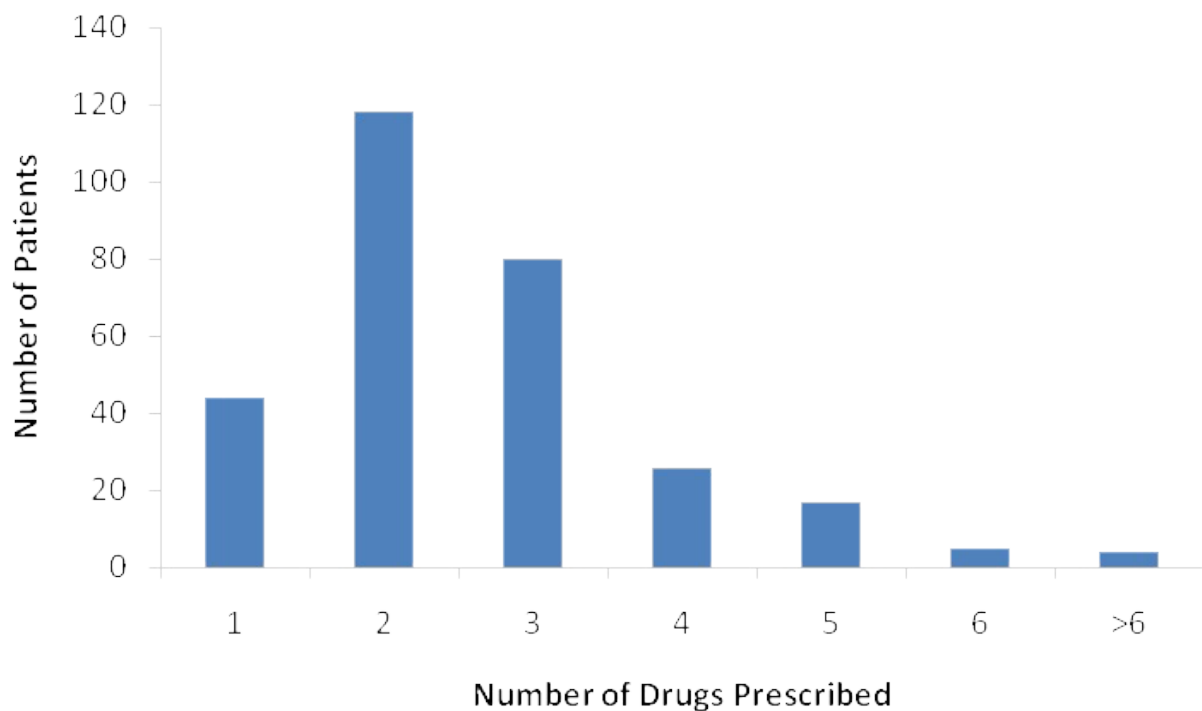

Figure 1   Number of drugs prescribed per prescription in the study population (n=294).

Data analysis

All statistical calculations were carried out with online Graph Pad Software [12].

Results

A total of 294 prescriptions were studied for various parameters during the tenure of our study in the Psychiatry Out-Patient Department (POPD) of a tertiary care teaching hospital, Kolkata/India. The percentage of female and male patients was 57.14% (n=168) and 42.86% (n=126), respectively.

Majority of the study subjects were found to be belonging to the age group 30-39 years (35.71%) (n=105), closely followed by age group 20-29 years (27.55%) (n=81) (Table 1). Out of the 294 prescriptions monitored, major depression was the most common disorder encountered (34.69%), followed by bipolar mood disorder (17.69%), anxiety (16.67%), schizophrenia (11.9%) and psychosis (9.86%) respectively (Table 2).

The prescribing frequency of psychotropic and other drugs was studied. The prescribing frequency of anti-anxiety agents was 26.9% (n=311), and that of antidepressants was 22.92% (n=265), thus being the most commonly prescribed categories of psychotropic medications. The other psychotropic drugs prescribed in psychiatry OPD in descending order were sedative-hypnotics 16.69% (n=193), antipsychotics 11.85% (n=137), and anti-convulsants 9.43% (n=109). In other categories of drugs prescribed, antacids topped the charts with 4.32% (n=50). Miscellaneous category of drugs, which included anti-hypertensives and anti-anginals, showed least prescribing frequency of 0.86% (n=10) (Table 3).

