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DRUG UTILIZATION STUDY IN THE DEPARTMENT OF PSYCHIATRY AT A TEACHING HOSPITAL

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ABSTRACT

Psychiatry disorders are creating its own place in morbidity now a days. Various factors like cost of drugs, local paradigms, etc, plays a critical role for selecting the appropriate therapy for a particular patient because usually they are chronic therapy. Keeping this in mind, we conducted a study to delineate the various drugs used in psychiatric disorders, to find discrepancies. Drug utilization studies are essential for correct use of drug. Our study identifies the problems that arise from drug usage in health care delivery system and highlights the current approaches to the rational use of drugs. A total of 518 patients' data were collected during the period and analyzed for WHO recommended prescribing and complementary indicators. Study shows low incidence of poly pharmacy which is good as poly pharmacy is common in psychiatry and also use of injections was very low. Study shows that prescribing from WHO List of Essential Medicine was not as good as it accounted for only 21.3%. There is scope for improvement in case of medicines prescribed by generic name as none were prescribed by generic name. The average cost per prescription in our study was only 9.41 Indian rupees per day which is affordable by the majority of the patients.

KEYWORDS

Drug utilization review, Rational use of medications and Psychiatry care.

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INTRODUCTION

In many countries today ensuring the rational use of drugs is one of the most pressing problems faced by public health providers and administrators. WHO published its report on selection of essential drugs in 1977 bringing in the concept of essential drug program to promote rational drug use[1]. The Conference of Experts on the Rational Use of Drugs, convened by the World Health Organization (WHO) in Nairobi in 1985, defined rational use as

follows: The rational use of drugs requires that patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements, for an adequate period of time, and at the lowest cost to them and their community[2]. Rational drug use implies an individual approach to patient treatment. Successful goal of therapeutic outcome depends upon the prescriber ability to diagnose, prefer the correct drug and prescribe the apt dosage form and route of administration, minimizing drug interactions and adverse events and take measures for no duplication of therapy. Further, rational drug use depends on the performance of the pharmacy and nursing departments in preparing and administering drugs. Implementation of hospital drug formulary systems helps to optimize treatment, make essential drugs available, and control costs of therapy. The drug formulary can be considered the basis of rational drug use. However not only prescriber but the patient also have to use the drug with adherence to get the correct benefit or desired therapeutic outcome.

One mechanism to ensure correct prescribing and use is the drug utilization review (DUR) process; although often considered a component of a drug formulary system, DUR programs can exist in the absence of other formulary activities[3]. Study of drug utilization pattern in a particular setting gives an idea about the prescribing practices and characterizes the early signals of irrational drug use. With the help of WHO prescribed drug use indicators and concept of defined daily doses (DDD) it is possible to compare drug utilization patterns between different settings[4]. DUR programs are carefully planned by the medical staff to include the drugs considered to be most problematic if not used correctly. By comparing actual drug use to predetermined standards, DUR can detect inappropriate and/or unnecessarily costly drug therapy. Programs are designed to monitor individual drugs, or drug classes, as well as to monitor drug use in specified diseases. When problems are identified, interventions are designed and implemented to improve drug use. The interventions founded will be helpful in modification of hospital drug formulary and some procedures. By conducting educational programs the need of providing drug information increases.

The aim of this study is to evaluate the drug utilization in the psychiatry department of a public teaching hospital using WHO recommended prescribing indicators. Not only cost of therapy but percentage of money spent on the psychotropic drugs is also taken into account. Psychotropic medications are widely prescribed and the utilization of psychotropic drugs is increasing all over the world[5]. However data on the utilization of psychotropic drugs are lacking in India, particularly in the northeastern region of the country.

One of the objectives of preparation of essential drugs list by WHO in 1977 was to develop and follow a system of rational use of drugs. Expenditures due to irrational use of drugs have been a strain on the meagre health budgets of several developing countries. In public healthcare systems, the problem first starts with improper and wrong procurement of drugs and then their overuse and misuse. Further there are issues about choice of psychotropic drugs in relation to due to different reasons like increased use of atypical antipsychotic drugs[6]. The use of too many medicines per patient (poly pharmacy), issues about underutilisation, overutilisation, non-compliance with health worker prescription are there especially in psychiatry[7]. A drug utilization study aims to identify irrational drug use in a particular setting. It was in late 1980s when considerable interest arose after research on quality of drug therapy, preventable adverse effects, inadequate patient compliance and cost containment pressure, in promoting large scale drug utilization study and drug use evaluation initiatives[1].

Drug utilization review and its objectives

According to WHO (1997) DUR is defined as "the marketing, distribution, prescription and use of drugs in the society, with special emphasis on the resulting medical, social and economic consequences"[1]. Drug utilization review mainly focus on

- Ensuring that the drug therapy meets current standards of care
- Controlling drug cost
- Preventing problems related to medicines
- Evaluating the effectiveness of drug therapy
- Identification of areas of practice that require further education of practitioners
- Stimulating improvements in medication use
- Creating guidelines for appropriate drug utilization
- Promoting optimal medication therapy
- Describing the current treatment practices

How DUR promotes rational drug use

Drug utilization study by facilitating rational drug use ensures that drugs are available to individual patient in an optimal dose on the right indication with correct information and at an affordable price. For facilitating rational drug use it is important to know how drugs are being prescribed and used, so that we can initiate discussion and suggest measures to change the prescribing habits. A drug utilization study does this by three different ways

1. Description of drug use patterns
2. Early signals of irrational drug use
3. Interventions to improve drug use

Drug use information

Different types of drug use information are required depending on the problem being examined. These include information about the overall use of drugs, drug groups, individual generic compounds or specific products. Often, information about the condition being treated, the patient demographic factors and the prescriber is also required. In addition, data on drug costs will be important in ensuring that drugs are used efficiently and economically. These types of drug information can be used to promote the rational use of drugs[8].

Types of drug utilization studies

Drug utilization studies can be of the following types:

Cross-sectional studies

Cross-sectional data provide a snapshot of drug use at a particular time (e.g. over a year, a month or a day). Such studies might be used for making comparisons with similar data collected over the same period in a different country, health facility or ward, and could be drug-, problem-, indication, prescriber- or patient-based. Alternatively, a cross-sectional study can be carried out before and after an educational or other intervention. Studies can simply measure drug use, or can be criterion-based to assess drug use in relation to guidelines or restrictions[9].

Longitudinal studies

Public health authorities are often interested in trends in drug use, and longitudinal data are required for this purpose. Longitudinal data are often obtained from repeated cross-sectional surveys (e.g. IMS (Intercontinental Medical Statistics) practice-based data are of this type).

Data collection is continuous, but the practitioners surveyed, and therefore the patients, are continually changing. Such data give information about overall trends, but not about prescribing trends for individual practitioners or practices[9].

Continuous longitudinal studies

In some cases continuous longitudinal data at the individual practitioner and patient level can be obtained. Insurance and other health claims identifies the patient using unique identifying database. These data can provide information about concordance with treatment based on the period between prescriptions, co-prescribing, duration of treatment, PDDs and so on. Some of the hospitals are developing electronic prescription databases which are trending now a day. Such databases are very powerful, and can address a range of issues including reasons for changes in therapy, adverse effects and health outcomes[9].

Drug utilization studies can be targeted towards any of the following links in the drug-use chain:

The *systems and structures* surrounding drug use (e.g. how drugs are ordered, delivered and administered in a hospital or health care facility);

The *processes* of drug use (e.g. what drugs are used and how they are used and do their use comply with the relevant criteria, guidelines or restrictions); and

The *outcomes* of drug use (e.g. efficacy, adverse drug reactions and the use of resources such as drugs, laboratory tests, hospital beds/procedures).

Different methods of DUR studies

Three approaches to DUR

Prospective-DUR (pDUR), Concurrent DUR and Retrospective DUR (rDUR).

1. Prospective DUR acts vitally by reviewing the prescription before it is dispensed to the patient or caregiver[6].
2. Concurrent DUR involves reviewing drug orders during the course of therapy. This type of evaluation is ideal where adjustments to drug therapy may be necessary based on ongoing diagnostic and laboratory tests[10].
3. Retrospective DUR is performed after the prescriptions have been dispensed and "uses practice pattern analysis to identify the use of high-cost drugs, to compare particular classes of drug use by different facilities or providers, or to monitor adherence to pharmacotherapy recommendations from practice pattern guidelines for the treatment of particular diseases"[10].

Data collection and evaluation

The method of data collection will vary greatly with the approaches (prospective, concurrent or retrospective) chosen in the previous step. In all cases, forms will be necessary for documenting results.

