

# A Descriptive Study of Use of Psychotropic Drugs in Child and Adolescent Psychiatric Illness in an Inpatient Facility

FAHAD JAMEEL, ASHWIN KAMATH, SHRIPATHY M. BHAT, LAXMINARAYANA K. BAIRY

## ABSTRACT

**Objectives:** To describe the child and adolescent psychiatric disorders in an inpatient setting and their pharmacological management.

**Method:** The case record files of all the patients who were  $\leq 18$  years of age, who were admitted to the psychiatry ward of a tertiary care hospital in southern India over a three year period were studied. The following details were recorded - age, gender, diagnosis and the drugs which were prescribed. The drug classes were delineated as follows – antidepressants, antipsychotics, mood stabilizers, anxiolytics/hypnotics and stimulants/non-stimulants for ADHD.

**Results:** A total of 611 patients were admitted during the three year period. 41.6% were females. The mean age was  $10.67 \pm 5.04$  years in males and it was  $12.37 \pm 4.81$  years in females. Neurotic and somatoform disorders were more common in the females ( $p < 0.001$ ), while disorders of psychological development

( $p = 0.023$ ) and behavioural disorders ( $p < 0.001$ ) were more common in males. 44.5% of the cases did not receive any psychotropic medication. The percentage use of the drug classes was as follows – antidepressants- 26%, anxiolytics -18.7%, antipsychotics- 14.7%, mood stabilizers -6.5% and stimulants/non-stimulants- 2%. Antidepressants and anxiolytics were more commonly prescribed in the females ( $p < 0.001$ ), while stimulants were more commonly prescribed in the males ( $p = 0.001$ ). 2.8% of the cases were discharged on 3 drugs.

**Conclusions:** Paediatric admissions due to psychiatric illness were more common in males, although towards adolescence, the percentage of the females increased. The most common diagnoses were behavioural and neurotic disorders, while the most commonly prescribed drugs were antidepressants and anxiolytics. A gender difference was seen in the use of the medications, which correlated with the difference in the disease presentation.

**Key Words:** Psychotropic drugs, Drug utilization, Children, Adolescents, Inpatients

## INTRODUCTION

The World Health Report has estimated the worldwide burden of psychiatric morbidity in children and adolescents to be about 20% [1]. Psychiatric illness in paediatric age group is a much more serious problem in India because more than 40% of our population is  $\leq 18$  years of age [2].

Studies which have been based on the prescription claims data, the pharmacy dispensing data and on surveys on the general population have shown a trend of increasing psychotropic drug prescription [3,4]. The increase in the medication use has not been accompanied by an increase in the clinical research which evaluates the efficacy of these drugs in the younger population. The clinical experience and the adult psychopharmacology data have added on to the limited information on the psychotropic drug use in children. However, the emergence of data which has questioned the safety of the selective serotonin reuptake inhibitors (SSRIs) in young people have highlighted the need for well conducted research in children and adolescents [5]. Also, given the considerable public health relevance of drug safety in children, and the potential effects of psychotropic medications on their physical growth and brain development, it is important to identify valid methods for detecting the possible drug-induced adverse events during an early or prolonged exposure to the drugs [6].

Before the issues which are related to excessive psychotropic drug use are addressed, it is essential to determine the actual rates of medication use and the clinical context of their use. Drug utilization studies have thus become essential to identify the

possibly unfounded or hazardous extensions of the indications of medications. Most of the research regarding psychotropic drug use in the paediatric age group has been conducted in the United States or Europe and studies have shown that the patterns of prescribing and drug utilization vary internationally and within regions [7]. Very little research has examined the patterns of the psychotropic drug utilization in children in India, especially in the inpatient setting. These children represent some of the most serious emotionally and behaviourally disturbed children who seek treatment and hence their drug utilization is likely to differ from that of the children in the outpatient setting [8]. Therefore, this study was undertaken to identify the pattern of the psychiatric illness and the psychotropic drug utilization in children and adolescents who were admitted to the psychiatry ward.