Total number of drugs prescribed per patient was analyzed. Out of the 294 patients monitored, 118 were prescribed two drugs, 80 patients were prescribed three drugs, and 4 patients more than six drugs (Figure 1). Monotherapy was thus practiced among 15% (n=44) while polytherapy was practiced among 85% (n = 250) of the study population (Figure 2). The duration of treatment was studied; 94 patients were on treatment for 16-30 days, 63 for 31- 45 days, and 25 for more than 90 days (Figure 3).

Overall, 83.09% (n= 964) of total drugs were prescribed by generic name while 17% (n= 162) were prescribed by brand names, which is in line with the WHO guidelines, where generic prescription is one of the indicators for rational prescribing. Utilization of drugs from the national list of essential medicines of India (NLEM 2011) was less (38.5%), because

NLEM was not updated since 2011. The primary purpose of NLEM is to promote rational use of medicines considering the three important aspects, i.e. cost, safety, and efficacy (Table 4) [13]. During the analysis of prescription, it was seen that 81% of the drugs were supplied from the hospital free of cost whereas 19% of the drugs were purchased from outside (Figure 4).

Table 2   Diagnosis-wise distribution of psychiatric disorders in the study population (n = 294)

Diagnosis	Male		Female		Total	
	N	%	N	%	N	%
Major depression	39	13.26	63	21.43	102	34.69
Bipolar mood disorder	23	7.82	29	9.86	52	17.69
Anxiety	26	8.84	23	7.82	49	16.67
Schizophrenia	20	6.8	15	5.1	35	11.9
Psychosis	4	1.36	25	8.5	29	9.86
Obsessive Compulsive Disorder	8	2.72	7	2.38	15	5.1
Dementia	5	1.7	6	2.04	11	3.74
Social phobia	1	0.34	0	0	1	0.34
Total	126	42.86	168	57.14	294	100

Table 3   Prescription-wise distribution of psychotropic and other drugs in the study population (n=294)

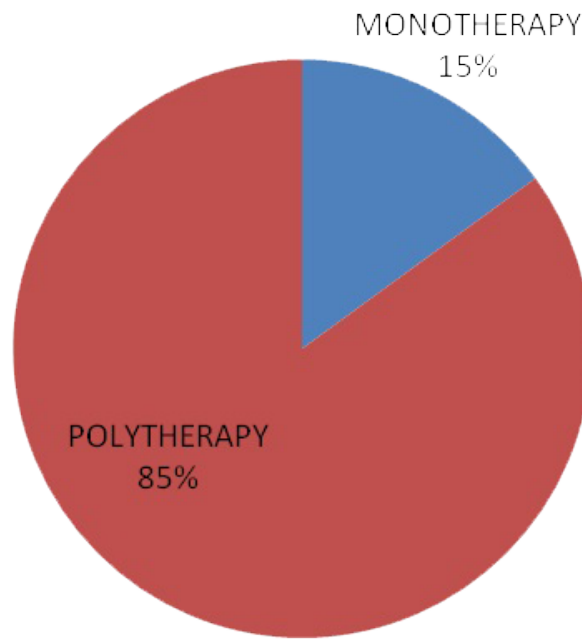| Categories	N	%
Anti-anxiety agents	311	26.9
Antidepressants	265	22.92
Sedative- hypnotics	193	16.69
Anti-psychotics	137	11.85
Anti-convulsants	109	9.43
Antacids	50	4.32
Anti-Parkinsonian	39	3.37
Analgesics	27	2.33
Diuretics	15	1.30
Miscelleneous	10	0.86