Prospective DUR

In prospective DUR, "data collection" usually requires a review of physicians orders and comparison to criteria prior to administration of the drug. How this is accomplished, or if it is even feasible, will vary greatly between hospitals. In western countries drugs are being dispensed only after sufficient verification of pharmacist so data collection and maintenance of data will be accurate and easy for them. In the ward-stock systems frequently seen in Russian hospitals, prospective DUR is only possible if a qualified "data collector" is available to review orders prior to administration by a nurse. In systems where the department chief reviews all drug orders prior to administration, this individual could also function in the capacity of DUR data collector[11].

Various drug use problems can be detected and prevented from occurring with prospective monitoring, such as[12].

- incorrect dosage
- inappropriate dosage form/route of administration
- incorrect duration of therapy
- drug-drug interactions
- therapeutic duplication
- drug-disease contraindications
- drug-allergy and other side effects
- incorrect laboratory/monitoring

Concurrent DUR

Concurrent DUR data collection is similar to prospective in that it may be done in the pharmacy, or on the wards. It differs from prospective in that the data collection does not have to occur prior to administration of a first dose. This method of data collection is most suitable when staffing permits a daily review of case histories[13]. The main difference between the two types is that with concurrent monitoring, interventions are corrective.

Retrospective DUR

Retrospective DUR involves reviewing prescribed drugs after they are dispensed to the patients. It presents the fewest problems with data collection, and therefore is often the method of choice in new programs. At most data can be obtained from the patient records itself. Retrieval of data elements that are not contained in the case history, such as drug prices, may require visits to ancillary departments[13]. The main drawback is that these interventions cannot be made to improve drug use for the patients. It can be used to monitor the same aspects of drug use listed for prospective DUR, as well as:

- identifying prescribing frequency of a single drug or class of drugs
- comparing drug prescribing among physicians
- comparing prescribing to standard treatment guidelines

- monitoring the therapeutic use of high cost drugs

Concept of ATC system of classification and DDD

Anatomical Therapeutic Chemical (ATC) classification developed by Norwegian researchers is the classification system recommended by WHO to be used in international comparisons. The purpose of the ATC/DDD system is to serve as a tool for drug utilization research in order to improve quality of drug use. One component of this is the presentation and comparison of drug consumption statistics at international and other levels. The ATC system divides the drug into different groups according to the organ or system in which they act and their chemical pharmacological and therapeutic properties. Drugs are classified in groups at five different levels. The drugs are divided into fourteen main groups (1st level), with two therapeutic/pharmacological subgroups (2nd and 3rd levels). The 4th level is a therapeutic/pharmacological/chemical subgroup and the 5th level is the chemical substance[14].

The complete classification of olanzapine illustrates the structure of the code[15].

Defined daily doses and Prescribed Daily Dosages

Defined daily doses (DDD)

The Defined Daily Dose is the assumed average maintenance dose per day for a drug used for its main indication in adults. It can also be used as a key for development of drug usage. DDD are advantageous for comparing the use of drug in hospitals or regions[16].

Prescribed Daily Dosages (PDD)

The PDD is the prescribed daily dose, expressed as an amount of the Defined Daily Dose (DDD). In our study PDD is considered as the average dose of drug usually prescribed in the number of prescriptions. The PDD can be determined from studies of prescriptions or medical or pharmacy records. During analysis one should analyze the prescribed dose is apt for the diagnosed disease. The PDD will give the average daily amount of a drug that is actually prescribed[16].

ATC classification of drugs acting on Nervous System

- N - Nervous System
- N01 - Anesthetics
- N02 - Analgesics
- N03 - Antiepileptics
- N04 - Anti-Parkinson Drugs
- N05 - Psycholeptics
- N06 - Psychoanaleptics
- N07 - Other Nervous System Drugs

N Nervous System

a) N01 Anesthetics: No DDDs have been established in this group because the doses used vary substantially.

b) N02 Analgesics: This group comprises general analgesics and antipyretics. All salicylic acid derivates and all combinations except those which are combined with corticosteroids are labeled as N02BA. All ibuprofen preparations are classified in M01A, even if they are only intended for use as pain relief. Corticosteroids + Salicylic acid derivatives are labeled as M01B.

There are a number of combined preparations, which contain analgesics and psycholeptics are labeled as N02. Analgesics used for specific indications are classified in the respective ATC groups.

E.g.:

A03D orA03EA - Antispasmodic or psycholeptics or analgesic combinations

M01 - Antiinflammatory and antirheumatic products

M02A - Topical products for joint and muscular pain

M03 - Muscle relaxants

Lidocaine indicated for postherpetic pain is classified in N01BB.

c) N03 Antiepileptics

d) N04 Anti-Parkinson Drugs: This group comprises preparations used in the treatment of Parkinson's disease and related conditions, including drug-induced parkinsonism.

e) N05 Psycholeptics: The group is divided into therapeutic subgroups:
   i. N05A Antipsychotics
   ii. N05B Anxiolytics
   iii. N05C Hypnotics and sedatives
f) N06 Psychoanaleptics: The group is divided into therapeutic subgroups:
   i. N06A Antidepressants
   ii. N06B Psychostimulants, Agents Used For ADHD And Nootropics
   iii. N06C Psycholeptics And Psychoanaleptics In Combination
   iv. N06D Anti-Dementia Drugs
g) N07 Other Nervous System Drugs: This group comprises other nervous system drugs, which cannot be classified in the preceding 2nd levels in ATC group N[17].

Drug use indicators

The indicators developed by WHO help in assessing drug use pattern in particular setting. There are three core indicators in addition to complimentary indicators. The three main indicators deal with the three areas in rational drug use - Prescribing practices by health care professionals, patient care and facility standards. Prescribing data are usually extracted from outpatient and inpatient prescription forms[18].

IMPORTANCE OF CLINICAL PHARMACOLOGY IN THE DUR PROCESS

Clinical pharmacology is a medical discipline that links pharmacological and clinical expertise in order to promote rational use of drugs. The likelihood of a DUR program being accepted by the hospital medical staff, and becoming a tool for optimizing drug therapy will be greatly increased if the personnel involved in the program have adequate knowledge of clinical pharmacology. This is especially true when selecting or developing criteria. Various types of specialized knowledge that can enhance the effectiveness of a DUR program include:

- Disease etiology
- Dosage forms, and routes of administration
- Differences in drug requirements depending on severity of disease
- Drug-disease contraindications
- Adverse drug reactions
- Pharmacokinetics
- Combination therapy

Disease etiology

When developing criteria it is necessary to consider and recognize the main pathogenic mechanisms of disease development, since various mechanisms can be involved in producing the same manifestations.

Dosage forms and routes of administration

Some drug use criteria often include dosage forms and routes of administration. Many drugs are available in several dosage forms with different bio-therapeutic characteristics. Special oral dosage forms are available that cause the active substance to be gradually released into the GI tract, achieving therapeutic plasma concentrations without reaching peak plasma concentrations, and therefore avoiding "acute" side effects. The severity of disease should be considered in development of drug use criteria, including the route of administration.

Differences in drug requirements depending on severity of disease

The severity of a condition is a factor in determining whether a patient requires mono or combination drug therapy. Normally, it is preferable to prescribe only one drug to produce a therapeutic effect, and increase or decrease the dosage to modify the dose-related effect. There are some exceptions, such as when the dose-related effect is unclear or where increases in dose produce little change in therapeutic effect, but increase side effects (e.g., hydrochlorothiazide, antiarrhythmic agents, and psychotropic drugs).The dose-related approach should be utilized so as to allow modification of therapy when a drug's effectiveness appears to be insufficient, but given in normal dose ranges. However, in serious conditions, and in conditions where multiple mechanisms, organs, and systems are involved in the pathological process, monotherapy, even with maximum doses, may be insufficient. In such cases, combination therapy may be appropriate and necessary although additive

therapeutic and side effects must be carefully considered in dosing.

Drug-disease contraindications

Optimal drug therapy requires consideration of a patient's total medical condition. In patients with multiple diseases, the drug of choice for one condition may be absolutely contraindicated, or should be used with caution due to another preexisting condition. Pregnancy and breast-feeding will also influence selection of drugs.

Adverse drug reactions

Rational drug use requires consideration of adverse drug reactions, which are defined here as any unexpected reaction to a drug. This definition distinguishes adverse drug reactions from side effects, which are drug reactions that could occur, since the incidence has been documented in the literature. Because adverse effects are addressed only after they appear, they can contribute significantly to morbidity and mortality, as well as add to the overall cost of health care. According to WHO statistics, up to 10% of the total number of hospital admissions are due to drug-induced adverse reactions[19]. While it may not seem possible to prevent adverse reactions, many are actually caused by incorrectly prescribed drugs.