## METHOD

The medical records of all the inpatients who were  $\leq 18$  years of age who were admitted with a diagnosis of psychiatric illness (International Statistical Classification of Disease and Related Health Problems, Tenth revision, ICD-10, F00-F99), during the period between 1st January 2006 to 31st December 2008, were retrieved from the medical records section of Kasturba Hospital, Manipal, a tertiary care hospital in southern India. Approval from the institutional ethics committee was obtained prior to start of the study. The following information was obtained from the medical records of each patient: age, gender, diagnoses, whether it was the first admission or readmission and the psychotropic drugs which were prescribed before the admission, during the hospital stay and

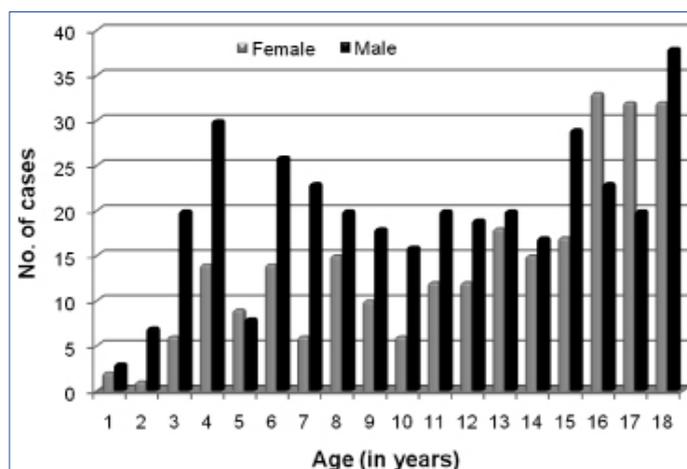
at the time of discharge. To facilitate the analysis, the psychotropic drugs were classified into 5 broad classes – anti-depressants, anti-psychotics, mood stabilizers, anxiolytics/hypnotics and stimulants/non-stimulants for attention deficit hyperactivity disorder.

A patient was considered to be on medication if he had received one or more psychotropic drugs, irrespective of the number of prescriptions and their dose or the patients' compliance to them. Readmission was considered as a separate medication trial, regardless of the duration between the two hospitalizations. Prescription percentage refers to the percent of the total study population who were prescribed the drugs.

The comparisons between the categorical variables were done by using the Chi-square statistic, with the level of significance being set at  $p < 0.05$ . The SPSS 14 software package was used for the statistical analysis.

## RESULTS

**Demographics:** The medical records of 611 paediatric inpatients who were admitted with psychiatric illnesses between 1st January 2006 and 31st December 2008 were studied. Of these, 58.4% (357/611) were males. The mean age was  $10.67 \pm 5.04$  years in males and it was  $12.37 \pm 4.81$  years in females ( $p < 0.001$ ). 48.1% (294/611) of the study sample were aged between 13 to 18 years. The age-wise gender distribution of the patients is shown in [Table/ Fig-1].



**[Table/Fig-1]:** Age-wise Gender Distribution of the Study Sample

9.8% (60/611) of the cases constituted readmissions. The median duration of the hospital stay was 5.5 days (range 1-54 days).

**Diagnosis:** Based on the ICD-10, the most common primary diagnoses are shown in [Table/Fig-2]. The disorders of psychological development ( $p=0.023$ ) and behavioural disorders ( $p < 0.001$ ) were more common in males, while neurotic and somatoform disorders were more common in females ( $p < 0.001$ ).

