Pharmacological intervention is the commonest mode of managing patients with schizophrenia. Both clinicians and patients are concerned that antipsychotic drugs are costly and contribute to poor drug compliance in India. This study compared the equivalent doses of antipsychotic drugs and their costs across brands. Results show that antipsychotic drugs are affordable and are comparable to drug treatment costs of other physical illnesses. However, coprescription of drugs add to the burden. Numerous brands and a 2-2.5 fold difference in cost raises many concerns including that of drug bioavailability. Hence, the authors recommend consensus and formulation of guidelines for the pharmacological management of schizophrenia.

Key Words: Schizophrenia, drug comparability, cost.
DRUG TREATMENT IN SCHIZOPHRENIA

for instance is manufactured by at least 20 companies and marketed under different brand names. Recently risperidone has been introduced by at least 10 companies.

While only 4-5 antipsychotic drugs were available in India in the 1970's (CIMS, 1970), over the last two decades this number has increased to about 12 (Drug Index, 1998). The number of brands available currently for each antipsychotic drug has steadily increased. With the influx of so many brands, it becomes increasingly necessary to examine issues of comparability across different pharmacological agents as well as individual user costs and discuss other issues that influence prescribing and compliance.

MATERIAL AND METHOD

A. Assessment of comparability: Drug equivalents in terms of oral CPZ were tabulated from i) drug company literature - CIMS., Drug Index., and Monthly Index of Medical Sciences (MIMS), ii) the British National Formulary (1998), and iii) review of articles comparing different antipsychotic drugs (Comprehensive Text Book of Psychiatry, Sadock & Kaplan (1995), Psychopharmacology 4th generation, Bloom & Kuffer (1995), and Lehman & Steinwachs, 1998)).

B. Assessment of cost: The prices of some of the commonly used antipsychotic drugs were compiled from the following sources:
1. The Consumers Cooperative Society at the National Institute of Mental Health and Neuro Sciences, Bangalore, where medications are available at a slightly subsidized rate.
2. The cash pharmacy, a government run dispensing unit in Bangalore.

The prices were listed as per the availability of different drug brands.

RESULTS

The drug equivalents of all commonly available oral antipsychotic drugs in terms of CPZ 100 mg are specified in table 1. The equivalent dose of depot neuroleptics are presented in table 2. Table 3 provides the dose equivalence of depot and oral antipsychotic drugs.

The prices of the commonly available oral antipsychotic drugs and the monthly expenditure for maintenance dose of 300 mg CPZ per day compiled in table 1. The cost-index (ratio of highest price to lowest) of each antipsychotic drug across different brands is also depicted in table 1. Table-1 also shows the relative cost of each antipsychotic drug compared to CPZ. Similarly the cost of available depot neuroleptics have been compared against the reference maintenance dose of 300 mg CPZ per day (Table 2).

DISCUSSION

Schizophrenia is one of the commonest disorders seen by practicing psychiatrists. Although schizophrenia affects less than 1% of the US population, the total costs of this severe mental disorder consumes 22% of the costs of all mental illnesses (Zito et al., 1998). Several carefully conducted cost studies have indicated that care in community is generally cheaper than care in a hospital, although none of these studies indicate that it is better (Goldberg, 1991). Cost functions are useful when evaluating, planning or purchasing alternative strategies or modes of care. However, no such studies comparing various drugs nor the models for treating schizophrenia have been carried out in our population. The various antipsychotic drugs that are available have helped significantly in symptom control. However, a surge in the availability of different antipsychotic drugs raises issues of drug choice and dose comparability. The clinicians prescription must be governed as much by the patient's purse as by the patient's need (Channabasavanna, 1996).

A comparison of cost of different antipsychotic drugs show that the monthly cost of maintenance with CPZ (300 mg) is Rs.55/- and that of trifluoperazine is Rs.25/- (the relative cost=0.45, table-1). Newer drugs like risperidone (4 mg/day) and clozapine (200 mg/day) costs as low as Rs.60/- and Rs.225/- per month respectively for the maintenance dose equivalent of CPZ (300 mg/day). In UK, newer
pharmacological therapies for schizophrenia are considerably more costly than previously existing treatments. For example, the approximate average cost for a 30-day treatment with clozapine is £168, for risperidone £112. This compares with less than £30 for haloperidol (Davis and Drummond, 1993).

Prices of antipsychotic drugs have reduced in the last five years. However, there still remains marked price differences across brands. There is an almost 2-2½ fold difference in the price of drugs across various brands. Although partially explained by differing overhead costs across companies, this raises a concern among clinicians about the bioavailability across brands. There is competitiveness across pharmaceutical companies in order to offer the best product at the cheapest rate. To the clinician, this translates to maximum therapeutic efficacy at the minimum cost. Thus, bioavailability is a serious concern while prescribing.