Pharmacokinetics

It is essential to know the pharmacokinetic properties for each drug in order to be able to make rational decisions. The main indicators of a drug's behavior in a human organism are data on the drug's plasma half-life (T ½), elimination metabolism, distribution, and concentrations in plasma and tissues. Knowledge of drug metabolism and elimination is very important, since it can help avoid severe side effects in some cases. These data should always be considered when developing drug use criteria for DUR.

Combination therapy

As discussed previously, a patient may have multiple medical problems requiring use of several drugs. Even in patients with one disease or condition, in some cases the use of a single drug does not always produce the desired therapeutic effect, necessitating combination therapy. In cases of multiple drug use physicians and pharmacists should be aware of significant drug-drug interactions.

A given combination of drugs can have both positive (desired additive effects, synergism, etc.) and negative (antagonism, adverse effects, etc.) results because of pharmacodynamic and pharmacokinetic principles. Just as combinations of drugs with similar mechanisms of action can lead to additive therapeutic effects, combinations of drugs with similar side effects can increase the risk of side effects. The success in therapy is very much stipulated by the physician's ability to recognize the main components of an individual patient's disease, and in turn to select a drug correctly, to define a drug dose and dosage schedule, to foresee possible unfavorable side effects (including those induced by drug-drug interactions), and to consider the cost of treatment[20].

Drug utilization studies in psychiatry setting

Psychotropic drug utilization rates can be useful in monitoring treatment for mental disorders on a population basis. Moreover, they provide information regarding rational drug use, given current knowledge regarding the risks and benefits of a given medication. In any DUR study it is important to link data on drug usage with the diseases or conditions for which the medicines are prescribed as it gives a better picture on the overall trend of drug use pattern. In order to achieve this it is useful to properly classify the diseases. The International Classification of Diseases (ICD) published by WHO and Diagnostic and Statistical Manual of Mental Disorders (DSM) by the American Psychiatric Association (APA) are two such coding systems that are widely used. The coding system utilized by the DSM-IV is designed to correspond with codes from the ICD. Since early versions of the DSM did not correlate with ICD codes and updates of the publications for the ICD and the DSM are not simultaneous, some distinctions in the coding systems may still be present[21,22]. In the present study ICD-10 Chapter Five Classification of Mental and Behavioural disorders coding system was used.

During the past few years, psychotropic medication use became common and is increasing in all industrialized countries. The information prevalence and patterns of drug use in the general population comes from pharmacoepidemiology investigating the interactions between drugs and populations[23]. This knowledge about the utilization and impact of pharmaceutical products at the level of population actually treated is necessary to inform mental health policies and service developments[24]. Several studies in Europe have explored the utilization of psychotropic drugs in representative samples from the general population, but most have been conducted at the national level[25-30]. Two large international surveys provided data for cross-national comparisons: the telephone-based, cross-national survey of the general populations of France, Germany, Italy, and the United Kingdom[31] and the European study of the Epidemiology of Mental Disorders/Mental Health Disability: a European Assessment (ESEMeD/MHEDEA 200), including the general populations of Belgium, France, Germany, Italy, the Netherlands, and Spain. A substantial difference has emerged in prevalence rates of use among the different countries involved in the ESEMeD survey (2000), here after referred to as the ESEMeD project is the first European survey to systematically assess the use of psychotropic drugs, using standardized methodologies in representative samples of the general population of six European countries; it is also the first study to link use patterns of all psychotropic drugs to prevalence rates of common mental disorder[32-37]. The Netherlands and Germany showed the lowest and France the highest prevalence rates, with the latter country having a use rate that was more than threefold higher compared to the Netherlands. Belgium, Italy and Spain showed prevalence rates in between, with more than 10% of the surveyed population having used at least once any psychotropic drugs in the previous year. Inter country differences in the use of psychotropic drugs may be attributed to a variety of factors, including differences in prevalence rates of mental disorders, in the utilization rate of health and mental health services and finally in the administrative and legal rules affecting the prescription, retail and use of psychotropic drugs[38]. Few other studies are compared in table 3[39-42].

There are great variations in the way psychotropic drugs are prescribed. Most experts are in favour of psychopharmacological monotherapy, but little is known about the extent to which it is actually practised. A survey of the psychopharmacological medication of all patients under treatment was carried out in three Austrian psychiatric clinics. It was established that only 8% to 22% of the patients underwent psycho-pharmacological monotherapy and that the patients received 2.2 to 3.3 psychotropics on average. Five to 22% of the patients received five or more psychotropic agents. The rare occurence of monotherapy might be due to unsound treatment regimens in some instances, but much more to a general trend in psychiatry fostering polydrug use[43].

Objectives

The objectives of this study were:

1. To evaluate the drug utilization in the psychiatry outpatient department of a public teaching hospital (GMCH) using WHO prescribing indicators.
2. To assess the prescriptions for the WHO recommended complementary indicators.

METHODOLOGY

Study Site

The evaluation of drug utilization was carried out in the psychiatry outpatient department of Gauhati Medical College and Hospital, Guwahati. It is a 1587 bed multispecialty tertiary care public teaching hospital with different specialties and super-specialties. The hospital has various departments like Medicine, Surgery, Pediatrics, Psychiatry, Pulmonology, Neurosurgery Obstetrics and Gynecology (OBG), Gastroenterology, Orthopedics, Urology, Neurology, Ophthalmology, Cardio thoracic Surgery Nephrology, Ear, Nose and Throat (ENT), Radiology, Skin and Sexually Transmitted Disease (STD).

Design

The study was descriptive, cross sectional and open study.

Participants

All the patients attending the Psychiatry OPD of GMCH, Guwahati over a 5 months period (from August to December 2009) were covered in the study.

Inclusion criteria

1. Patients of both sexes
2. Patients of all ages
3. All patients receiving psychotropic drugs for various indications.

Exclusion criteria

- Prescription with incomplete information.
- Patients admitted in the indoor department after being referred from the psychiatry OPD
- Cases of substance abuse, mental retardation and deferred diagnosis.

Following information for each patient were recorded on a data entry form designed in mutual consultation with the clinician

- Patient's name, age, sex, identification number
- Diagnosis
- Drugs prescribed (Generic / Branded)
- Strength of drugs prescribed and frequency of administration
- Dosage form
- Route of administration
- Duration of medication

Ethical Approval

Institutional Ethics Committee of Gauhati Medical College & Hospital, Guwahati, approved the study.

Testing tool

The prescribing indicators as well as the complementary indicators recommended by the WHO were used to assess the drug utilization pattern.

Data analysis

The data obtained were analyzed for the calculation of the prescribing and complementary indicators. The various prescribing indicators are as follows

- Average number of medicines per encounter
- Percentage of medicines prescribed from WHO Essential Medicine List
- Percentage of medicines prescribed by generic name
- Percentage of encounters with an injection prescribed

Apart from this the following complementary indicators were also determined.

- Average drug cost per encounter
- Percentage of drug cost spent on psychotropic drugs
- Percentage of drug cost spent on Injections

The prescribing and utilization pattern of the medicines were carried out with reference to WHO Essential Medicines List 2009 16th edition. The data were organized using ATC/DDD methodology. The data were analyzed with respect to the age, sex and diagnosis of the patients.

Cost calculation

The cost of each prescription was calculated as cost of drug treatment per day. Drug Today April - June 2010 and CIMS July - Oct. 2009 were used as source for finding the cost. The drug cost was calculated as maximum retail price (MRP).

Statistical consideration

Descriptive statistics was used for the analysis of data. The data obtained was represented as mean ± SEM and percentages, as applicable. Drug data and patient characteristic data were computed using MS Excel version 2007and SPSS version 16.0 statistical package. Appropriate statistical tests (Fisher's exact test, Student's t- test and One way Analysis of Variance, ANOVA) were used for determining association between variables. A difference was considered as significant if the P value was less than 0.05.

RESULTS

The results presented below are for 518 patients' data obtained from the outpatient clinic of psychiatry.

Profile of the patients

Out of 518 patients 55.8% (289 Patients) were male and 44.2% (229) were female.

All the patients were divided into seven age groups – upto 14 years (A), 15 to 25 years (B), 26 to 35 years (C), 36 to 45 years (D), 46 to 55 years (E), 56 to 65 years (F) and above 65 years (G). Majority of the patients attending the psychiatry OPD [408 (78.8 %)] were between the age group of 15 to 45 years (Figure No.1.).