Primary diagnosis (according to ICD-10)	No. of cases
Neurotic, stress related and somatoform disorders	25.2% (154/611)
Behavioral and emotional disorders	25.2% (154/611)
Disorders of psychological development	18.8% (115/611)
Mental retardation	14.1% (86/611)
Mood disorders	10.3% (63/611)
Schizophrenia, schizotypal and delusional disorders	3.6% (22/611)

**[Table/Fig-2]:** Primary psychiatric diagnosis in the study sample

**Psychotropic Drug Use:** Out of the 611 patients, 16.53% (101/611) were on psychotropic medications before their hospitalization. These included 6.38% who were on antipsychotics, 3.27% who were on antidepressants, 2.13% who were on mood stabilizers, 1.64% who were on anxiolytics/hypnotics and 3.11% who were on drugs for ADHD. 55.5% (339/611) received the psychotropic medication following their hospital admission and the rest were treated with non-psychotropic drugs or psychological therapy. Males accounted for 56.3% (191/339) of the patients who were on the psychotropic medication. 58.3% (148/254) of all the females who were admitted were on psychotropic medication as compared to 53.5% (191/357) of all the males ( $p=0.24$ ). The patients who stayed in the hospital for longer than 6 days showed higher rates of psychotropic medication use. [Table/Fig-3A-3F] shows the most commonly prescribed drug class and also the most commonly prescribed drugs in each class. There was no significant changeover of the drug classes between the admission and the discharge. Also, there was no significant difference between the prescription rates of a drug class on admission and discharge.

Selective serotonin reuptake inhibitors (SSRIs) were the most commonly prescribed antidepressants in the study sample – which were given to 20% (122/611) of the patients. Tricyclic antidepressants contributed to 17.6% of all the patients who were discharged on anti-depressants (28/159) and newer antidepressants (venlafaxine, duloxetine, mirtazepine) contributed to 6% (9/159). Anxiolytics and hypnotics were the second most commonly prescribed psychotropic agents (114/611, 18.7%). Clonazepam was the second most commonly used drug (62/611, 10.1%) in the study. Of the 14.7% (90/611) patients who received antipsychotics on hospital discharge, 14.4% (13/90) were on typical anti-psychotics and the rest were on atypical anti-psychotics. Methylphenidate was found to be the only stimulant which was used in 12 of the 74 (16.2%) patients of ADHD who were on psychotropic drugs. Non-stimulant drugs like clonidine (45/74, 60.8%) and atomoxetine (17/74, 30%) were more frequently prescribed for the management of ADHD.