Figure 2 Prescribing pattern showing the practice of monotherapy or polytherapy.
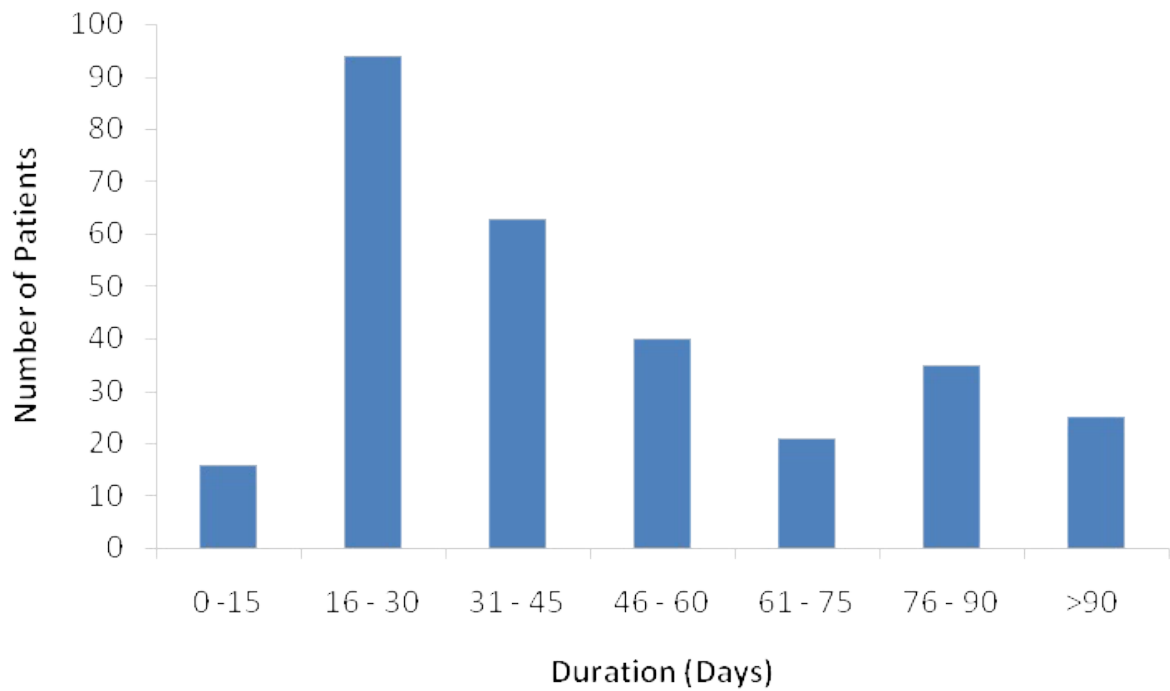
Figure 3 Duration of treatment among the study population.

60.2% of the psychotropic drugs are actually dispensed from the hospital drug store free of cost as per government policy, and this helps to improve compliance, especially in the low socioeconomic population [14].

When calculating the cost of drugs prescribed from outside the hospital, we found that the minimum cost of drug therapy per month was 16.11 for chlorpromazine, and the maximum cost was 2400 for bupropion. The Cost Index (CI) of paroxetine was the lowest (1.19 times), and that of venlafaxine was the highest (7.33 times). CI gives an idea about the difference in cost of the same brand generic drug of similar dosage formulation marketed by different companies. In addition, the ATC code and DDDs obtained from the WHO ATC/DDD website are applicable for management of conditions of moderate intensity, and are based on the international data. The WHO encourages countries to have their own DDD list based on indigenous data (Table 5) [15].

Table 4   Drug usage pattern in psychiatric illness in the study population (n=294)

Drug use indicators	Result
Average number of drugs per prescription	3.9 (1.34)
Average number of psychotropic drugs per prescription	3.39 (1.67)
Percentage of prescriptions containing psychotropic FDCs	54/294 (18.36%)
Percentage of the psychotropic drugs prescribed by generic name	801/964 (83.09%)
Percentage of prescriptions with an injection prescribed	13/ 294 (4.42%)
Percentage of psychotropic drugs prescribed from the hospital drug schedule	69.2%
Percentage of psychotropic drugs actually dispensed from the hospital drug store	60.2%
Percentage of psychotropic drugs prescribed from the national list of essential medicines (NLEM)	45.63%

Discussion

A prescription may be taken as reflection of physician's attitude to the disease and the role of drug in its treatment. It also provides an insight into the nature of the healthcare delivery system [16].The rapidly expanding field of psycho-pharmacology is challenging the traditional concepts of psychiatric
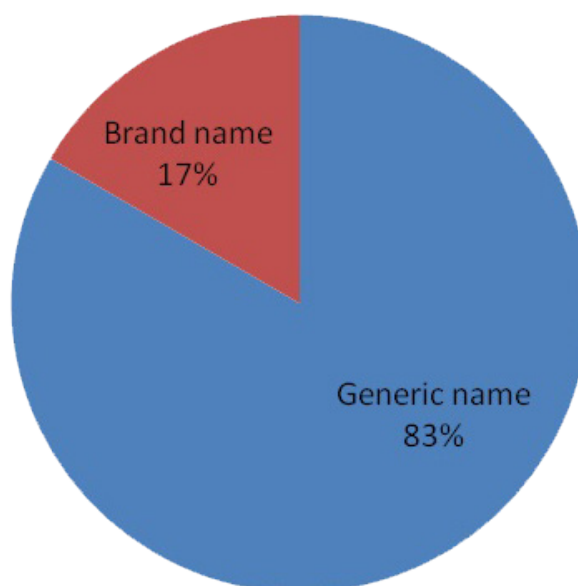

Figure 4   Percentage of drugs prescribed under generic name or brand name.