Prescribing indicators

The prescribing indicators were calculated for all the patients and for the seven age groups to determine any differences in prescribing between these age groups.

Average number of medication per prescription

A total of 1000 medicines were prescribed to 518 patients out of which 948 were psychotropic drugs and the remaining 52 non-psychotropic drugs. Mean ± SEM of medicines prescribed was 1.93 ± 0.03. Mean ± SEM of psychotropic drugs was 1.83 ± 0.04. Mean ± SEM of medicines prescribed for male patients was 1.92 ± 0.04, while for female patients it was 1.93 ± 0.04 (Table No.5.). For different age groups average number of medicines per prescription were , 1.77, 1.85, 1.96, 2.01, 1.95, 2.05 and 2.30 respectively for group A, B, C, D, E, F and G (Table No.6.). It was found that in most of the prescriptions 2 drugs (57.14%) were prescribed (Table No.7.).

Percentage of medicines prescribed from WHO EML

Out of 1000 medicines only 213 (21.3%) medicines were prescribed from WHO Essential Medicine List (EML) 2009 16th edition. Lorazepam, fluoxetine and amitriptyline, contributed to majority of drugs prescribed from WHO List of Essential Medicines.

Percentage of medicines prescribed by generic name

All the drugs were prescribed by brand names. This could be due to shortage of psychotropic drugs in the hospital pharmacy of GMCH.

Percentage encounter with an injection prescribed

Use of injection was very low and percentage encounter with an injection prescribed was 1.9 % (10 cases) only. All the injections were of depot antipsychotic preparations (9 fluphenazine and 1 flupentixol formulations) prescribed for schizophrenia. Injection was prescribed in three age groups only, with one injection prescribed in age group above 65 years, two and seven in age group 15–25 years and age group 26-35 years respectively.

Complementary indicators

Apart from prescribing indicators complementary indicators were also calculated. Cost for 518 prescriptions were calculated. It was found that average cost of drug treatment per day was Rs 9.41 ± 0.25 in Indian currency. Psychotropic drugs accounted for 97.4% of the total drug cost while Injections accounted for only 0.23%. Cost was calculated on the basis of maximum retail price (MRP).

Other parameters

Top ten medicines

Clonazepam was the most frequently prescribed medicine (138 cases) followed by olanzapine (126 cases), lorazepam (100 cases) and escitalopram (77 cases).

A total of 76 different drugs were prescribed, out of which 59 were psychotropic drugs and the remaining 17 non-psychotropic drugs. Of the 59 different psychotropic drugs, 6 were combination preparations. Table No.8. Shows the list of psychotropic drugs along with their ATC code encountered in the present study.

Among non-psychotropic drugs various multivitamin preparations top the list with 29 cases followed by antiulcer drugs. Combination drugs accounted for 8.3% of the total drugs i.e. 83 out of 1000 drugs. Risperidone and trihexyphenidyl combination tops the list with 35 cases followed by trifluoperazine and trihexyphenidyl (17 cases), flupentixol and melitracen (11 cases).

Prescribing frequencies of selected drug categories

Anxiolytics form the most frequently prescribed drug category (n = 272, 52.5%) followed by antidepressants (n = 266, 51.4%) and antipsychotics (n = 252, 48.6%). Sedatives and hypnotics constituted only about 8.3% i.e. 43 cases (Figure No3.).

Table No.9 and Figure No.4 show the prescribing frequency of the different categories of psychotropic medications versus sex. Females received a slightly higher percentage of anxiolytics (57.2%) than males (48.8%) while males received more hypnotics and sedatives (9.3%) than females (7.0%). However the differences were not statistically significant, (p = 0.06, F-test 95% CI) and (p = 0.42, F-test 95% CI). The prescribing frequency of the tricyclic antidepressants (p = 0.83, F-test 95% CI) and selective serotonin reuptake inhibitors (p = 0.61, Chi square test 95% CI)) were more for male patients but not statistically significant. There were slight differences in the prescribing frequencies of other different classes of drugs between male and female but not statistically significant.

Figure No.5 shows prescribing frequencies among sub-classes of major drug categories. Among patients receiving anxiolytics/hypnotics and sedatives groups (n=315) 86.3% received axiolytics while 13.7% received hypnotics and sedatives. Among patients receiving antidepressants (n=266), 72.9% received SSRIs, 11.3% received SNRIs, 8.3% received TCAs, 5.6% received NaSSAs, 1.5% NDRIs and 0.4% other antidepressants. Among patients receiving antipsychotics (n=252), 83.3% of them received atypical antipsychotics while only 16.7% received classical antipsychotics.

Age-wise prescribing frequency for chosen drug categories

Table No.9 shows the prescribing frequency of the different categories of psychotropic medications versus age. Among the patients receiving anxiolytics more than 60% patients were from the age group 15 to 35 years. Among patients receiving antipsychotics more than 40% were from the age group 15 to 25 years alone. Among patients receiving antidepressants more than 75% were from a wide range of age group 15 to 45 years.

No clear trends of differences in prescribing frequency with age were observed. Variations in number of drugs per prescription among different age groups were not significantly greater than expected by chance (p = 0.22, One way ANOVA).

Diagnostic characteristics of the patients

The diseases encountered in the present study were organized according to International Classification of Diseases (ICD-10). Schizophrenia was the most common disease among the patients attending the psychiatry OPD (136 cases) followed by other common disorders like depressive episode (59 cases), anxiety disorders (49 cases) etc. Mixed presentation of depression with other disorders like anxiety, dissociative and somatic symptoms were also seen (29 cases). More than half of the patients presenting with schizophrenic disorders were of paranoid schizophrenia cases alone (74 cases). Further division of disorders among 59 cases of depressive episode showed the following data of mild depression (12 cases), moderate depression (4 cases), severe depressive episode without psychotic symptoms (4 cases), severe depressive episode with psychotic symptoms (16 cases) and other unspecified depressive episode (23 cases). Out of 49 cases of anxiety disorders generalized anxiety disorder (GAD) numbered 19 cases and panic disorder 11 cases.

Prescribing differences between male and female patients

On correlating data with respect to male and female patients it was found that there was no difference in prescribing of psychotropic drugs between the two groups with respect to number of drugs prescribed (p = 0.64, unpaired t-test, 95% CI).

DISCUSSION

A prescription provides an insight into the nature of the health care delivery system[44]. The role of the psychiatrist in ensuring compliance to the drug treatment cannot be over-emphasized. Average number of drugs in a prescription audit is an

important factor because higher number increases the risk of drug interactions. This is especially important in psychiatry as polypharmacy is common and psychotherapeutic drugs have been over-prescribed and misused[45]. The average number of drugs per prescription in our study (n=1.93) is comparable to that in Nepal[39], Switzerland[40] Spain[41], India (Calicut)[42] as shown in Table No.11. Only 16.41% of the patients received 3 or more drugs as compared to 40% reported from an Italian study[46].

In the present study it was found that in most of the prescriptions 57.14%, 2 drugs were prescribed. As the mean number of prescriptions were found below two in the present study, the risk of ADRs due to drug interactions and errors of prescribing with polypharmcy were low. 8.3% of the drugs used were combination preparations and 21.3% of the drugs prescribed were from the WHO essential medicine list. All the drugs were prescribed by brand names. These are issues of concern which can be redressed to some extent by prescriber education. The reasons often cited for the use of such combination preparations namely convenience, improvement in compliance and lower cost hold true in the department. This is an important area where improvement will lead to cost effective and rational drug therapy as the drugs included in list of essential medicines are both therapeutically and cost effective.

Use of injection was very low and percentage encounter with an injection prescribed was 1.9 % (10 cases) only. All the injections were of depot antipsychotic preparations (9 fluphenazine and 1 flupentixol formulations) prescribed for schizophrenia. The cost of the prescription is an important variable in determining compliance to the treatment, especially in developing countries. Compliance is a variable which must be taken into account in the interpretation of the results of a given treatment. This is especially true in psychiatry because of the long duration of treatment and the high level of non-compliance (20-50%)[46]. The issue of compliance was not addressed in the present study. The average cost per prescription per day in our study was 9.41 Indian rupees which is affordable by the majority of the patients.

Previous studies had suggested that women received more psychotropic medications than men[47,48]. However in our study no gender differences were found. Psycholeptics were the most commonly prescribed class of psychotropic drugs in the present study, of which anxiolytics topped the list. Clonazepam (138 cases) was the most frequently prescribed anxiolytic followed by lorazepam (100 cases) in this study. Clonazepam is one such benzodiazepine which has antiepileptic as well as anxiolytic properties. Although clonazepam falls under antiepileptics according to ATC/DDD classification, it had been grouped under anxiolytics because of its indications and low dose prescribing in the present study. This holds true across the different age groups and also in both genders. In most of the studies[48,49] benzodiazepines were the frequently prescribed psychotropic drugs and this is in consonance with the present study.