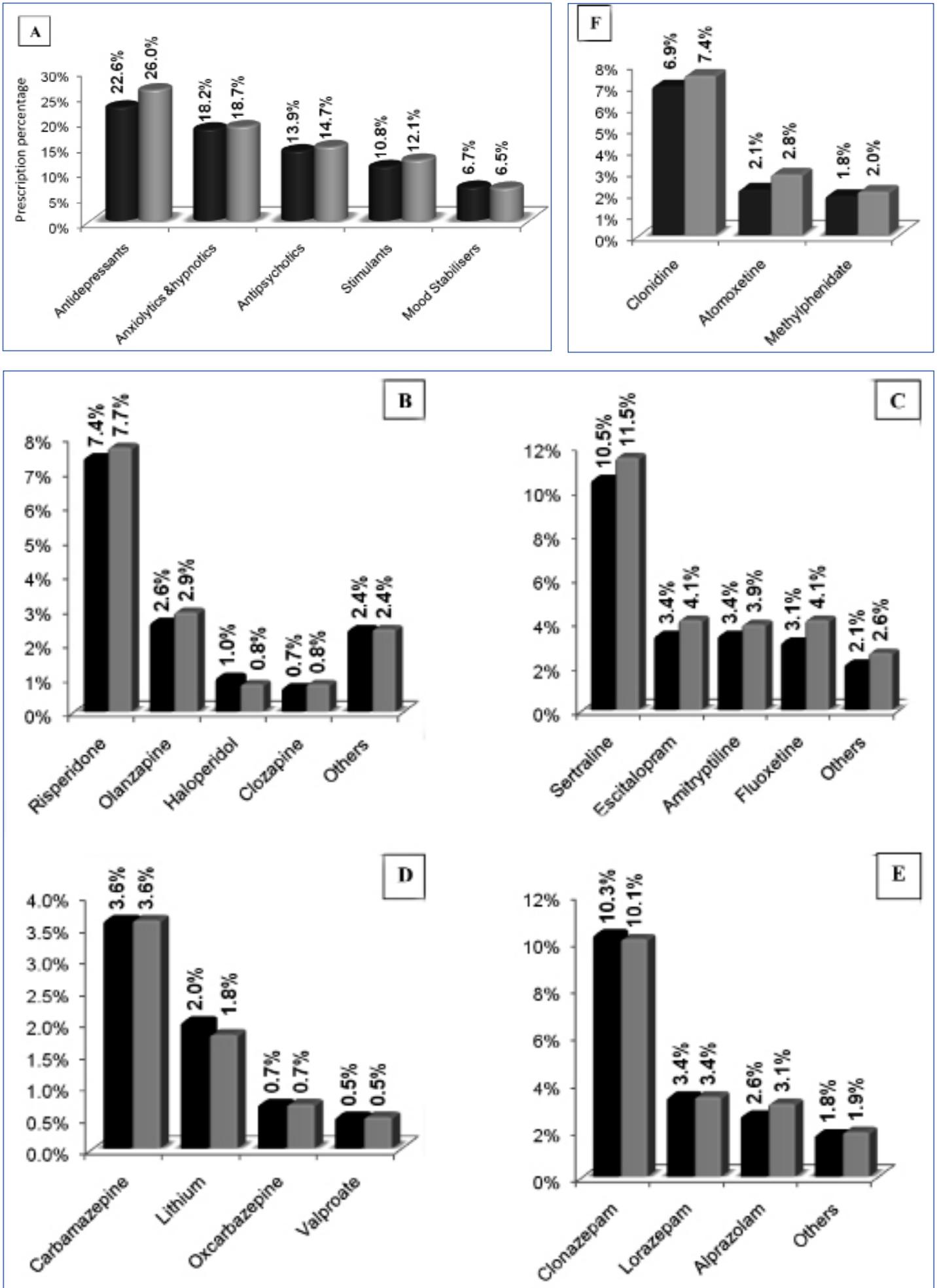
The prescription rates of all the drug classes except those for ADHD were significantly higher in older patients who were aged 13 to 18 years ( $p < 0.001$ ), while that of stimulants was higher in younger patients who were aged 1 to 12 years ( $p < 0.001$ ).

As seen in [Table/Fig-4], anti-depressants and anxiolytics were significantly more commonly prescribed in females, while stimulants were more commonly prescribed in males. This correlated well with the finding that disorders of psychological development ( $p=0.023$ ) and behavioural disorders ( $p < 0.001$ ) were more common in males, while neurotic and somatoform disorders were more common in females ( $p < 0.001$ ).

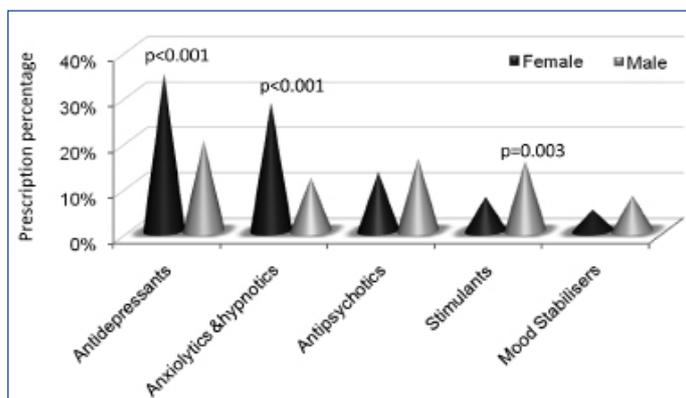
**Polypharmacy:** 34% of all the patients (208/611) were prescribed a single psychotropic drug, 17.8% (109/611) were given 2 drugs and 2.8% (17/611) were given 3 psychotropic drugs at discharge. The use of two drugs during the cross tapering was not considered as polypharmacy.

The use of two psychotropic drugs simultaneously was frequently associated with the diagnosis of – neurotic, stress related and somatoform disorders (37.6%, 41/109), mood disorders (29.4%, 32/109), and behavioural and emotional disorders (18.3%, 20/109).