While on the face of it antipsychotic drugs seem 'affordable' the other costs associated with treatment make it more expensive. For example, antiparkinsonian agents are often co-prescribed. Antiparkinsonian agents are often more expensive than the antipsychotic drugs themselves. For example, the monthly cost of trihexyphenydyl (4mg/day) is Rs.20/- to Rs.50/- (Drug Index, 1998). Similarly when antidepressants, anxiolytics, hypnotics and so on are co-prescribed the costs increase.

The problem of cost is not exclusive for schizophrenia. Grossly, it appears that the cost of antipsychotic drugs is comparable to drug treatment costs of chronic physical illnesses such as tuberculosis, hypertension, diabetes and epilepsy.

In summary, we have attempted to provide comparisons across various antipsychotic drugs. Our analysis of cost suggests that most of the antipsychotic drugs are affordable. However, treatment expenditure of comorbidity, side effects,

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**TABLE - 1**

DOSE EQUIVALENTS OF ANTIPSYCHOTIC DRUGS AND THEIR APPROXIMATE COST

| Drug          | CPZ Equ(A) (100 mg/day) | Dose per tab. (mg) (B) | Price per 10 Tab (Rs) (C) | Cost* per month (Rs) (Z) | Cost Index* | Relative Cost** |
|---------------|-------------------------|------------------------|---------------------------|--------------------------|-------------|-----------------|
| Chlorpromazine| 100                     | 100                    | 6-15                      | 55-135                   | 2.5         | 1.0             |
| Haloperidol   | 2-3                     | 10                     | 20-40                     | 35-70                    | 2.0         | 0.8             |
| Trifluoperazine| 5                      | 10                     | 5-10                      | 25-45                    | 1.8         | 0.4             |
| Pimozide      | 1.5                     | 4                      | 20-50                     | 70-170                   | 2.4         | 1.3             |
| Thoridazine   | 100                     | 100                    | 45-50                     | 405-450                  | 1.1         | 7.4             |
| Loxapine      | 10-20                   | 25                     | 70                        | 210                      | -           | 3.8             |
| Flupenthixol  | 3                       | 3                      | 70                        | 610                      | -           | 11.1            |
| Risperidone   | 0.6-1                   | 4                      | 20-500                    | 60-1500                  | 25.0        | 1.1             |
| Clozapine     | 50                      | 100                    | 42-48                     | 225-300**                | 1.3         | 4.1             |

* approximate cost of drugs as per month (Z) equivalent to 300 mg of CPZ/day (Z = 90AxC + 10B)
** maintenance dose of 200 mg/day
* ratio of maximum to minimum cost across brands
** ratio of minimum cost of the antipsychotic drug per month to that of CPZ

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**TABLE - 2**

EQUIVALENT DOES OF DEPOT NEUROLEPTICS

| Drug             | Dosage | CPZ Equiv. (mg/day) | Cost (Rs) per month |
|------------------|--------|---------------------|---------------------|
| Fluphenazine     | 25 mg  | 1000                | 40-60               |
| decanoate        | every 2 weeks |              |                     |
| Haloperidol      | 100 mg | 500                 | 180-210             |
| decanoate        | every 4 weeks |            |                     |
| Flupenthixol     | 40 mg  | 400                 | 300                 |
| decanoate        | every 2 weeks |            |                     |

* maintenance dose equivalent to 300 mg of CPZ per day

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**TABLE - 3**

CONVERSION OF ORAL TO PARENTERAL ANTI-PsyCHOTICS

| Oral dose         | Parenteral dose         |
|-------------------|-------------------------|
| Fluphenazine 10 mg/day | 12.5 mg every 2 weeks |
| Haloperidol 10 mg/day | 100 mg every 4 weeks  |
| Flupenthixol 6 mg/day | 20 mg every 2 weeks  |
and cost of consultation including travel add to the burden. This may in turn influence compliance. The wide variation in cost of different brands of the same drug is also of concern to both prescribers and consumers. The issues raised in the article highlight several concerns and a need for action the most important being formulation of guidelines for pharmacological management of psychoses from an authorized body such as the Indian Psychiatric Society. For example, the Australian Legislative for the first time formulated guidelines including economic evaluation of a drug prior to government approval of new pharmaceutical products in addition to establishing efficacy and safety (Moscarelli, 1998). The cost analysis for the treatment of schizophrenia should include a broad range of direct and indirect outcomes rather than focussing on direct medical cost of the alternative therapies. There should be systematic procedures for monitoring and enforcing guidelines for economic evaluation. The other concerns are: a need for judicious use of co-prescribed drugs, ensuring availability of antipsychotic drugs at least in all districts, and constant monitoring of bioavailability of different antipsychotic brands.

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