Selective serotonin reuptake inhibitors (37.5%) were the most frequently prescribed antidepressants in this study and this is in consonance with other studies[5,42]. In a study in Canada[50] SSRIs (17.5%) were the most frequently prescribed antidepressants followed by venlafaxine (7.4%). In the same study[50] sedatives and hypnotics were prescribed in 3.1% of the population while in the present study they accounted for 8.3%. Escitalopram (77 cases) was the most frequently prescribed SSRI followed by fluoxetine (56 cases) and paroxetine (46 cases) in the present study. While fluoxetine was the most frequently prescribed SSRI in the Calicut[42] study. However in other studies tricyclic antidepressants remain the most frequently prescribed class of antidepressants[39,46,51].

Analysis of the prescriptions of psychotropic drugs in this study revealed that the most commonly prescribed antipsychotics were olanzapine (24.3%) followed by risperidone and risperidone with trihexyphenidyl combination (11.8 %),
trifluoperazine with trihexyphenidyl combination (3.3%). An Indian study had identified olanzipine as the most commonly prescribed antipsychotic drug[52].

In the present study atypical antipsychotics (40.5%) were more commonly prescribed compared to classical antipsychotic drugs (8.1%). Another Indian study at Calicut[42] showed similar pattern with atypical antipsychotics (53.2%) and classical antipsychotic drugs (8.4%), however risperidone (31%) was identified as the most commonly prescribed antipsychotic followed by olazepine (12.3%) and quetapine (6.5%)[42]. Haloperidol was identified as the commonly prescribed antipsychotic drug in the study conducted by McCue *et al*[53]. In the present study the commonly prescribed classical antipsychotics were trifluoperazine (3.3%) followed by fluphenazine (1.7%) and chlorpromazine (1.4%) while the commonly prescribed atypical antipsychotics were olanzapine (24.3%) followed by risperidone (11.8%), aripiprazole (1.15%) and quetiapine (1.15%). In a study in France the commonly prescribed atypical antipsychotics were olanzapine followed by risperidone, amisulpride and clozapine[54].

The value of medical audits for generating and testing hypotheses on inappropriate prescribing has resulted in educational interventions to improve prescribing patterns[55]. The information can be used to develop adverse drug reaction monitoring programs also. Polypharmacy increases the risk of drug interactions and errors of prescribing. In our study the incidence of polypharmacy was low (1.93 drugs per prescription).

In the present study schizophrenia was the most common disease among the patients visiting the psychiatry OPD (26.3%) The other common complaints were depressive episode (11.5%), anxiety disorders (9.5%), somatoform disorders (8.3%), dissociative disorders (6.4%) etc. while in a study in Nepal[39] somatoform disorders were the most common complaint among the patients attending the psychiatry OPD (26.4%) followed by other common disorders like anxiety (14.2%) and depression (12.1%). Mixed presentation of depression with other disorders like anxiety, dissociative and somatic symptoms were also seen (5.6%) in the present study.

Majority of the patients attending the psychiatry OPD [408 (78.8 %)] were between the age group of 15 to 45 years. Among the patients receiving anxiolytics more than 60% patients were from the age group 15 to 35 years. Among patients receiving antipsychotics more than 40% were from the age group 15 to 25 years alone. Among patients receiving antidepressants more than 75% were from a wide range of age group 15 to 45 years. No clear trends of differences in prescribing frequency with age were observed in the present study.

The findings of our study, along with those of similar studies elsewhere in India and other countries showed slight but no major differences in terms of number of drugs per prescription. However there were similar as well as conflict of interest in the choice of certain classes of psychotropic drugs prescribed. Further studies in patient compliance with treatment and the dropout rate from psychiatric treatment are required. Studies in prescription audit of psychotropic drugs can be conducted to investigate the scope for improvement in prescribing practices.

N	Nervous system (1st level, anatomical main group)
N05	Psycholeptics (2nd level, therapeutic subgroup)
N05A	Antipsychotics (3rd level, pharmacological subgroup)
N05AH	Diazepines, oxazepines, thiazepines and oxepines (4th level, chemical subgroup)
N05AH03	olanzapine (5th level, chemical substance)

Table No.1: Core indicators

S.No	Indicators	Purpose
Prescribing indicators		
1	Average number of medicines per encounter	To measure the degree of poly pharmacy
2	Percentage of medicines prescribed by generic name	To measure the tendency to prescribe by generic names
3	Percentage encounters with an injection prescribed	To measure the overall use of an important but commonly overused and costly form of drug therapy.
4	Percentage of medicines prescribed from essential medicine list/ hospital formulary	To measure the degree to which practice conforms to national drug policy
Patient care indicators		
5	Average consultation time	To measure the time that medical personnel spend with patients in the process of consultation and prescribing.
6	Average dispensing time	To measure average dispensing time that personnel dispensing drugs spends with the patients
7	Percentage of medicines actually prescribed	To measure the degree to which health facilities are able to provide the drugs, which were prescribed
8	Percentage of drugs actually labeled	To measure the degree to which, dispenser record essential information on drug package, they dispense
9	Percentage of patients with knowledge of correct doses	To measure the effectiveness of information given to the patient on the dosage schedule of drugs they receive.
Facility indicators		
10	Availability of EML or formulary	To indicate the extent to which copies of EML or formulary are available at health facilities
11	Availability of key drugs	To measure the availability of key drugs recommended for treatment of some common health problems at health facilities

Table No.2: Complementary indicators

S.No	Indicators	Purpose
1	Percentage of patients treated without drugs	To measure the degree to which primary care prescribers treat patients with non pharmacological treatment.
2	Average drug cost per Encounter	To measure the cost of drug treatment
3	Percentage of drug cost spent on Injections	To measure the overall cost of an important but commonly overused form of drug therapy
4	Percentage of patients satisfied with the care they receive	To measure the extent to which patients leave health facilities generally satisfied with the overall care they received
5	Percentage of health facilities with access to impartial drug information	To determine whether accurate and unbiased information about the drugs is locally available to prescribers
6	Prescription in accordance with treatment guidelines	To measure the quality of care for some important health conditions where clear standards of treatment exist locally.

Table No.3: Comparison of DUR studies

S.No	Indicators	Shankar *et al*	Schulz *et al*	Cuevas *et al*	Padmini *et al*
		Nepal (2002)	Switzerland (1984)	Spain (2004)	India (2007)
1	Number of prescriptions	239	403	2647	1159
2	Average no of drugs/ prescription	1.75	1.8	1.63	1.8
3	% drug prescribed with generic names	29.7%	-	-	-
4	% drugs prescribed from WHO EML	29.48%	-	-	-
5	Duration	45 days	90 days	-	365 days

Table No.4: Average age distribution of the patients

S.No	Age group (yrs)	No of patients				
		Total (n=518)	Male (n=289)	Average age±SEM	Female (f=229)	Average age±SEM
1	upto 14	34	20	11.11 ± 0.67	14	12.43 ± 0.46
2	**15 – 25**	172	95	20.98 ± 0.32	77	20.22 ± 0.39
3	**26 – 35**	147	98	31.06 ± 0.31	49	31.41 ± 0.46
4	**36 – 45**	89	44	40.23 ± 0.44	45	40.82 ± 0.45
5	46 – 55	44	21	49.24 ± 0.49	23	51.65 ± 0.61
6	56 – 65	22	7	62.29 ± 1.11	15	61.53 ± 0.67
7	above 65	10	4	71.50 ± 2.22	6	74.33 ± 2.87

Table No.5: Distribution of Average number of medication per prescription

S.No		Total		Male (n = 289)		Female (n=229)	
		No. of drugs	Mean±SEM	No. drugs	Mean±SEM	No.of drugs	Mean±SEM
1	All drugs	1000	1.93 ± 0.03	557	1.92 ± 0.04	443	1.93 ± 0.04
2	Psychotropic drugs	948	1.83 ± 0.04	527	1.82 ± 0.04	421	1.84 ± 0.03

Table No.6: Distribution of Average number of medication per prescription among different age groups