Three drugs were co-prescribed for - mood disorders (29.4%, 5/17), schizophrenia, schizotypal and delusional disorders (23.5%, 4/17), and behavioural and emotional disorders (23.5%, 4/17).



**[Table/Fig-3]:** Percentage use of various psychotropic medications: A. Drug classes B. Antidepressants C. Antipsychotics D. Mood stabilizers E. Anxiolytics/hypnotics F. Drugs used in ADHD (stimulants/non-stimulants). ■ On hospital admission ■ On discharge



**[Table/Fig-4]:** Differences in the prescription pattern among males and females

[Table/Fig-5] shows the incidence of polypharmacy in the 334 patients who were discharged with psychotropic drugs. Anxiolytics/hypnotics (86/334, 25.7%) and antidepressants (82/334, 22.6%) were most frequently prescribed with other psychotropic drugs.

As a group, benzodiazepines were used in 65.9% (83/126) patients who were on ≥2 drugs, SSRIs were used in 49.2% (62/126) patients and atypical anti-psychotics in were used 35.7% (45/126) patients. SSRIs and benzodiazepines were co-prescribed in 42.1% (53/126) of such patients, atypical antipsychotics and benzodiazepines were co-prescribed in 16.7% (21/126) patients and SSRIs were co-prescribed with atypical anti-psychotics in 7.1% (9/126) patients.

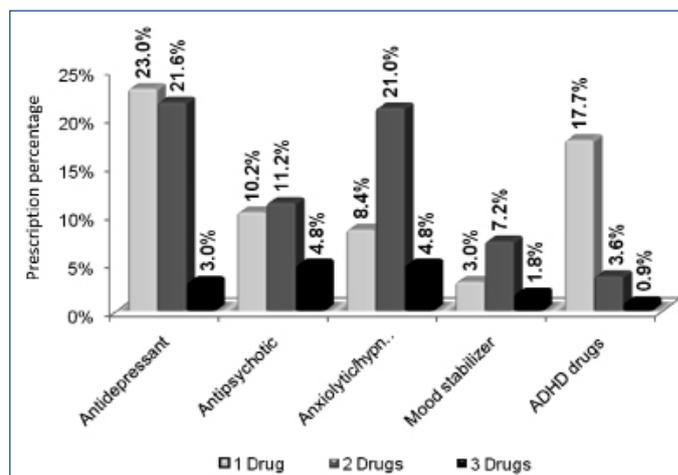
[Table/Fig-6] shows the most frequently used drugs in polypharmacy. The most frequently used combination in the study was clonazepam with sertraline in 17.5% (22/126) patients who were on ≥2 drugs.

## DISCUSSION

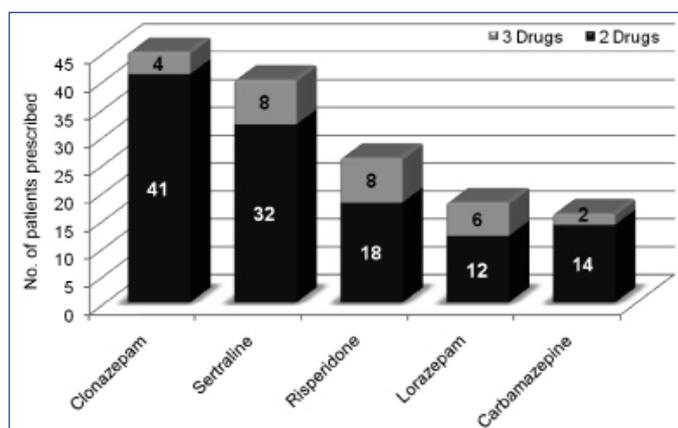
This study examined the patterns of psychotropic medication utilization in 611 paediatric inpatients in the psychiatry ward of a tertiary care hospital who were admitted over a period of three years. There was no significant difference in the age presentation of both the genders, a trend which was similar to that which was found in other studies [9,10]. 58.4% of the total admissions comprised of males as compared to a range of 44.3% to 52.5% which was reported in other studies [9,10]. The higher percentage of males who were admitted in our study could be due to the increased social stigma in India and the reluctance of the parents which was associated with the admission of females in the psychiatry ward [11].