Table 5   ATC/DDD classification, DDD, and cost analyses of psychotropic drugs prescribed in a sample of patients (n=294) [*the minimum and maximum cost was obtained from the Drug Index (April – June 2014); **for conversion of dose of lithium from mg to mmol, the formula used was: mg/l × 0.144 = mmol/l × 6.94]

Drug	Dose	[%, n=294]	ATC code	DDD (mg)	Price per 10 tabs/caps in Rupees* in(₹)		Average monthly Cost (₹)		CI(b/a)
					Min (a)	Max (b)	Min	Max	
Chlorpromazine	25mg	0.7	N05AA01	300	1.79	7.14	16.11	64.26	3.99
Haloperidol	5mg	5	N05AD01	8	9.25	41.48	55.5	248.88	4.48
Fluphenazine	1mg	1.3	N05AB02	10	23.76	29.98	142.56	179.88	1.26
Clozapine	25mg	2.81	N05AH02	300	15.9	28.5	95.4	171	1.79
Risperidone	1mg	7	N05AX08	5	5.6	21	50.4	189	3.75
Olanzapine	5mg	8	N05AH03	10	17.9	34	53.7	102	1.89
Quetiapine	25mg	2	N05AH04	400	16	32.20	96	193.2	2.01
Aripiprazole	10mg	0.4	N05AX12	15	52	144	156	432	2.77
Fluoxetine	20mg	7.12	N06AB03	20	23.65	52.80	70.95	158.4	2.32
Sertraline	25mg	13	N06AB06	50	17	39	102	234	2.29
Paroxetine	12.5mg	0.6	N06AB05	20	80	95	480	570	1.19
Escitalopram	10mg	15.53	N06AB10	10	49	125	147	375	2.55
Venlafaxine	37.5mg	1.10	N06AX16	100	13.5	99	81	594	7.33
Amitriptyline	25mg	8.12	N06AA09	75	10.78	39.20	64.68	234	3.64
Bupropion	150mg	1.10	N06AX12	300	73	400	438	2400	5.48
Mirtazapine	15mg	1.71	N06AX11	30	58	74	348	444	1.28
Lithium**	250mg	6.82	N05AN01	24 mmol	8.2	14	49.2	84	1.71
Divalproex	250mg	8.61	NA	NA	24	84	72	252	3.5
Lamotrigine	25mg	0.81	N03AX09	300	30	50	90	270	1.67
Clonazepam	0.5mg	8.12	N03AE01	8	9.63	45	28.89	135	4.67
Lorazepam	1mg	7.62	N05BA06	2.5	7.80	30	46.8	180	3.85
Diazepam	5mg	1.23	N05BA01	10	7	33.21	21	99.63	4.74
Alprazolam	0.5mg	0.71	N05BA12	1	9.90	51	29.7	153	5.15
Chlordiazepoxide	10mg	1.20	N05BA02	30	15	35	90	210	2.33
Midazolam	1mg/ml	0.31	N05CD08	15	20.70	33.70	62.1	101.1	1.63

treatment and research, and is constantly seeking new and improved drugs to treat psychiatric disorders. In this way, psychiatrists are continuously exposed to newly introduced drugs that are claimed to be safe and more efficacious [17].

The present study aimed to analyze the current

prescribing pattern of psychotropic medications in the POPD of a tertiary care unit. The demographic analysis suggested that females are represented with more psychiatric illness, compared to males; this finding is similar to the findings of Mant et al [18] and Thakkar et al [19]. The age group of 30-39 years was found to be represented with maximum psychiatric disorders.

Analysis of the diagnostic pattern suggested that major depression was the most common psychiatric illness encountered followed by bipolar disorder, anxiety, schizophrenia and psychosis respectively. This analysis is useful to find the precipitating cause for the prescribing medication, and also to judge the rationality for such prescribing pattern.