S.No	Age group (yrs)	Distribution of number of medications	
		No. of Drugs	Mean±SEM
1	upto 14	60	1.76 ± 0.14
2	15 - 25	319	1.85 ± 0.05
3	26 - 35	288	1.96 ± 0.06
4	36 - 45	179	2.01 ± 0.08
5	46 - 55	86	1.95 ± 0.11
6	56 - 65	45	2.05 ± 0.19
7	above 65	23	2.30 ± 0.30

Table No.7: Average number of medication per prescription

S.No	No of drugs per prescription	No of prescriptions	Percentage
1	0	0	0
2	1	137	26.45
3	2	296	57.14
4	3	69	13.32
5	4	16	3.09
6	Total	518	100

Table No.8: List of Psychotropic drugs along with their ATC code

S.No	DRUG	ATC code
1	Alprazolam and Propanolol	N05BA12
2	Amisulpride	N05AL05
3	Amitriptyline	N06AA09
4	Amitriptyline and Chlordiazepoxide	N06CA01
5	Aripiprazole	N05AX12
6	Atomoxetine	N06BA09
7	Bupoprion	N06AX12
8	Buspirone	N05BE01
9	Carbamazepine	N03AF01
10	Chlorpromazine	N05AA01
11	Citalopram	N06AB04
12	Clobazam	N05BA09
13	Clomipramine	N06AA04
14	Clonazepam	N03AE01
15	Clozapine	N05AH02
16	Diazepam	N05BA01
17	Divalproex	Not Available
18	Donepezil	N06DA02
19	Dothiepin	N06AA16
20	Duloxetine	N06AX21
21	Escitalopram	N06AB10
22	Escitalopram and Clonazepam	Not Available
23	Etizolam	N05BA19
24	Flunarizine	N07CA03
25	Fluoxetine	N06AB03
26	Flupentixol	N05AF01
27	Flupentixol and Melitracen	N06CA02
28	Fluphenazine	N05AB02
29	Fluvoxamine	N06AB08
30	Ginkgo biloba	N06DX02
31	Haloperidol	N05AD01
32	Imipramine	N06AA02
33	Levosulpiride	N05AL07
34	Lithium	N05AN01
35	Lorazepam	N05BA06
36	Milnacipran	N06AX17
37	Mirtazapine	N06AX11
38	Olanzapine	N05AH03
39	Oxcarbazepine	N03AF02
40	Paliperidone	N05AX13
41	Paroxetine	N06AB05
42	Phenytoin	N03AB02
43	Pimozide	N05AG02
44	Piracetam	N06BX03
45	Piribedil	N04BC08

46	Procyclidine	N04AA04
47	Quetiapine	N05AH04
48	Risperidone	N05AX08
49	Risperidone and Trihexyphenidyl	Not Available
50	S-adenosyl Methionine	Not Available
51	Selegiline	N04BD01
52	Sertraline	N06AB06
53	Sod valproate	N03AG01
54	Sulpiride	N05AL01
55	Trifluoperazine and Trihexyphenidyl	Not Available
56	Trihexyphenidyl	N04AA01
57	Venlafaxine	N06AX16
58	Zolpidem	N05CF02
59	Zopiclone	N05CF01

Table No.9: Prescribing frequencies of selected drug categories

S.No	Drug category			Number of patients with % of population					
				Total (n=518)	%	male (n=289)	%	female (n=229)	%
1	PSYCHOLEPTICS	Anxiolytics		272	52.5	141	48.8	131	57.2
		Hypnotics and Sedatives		43	8.3	27	9.3	16	7.0
		Antipsychotics	atypical	210	40.5	121	41.9	89	38.9
			classical	42	8.1	21	7.3	21	9.2
2	PSYCHOANALEPTICS	Antidepressants	TCA	22	4.2	13	4.5	9	3.9
			SSRI	194	37.5	111	38.4	83	36.2
			SNRI	30	5.8	14	4.8	16	7.0
			NDRI	4	0.8	3	1.0	1	0.4
			NaSSA	15	2.9	7	2.4	8	3.5
			other	1	0.2	0	0.0	1	0.4
		Antidepressant with Psycholeptics		25	4.8	15	5.2	10	4.4
		Anti-dementia drugs		8	1.5	4	1.4	4	1.7
		Psychostimulants		7	1.4	6	2.1	1	0.4
3	OTHER NERVOUS SYSTEM DRUGS	Anticholinergic/Dopaminergic agents		53	10.2	28	9.7	25	10.9
		Mood stabiliser and Anticonvulsant		21	4.1	15	5.2	6	2.6
		Antivertigo preparations		1	0.2	1	0.3	0	0.0
4	NON-PSYCHOTROPIC DRUGS	Vitamins		29	5.6	18	6.2	11	4.8
		Others		23	4.4	12	4.2	11	4.8

TCA = Tricyclic antidepressant
SSRI = Selective serotonin reuptake inhibitor
SNRI = Selective noradrenaline reuptake inhibitor
NDRI = Noradrenaline - dopamine reuptake inhibitor
NaSSA = Noradrenaline and specific serotonin reuptake inhibitor

Table No.10: Age-wise prescribing frequency for chosen drug categories

Drugs prescribed			Number of patients with % of population													
			0-14 (n=34)	%	15-25 (n=172)	%	26-35 (n=147)	%	36-45 (n=89)	%	46-55 (n=44)	%	56-65 (n=22)	%	> 65 (n=10)	%
PSYCHOLEPTICS	Anxiolytics		6	17.6	76	44.2	62	42.2	32	36.0	20	45.5	10	45.5	4	40
	Hypnotics and Sedatives		1	2.9	11	6.4	20	13.6	7	7.9	1	2.3	2	9.1		0
	Antipsychotics	Atypical	19	55.9	96	55.8	79	53.7	38	42.7	25	56.8	12	54.5	3	30
		Classic		0.0	11	6.4	11	7.5	13	14.6	3	6.8	3	13.6	2	20
PSYCHOANALEPTICS	Antidepressants	TCA		0.0		0.0	9	6.1	7	7.9	4	9.1	2	9.1		0
		SSRI	14	41.2	65	37.8	54	36.7	37	41.6	17	38.6	3	13.6	4	40
		SNRI		0.0	9	5.2	11	7.5	6	6.7	2	4.5	2	9.1		0
		NDRI		0.0	1	0.6	3	2.0		0.0		0.0		0.0		0
		NaSSA		0.0	1	0.6	5	3.4	5	5.6	3	6.8	1	4.5		0
		other		0.0	1	0.6		0.0		0.0		0.0		0.0		0
	Antidepressant with Psycholeptics			0.0	6	3.5	8	5.4	9	10.1	1	2.3		0.0	1	10
	Anti-dementia drugs			0.0		0.0		0.0	2	2.2		0.0	3	13.6	3	30
	Psychostimulants		6	17.6	1	0.6		0.0		0.0		0.0		0.0		0

Drugs prescribed			Number of patients with % of population													
			0-14 (n=34)	%	15-25 (n=172)	%	26-35 (n=147)	%	36-45 (n=89)	%	46-55 (n=44)	%	56-65 (n=22)	%	> 65 (n=10)	%
OTHER NERVOUS SYSTEM DRUGS	Anticholinergic / Dopaminergic agents		2	5.9	19	11.0	14	9.5	9	10.1	4	9.1	5	22.7		0
	Mood stabilizer and Anticonvulsant		1	2.9	11	6.4	4	2.7	3	3.4	2	4.5		0.0		0
	Antivertigo preparations			0.0		0	1	0.7		0.0		0.0		0.0		0
NON-PSYCHOTROPIC DRUGS	Vitamins		8	23.5	8	4.7	1	0.7	7	7.9	3	6.8		0	2	20
	Others		3	8.8	3	1.7	6	4.1	4	4.5	2	4.5	1	4.5	4	40