Neurotic, stress related and somatoform disorders, behavioural and emotional disorders, disorders of psychological development, mental retardation and mood disorders were the most common diagnoses and this pattern was consistent with that of similar studies which were done in India [12]. As found by Dean and coworkers, the disorders of psychological development and behavioural disorders were more common in males, while neurotic and somatoform disorders were more common in females [9].

More than half (55.5%) of the total sample received one or more psychotropic medication. In similar studies, these values ranged from 49% in residential psychiatry facilities to 71.3% in inpatient units [8,9]. We found that there was no significant change in the number or class of the drugs which were used on hospital admission and discharge. Earlier studies had shown a significant decrease in the use of psychotropic drugs from the time of the



**[Table/Fig-5]:** Polypharmacy in the patients who were discharged on psychotropic drugs



**[Table/Fig-6]:** The most common drugs which were used in patients who were discharged on 2 or more psychotropic agents

hospital admission to the discharge [8,9]. This study confirmed the observation of Dean et al that patients who stayed in the hospital for longer periods had higher rates of psychotropic medication use [9]. The prescription rates of all the drug classes were significantly higher in older patients (13 to 18 years), except those of the drugs which were used in ADHD, which has its occurrence at a younger age.

The prescription rates of various groups of drugs differed in various studies. In the study which was done by Dean et al, the percentage use of anti-depressants was 56.6%, that of antipsychotics was 32.8%, that of anxiolytics/hypnotics was 13.9%, that of stimulants was 13.9%, and that of mood stabilizers was 3.3% [9]. The percentage use of the drug classes in our study was as follows – antidepressants–26%, anxiolytics–18.7%, anti-psychotics–14.7%, mood stabilizers –6.5%, and stimulants/non-stimulants –2%. However, the disease presentation patterns were not similar and hence there was a difference in the drug utilization rates.

Selective serotonin reuptake inhibitors were the most commonly prescribed antidepressants. This trend was similar to that which was reported by other studies, both among children and in adults [3,13]. Sertraline was clearly the most popularly prescribed SSRI. Sertraline, and the next commonly prescribed agent, escitalopram, have a more favourable pharmacokinetic profile, including fewer pharmacokinetic drug interactions than other SSRIs [14]. This could be the reason for their preference over other antidepressants. Also, the high usage and familiarity with these agents in adult psychiatry may be responsible for their greater use in the paediatric age

group. It is important to remember that younger people may show a differential risk of the toxicity outcome while using these agents and this is yet to be determined by systematic studies. Deliberate self harm is a major problem in adolescents [15].

In our study, 86.6% of all the patients who received anti-psychotics were on atypical anti-psychotics and risperidone alone accounted for more than half (52.2%) of these cases. The use of atypical antipsychotics for psychotic and nonpsychotic disorders, such as aggression in the youth, is increasing [16]. This merits caution because the risk of drug-related side effects, some of which are serious, is greater with antipsychotics than with most other psychotropics which are used in children. Also, of concern is the dearth of evidence to support the current practices which involve the paediatric use of antipsychotics, except for a few short term studies [16, 17]. The popularity of the atypical anti-psychotics is mostly due to the lower incidence of the extrapyramidal side effects which are related to them. But the side effects, including extrapyramidal effects, may occur more frequently in younger patients as compared to the adults [18]. Currently, there is insufficient evidence regarding the potential, negative, long-term consequences of weight gain and the endocrinological changes which are associated with most of the atypical antipsychotics [17]. Larger, detailed studies are needed to confirm these observations. The proactive monitoring of the body weight, fasting blood glucose and the lipid levels is necessary for taking into consideration the developmental norms that incorporate the age- and sex-specific thresholds [19].