Here, we found that anti-anxiety and anti-depressant drugs are the most commonly prescribed categories of psychotropic medications, followed by sedative- hypnotics, anti-psychotics and anti-convulsants in decreasing order. Anti-anxiety group (BZD) is remarkably useful and efficacious in a wide range of conditions for short term or intermittent use [20].

The average number of psychotropic drugs per prescription was 3.39, which is higher than that found in similar studies, where it ranged from 1.79 to 3 drugs per prescription [21, 22, 23]. Out of the 294 patients monitored in our study, 118 were prescribed two drugs, while 80 patients were prescribed three drugs; we can say that polypharmacy was not avoided. Polypharmacy can lead to poor compliance, drug interaction, adverse drug reactions, under-use of effective treatments, healthcare costs, and medication errors [24]. Average number of drugs per prescription is an important index of prescription audit. It is preferable to keep the mean number of drugs per prescription as low as possible because multiple drugs lead to increased risk of drug interaction. In this study, we found that majority of the study subjects are prescribed two drugs at a time; thus, the range is on the lower side, suggesting a trend of polytherapy.

A large proportion of drugs (83.09%) were prescribed by generic names, slightly higher to the studies done by Thakkar KB et al [8]. There might be a mandatory prescribing of generic names among the medical practitioners at government tertiary care teaching hospital as per local health administration order. It is in favor of the WHO guidelines, where generic prescription is one of the indicators of rational prescribing. Generic drug prescribing also facilitates cheaper treatment for the patient.

The prescription distribution pattern suggested that majority of the drugs were dispensed from the hospital pharmacy at free of cost.

The value of medical audits for generating and testing hypotheses on inappropriate prescribing has resulted in educational interventions to improve prescribing patterns [17, 18].

The oral (95.58%) and parenteral (4.42%) preparations used in this study are comparable with those of Rode et al. and Dutta et al [19,20].The only injection prescribed was haloperidol decanoate (50 mg/ml once a month), intramuscularly. Concerns about the adverse effects and cost-effectiveness of the parenteral route of drug administration are probably the reasons for the low utilization of depot injection formulation in the POPD.

Among the anti-depressant drugs, the prescribing frequency of SSRI was more than that of TCA and atypical agents. SSRIs are generally free of sedative effects and safer at higher doses. Because of better tolerability, SSRIs are generally recommended as first line pharmacological treatment for depression [21, 22].

About 18.36% prescriptions contained psychotropic FDCs. The antipsychotic two-drug combinations prescribed most often were risperidone/chlorpromazine, followed by risperidone with haloperidol. Trihexyphenidyl hydrochloride (central anticholinergic) was prescribed in the patients on antipsychotic polytherapy (two antipsychotic combinations); a typical anti-psychotic co-prescribed with another typical or with an atypical antipsychotic. Prescription of anti-cholinergics with both typical and atypical antipsychotics is very common to prevent their extra-pyramidal side-effects (EPS) [23, 24].

We did not study the appropriateness of prescription of the psychotropic drugs with regard to the diagnosis and co-morbidities. We also did not evaluate factors such as cost, patient compliance, and adherence to treatment guidelines while prescribing. The study involved patients attending the POPD of a tertiary care unit in Eastern India; thus, the results cannot be a representative of national data. The hospital resources (e.g., availability of free medicines from hospital) govern the issue of polypharmacy, which has not been considered in this research. Future studies should try to overcome these limitations.

Conclusions

The present study revealed that females suffer from

psychiatric illness more than their male counterparts, while the age of onset and duration of illness are almost same in the two genders. The age group of 30-39 years was represented with maximum psychiatric disorders. Major depression was found to be the most clinically diagnosed psychiatric illness among the study population, closely followed by bipolar disorder, anxiety, schizophrenia and psychosis, respectively. Among the psychotropic medications, anti-anxiety and antidepressant drugs were found to be the most commonly prescribed categories of psychotropic drugs in our institution. A trend of polytherapy was noted in the study. Duration of treatment was studied for the entire study population, and a trend of prescribing in generic name compared to brand name was revealed. Prescription distribution pattern suggested that majority of the drugs were dispensed from the hospital pharmacy at free of cost. The study provides a baseline data for carrying out further studies on prescribing pattern in a tertiary care unit, which would provide information for improving the utilization of psychotropic drugs in mental health facilities.

Competing Interests

The authors declare no competing interests.

Authors' Contributions

The authors contributed equally to this study.

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