Table No.11: Diagnostic characteristics of the patients

S. No	Diseases	ICD-10	Male	Female	Total %
1	Schizophrenia	F 20	80	56	26.3
2	Depressive episode	F 32	26	33	11.4
3	GAD/panic disorder	F 41	32	17	9.5
4	Somatoform disorder	F 45	23	20	8.3
5	Disssociative disorder	F 44	11	22	6.4
6	Acute and transient psychotic disorder	F 23	12	19	6.0
7	Depression with anxiety/dissociative/somatic symptoms	-	14	15	5.6
8	Bipolar affective disorder	F 31	17	7	4.6
9	Dhat syndrome	F 48.8	12	0	2.3
10	Adjustment disorder	F 43.2	6	5	2.1
11	Obsessive compulsive personality disorder	F 60.5	6	5	2.1
12	Delusional disorder	F 22.0	4	4	1.5
13	Acute stress reaction	F 43.0	5	2	1.4
14	Mixed disorder of conduct and emotion	F 92	3	4	1.4
15	Manic episode	F 30	5	1	1.2
16	Postpartum depression	F 53	0	6	1.2
17	Attention deficit hyperactivity disorder ADHD	F 90.0	5	1	1.2
18	Nonorganic insomnia	F 51.0	5	0	1.0
19	Sexual dysfunction	F 52	5	0	1.0
20	Dementia	F 00/F 03	1	3	0.8
21	Phobic anxiety disorder	F 40.0	3	1	0.8
22	Schizoaffective disorder	F 25	3	0	0.6
23	Recurrent depressive disorder	F 33	1	2	0.6
24	Dysthymia, persistent mood affective disorder	F 34.1	1	2	0.6
25	Paranoid/schizoid personality disorder	F 60.0/F 60.1	0	3	0.6
26	Postencephalitic syndrome	F 07.1	2	0	0.4
27	Conduct disorder	F 91.0	2	0	0.4
28	Emotional disorder anxiety onset in childhood	F 93	2	0	0.4
29	Acute confusional state	-	1	0	0.2
30	Induced psychotic disorder	F 24	1	0	0.2
31	Habit and impulse disorders	F 63	0	1	0.2
32	Tourette disorder, tic disorder	F 95.2	1	0	0.2

Table No.12: Comparison of current study with other studies

S.No	Indicators	**Current study** India (2009)	**Shankar *et al*** Nepal (2002)	**Schulz *et al*** Switzerland (1984)	**Cuevas *et al*** Spain (2004)	**Padmini *et al*** India (2007)
		Psy. OPD	Psy. OPD	Psy. setting	Psy. setting	Psy. IPD
1	Number of prescriptions	518	239	403	2647	1159
2	Average no of drugs/ prescription	1.93	1.75	1.8	1.63	1.8
3	% drug prescribed with generic names	0	29.7%	-	-	-
4	% drugs prescribed from EDL	21.3%	29.48%	-	-	-
5	duration	150 days	45 days	90 days	-	365 days