One of the salient findings in this study was the significantly higher use of anxiolytics/hypnotics as compared to that in the earlier studies. This was the second most commonly prescribed class of drugs (18.7%) in our study, with clonazepam being the second most frequently used drug (10.1%). They were frequently indicated in cases with multiple diagnoses which involved neurotic, stress related and somatoform disorders, mood disorders and behavioural and emotional disorders. Carbamazepine was the most commonly used drug for bipolar disorder in our study, followed by lithium. While lithium is the most studied medication for paediatric bipolar disorder, there are no well controlled large studies which have evaluated the efficacy of anticonvulsants [20]. Using an atypical antipsychotic either alone or in addition to another mood stabilizers, has shown its utility in treating manic symptoms, depression in mixed states, and aggression, since children might not respond well to the conventional mood stabilizers alone [21].

The use of stimulants was much lower as compared to that in other reports and methylphenidate was the only one which was prescribed. All the prescriptions in our study were written by psychiatrists. The pattern of the stimulant prescription might vary when prescriptions from paediatricians and general practitioners are taken into consideration [10, 22]. The reports which showed an increased incidence of growth suppression with chronic stimulant use could also be responsible for the lower prescription rates of these drugs in our study [23].

**Polypharmacy:** Nearly 20% of all the patients in our study were started on 2 or more psychotropic drugs simultaneously. The rates of the reported polypharmacy differed among the various settings, with the psychiatric inpatient facilities having higher rates than the outpatient facilities and the paediatric clinics [24]. The most frequently prescribed combination in our study, i.e. SSRIs and benzodiazepines, was different from that in other reports. Other studies have reported SSRIs with atypical anti-psychotics

or stimulants with clonidine or stimulants with anti-depressants to be the most frequently prescribed combinations [9,22,25]. As discussed above, this may reflect the differences in the nature of the prescribers, as well as the different clinical profiles of the corresponding patient populations. While polypharmacy alone does not necessarily reflect poor prescribing practices, with the high rates of concomitant pharmacotherapy among the children and adolescents in psychiatric care, additional research on the efficacy and safety of this treatment strategy is necessary [25]. Until then, caution must be taken while initiating these psychotropic combinations.

Our study has limitations. We did not look for the appropriateness of the psychotropic drugs which were prescribed for the various mental illnesses. Also, the rationality of the drug combinations was not assessed. These would require studying the drug utilization in comparison to the practice guidelines for specific disorders. Our study intended to present the drug utilization data in the child and adolescent inpatients in general.

To conclude, the paediatric admissions due to psychiatric illness were more common in males, although towards adolescence, the percentage of the females increased. The most common diagnosis was behavioural and neurotic disorders, while the most commonly prescribed drugs were antidepressants and anxiolytics. A gender difference in the use of the medications was seen, which correlated with the difference in the disease presentation. More than half of the total sample received one or more psychotropic medications. Although appropriate comparisons are scarce, these rates were found to be lower than those which were reported in inpatient and residential psychiatry facilities. About 60% of the patients who received psychotropic medications were on more than one drug. No significant difference in the drug use was seen on admission and discharge. Since all the drugs do not produce equal effects and to the same extent in children and adolescents, well controlled clinical trials are needed to establish their true benefit in this population. The long-term safety and quality of the life outcomes also need to be determined.

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**AUTHOR(S):**

1. Dr. Fahad Jameel
2. Dr. Ashwin Kamath
3. Dr. Shripathy M. Bhat
4. Dr. Laxminarayana K. Bairy

**PARTICULARS OF CONTRIBUTORS:**

1. Department of Pharmacology, Kasturba Medical College, Manipal, Manipal University, India.
2. Department of Pharmacology, Kasturba Medical College, Mangalore, Manipal University, India.
3. Department of Psychiatry, Kasturba Medical College, Manipal, Manipal University, India.
4. Department of Pharmacology, Kasturba Medical College, Manipal, Manipal University, India.

**NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:**

Dr. Ashwin Kamath  
 Assistant Professor, Department of Pharmacology  
 Kasturba Medical College, Light house hill road,  
 Mangalore – 575001, Karnataka, India.  
 Phone: +919844262808  
 E-mail: mailmaka@gmail.com

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