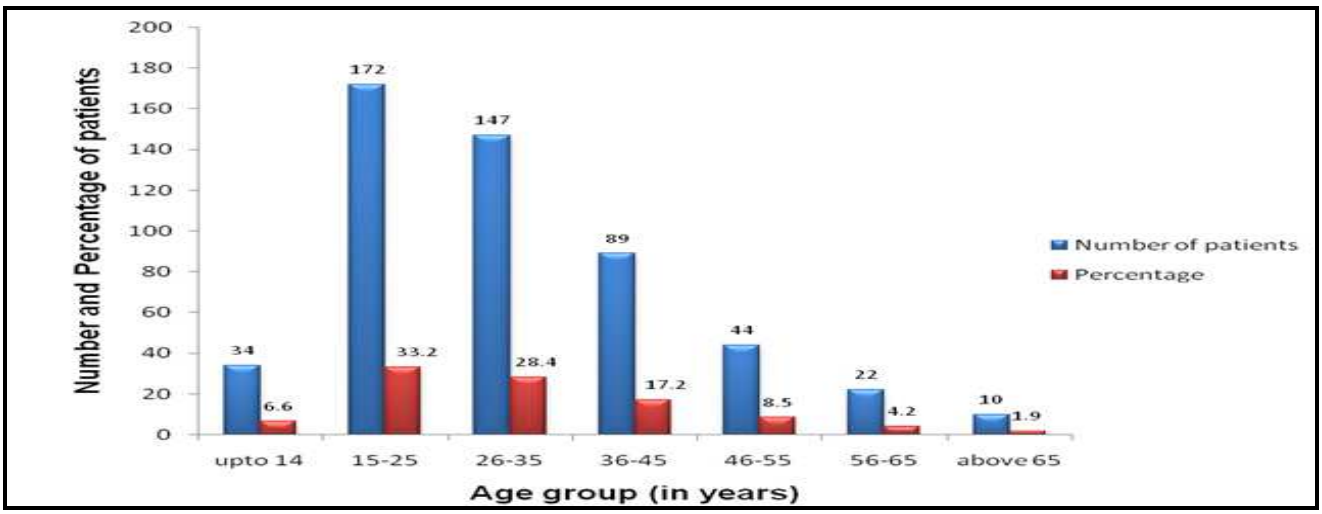

Figure No.1: Age Group Wise Distribution of Patients

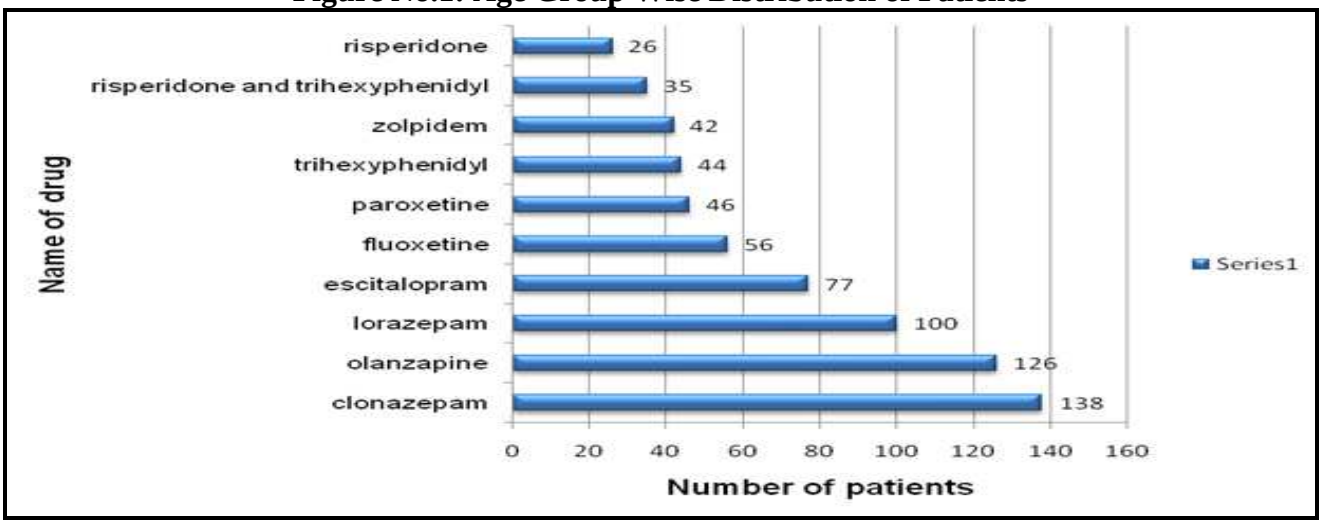

Figure No.2: Top ten medicines

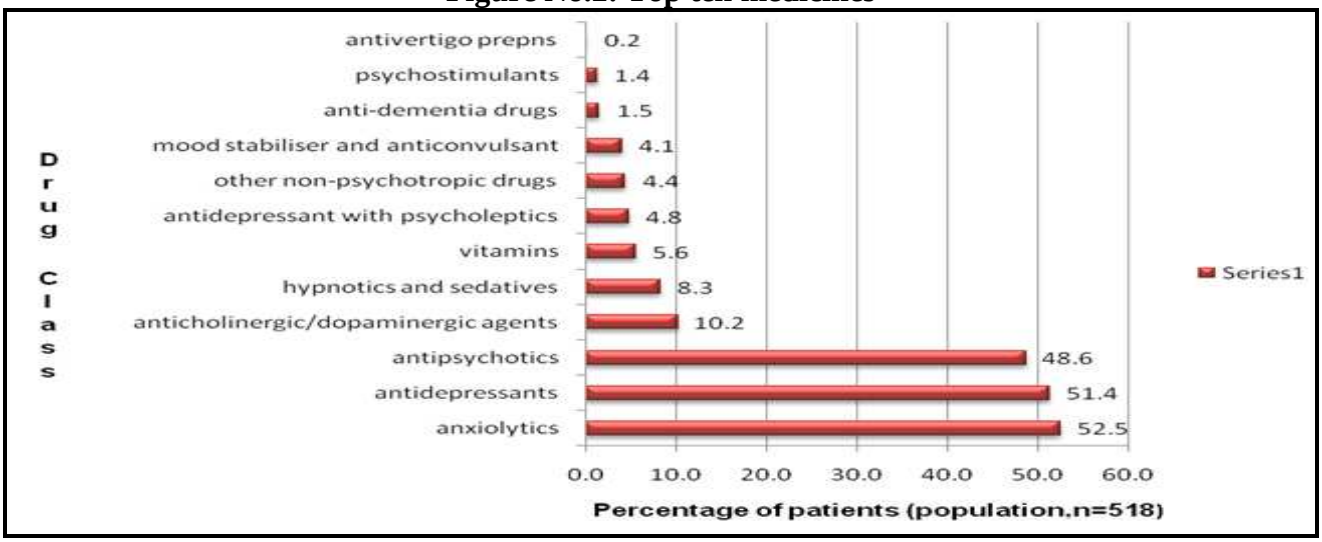

Figure No.3: Prescribing frequencies of selected drug categories

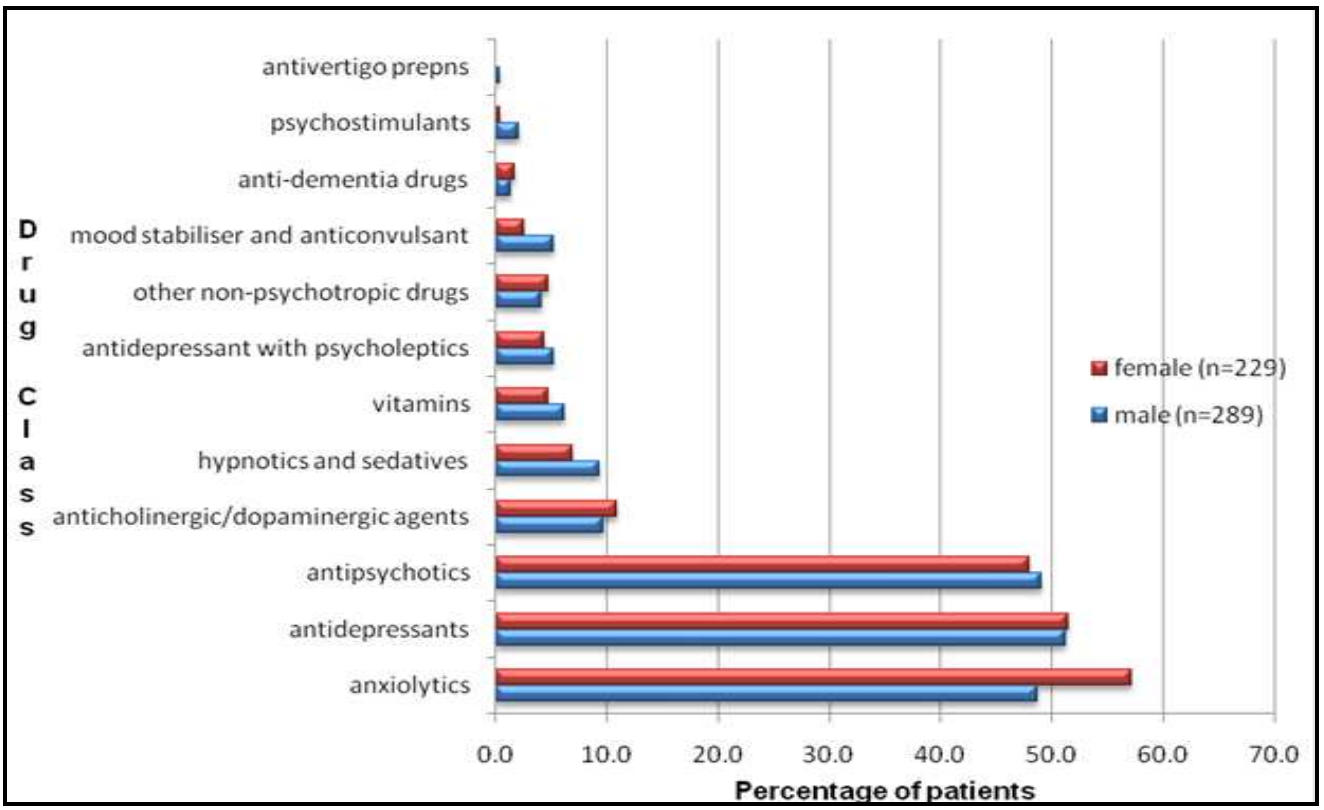

Figure No.4: Prescribing frequencies of selected drug categories among male and female

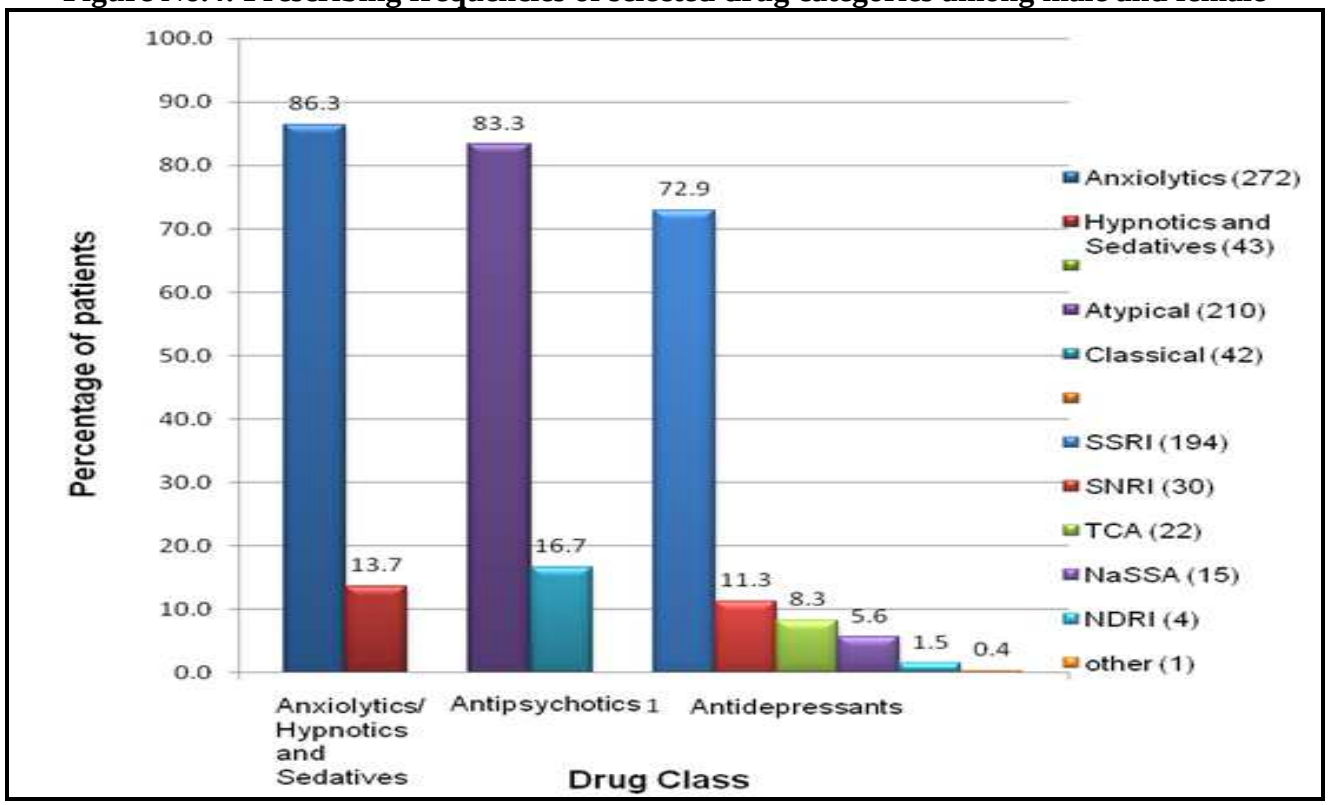

Figure No.5: Prescribing Frequencies among sub-classes of major drug categories

CONCLUSION

1. A total of 518 patients' data were collected during the period and analyzed for WHO recommended prescribing and complementary indicators.
2. Study shows low incidence of polypharmacy which is good aspolypharmacy is common in psychiatry and also use of injections was very low.
3. Study shows that prescribing from WHO List of Essential Medicine was not so good as it accounted for only 21.3%.
4. There is scope for improvement in case of medicines prescribed by generic name as none were prescribed by generic name.
5. The average cost per prescription in our study was only 9.41 Indian rupees per day which is affordable by the majority of the patients.
6. Psycholeptics were the most commonly prescribed class of psychotropic drugs in the present study, of which anxiolytics topped the list.
7. Selective serotonin reuptake inhibitors and atypical antipsychotics were the most frequently prescribed antidepressants and antipsychotics respectively in the present study.
8. No clear trends of differences in prescribing frequency with age and sex were observed in the present study
9. The issue of compliance was not addressed in the present study.

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CONFLICT OF INTEREST

We declare that we have no conflict of interest.

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