A STUDY ON DRUG USE PATTERN USING WHO PRESCRIBING INDICATORS IN IN-PATIENTS OF MEDICINE DEPARTMENT IN A RURAL TERTIARY CARE TEACHING HOSPITAL

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ABSTRACT
Irrational use of drugs is a major health problem whose consequences include ineffective treatment, unnecessary prescription, development of resistance to antibiotics, adverse effects and economic burden to the patients. A study of prescription patterns is an important tool to determine rational drug therapy and maximize utilization of resources. Periodic assessment of the prescribing pattern in a health facility helps to identify specific drug use problems, promote rational drug prescription and helps in implementation of drug procurement policies on drug prescribing practices. The objective of the study was to assess the drug prescribing practice of the physicians using WHO prescribing indicators in tertiary care teaching hospital and to promote rational prescribing. A descriptive and quantitative survey was carried out taking 205 inpatient prescriptions, designed to evaluate the prescribing practice of the physicians for a period of 6 months. Overall 205 patients were encountered in the study in which 116 were male and 89 were female. A total of 1366 drugs were prescribed with a range of 3 to 5 drugs. 67.32% of the prescriptions were with more than 5 drugs. Brand prescription dominated the generic prescription. 57.07% of the total prescriptions were prescribed with antibiotics. 42.44% of the prescriptions were found to be prescribed with no any injectables. Out of 1366 drugs prescribed, 971 (71.03%) were included in National List of Essential Medicine of India 2011. This study revealed that poly-pharmacy and prescription by brand name were common. It is necessary to make doctors aware about the use of drugs and importance of prescribing drugs with their generic names. There is also a need for the development of prescribing guidelines and educational initiatives to encourage the rational and appropriate use of drugs.

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INTRODUCTION
Medicines have an important role in health care delivery and disease prevention [1]. In the present days, irrational drug use is a major health problem. The irrational drug use results in various adverse consequences like ineffective treatment, unnecessary prescription of drugs, development of resistance to antibiotics, adverse drug reactions and economic burden to the patients [2]. However, irrational drug use is prevalent due to irrational prescribing, dispensing and administration of the drugs. Thus, availability and affordability of quality drugs with the rational use is required for effective health care system [1].

Irrational drug use is a global health problem that leads to ineffective and unsafe treatment, prolongation of illness, harm to the patients and higher cost of the drugs. 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, at the lowest cost to them and their community.” [3]. Various studies have been carried out in various countries for assessing the rationality of drug prescribing. The study of the prescribing pattern aims to monitor and evaluate and then recommend modifications in prescribing pattern to make the drug use rational and cost effective [4].

The study of the prescribing pattern is an important tool to promote the rational drug therapy and also to maximize the utilization of available resources [5]. The WHO recommends a set of drug use indicators that is useful for investigating drug use pattern in health care facilities (WHO, 1993). Various studies have been carried out to evaluate the drug use pattern in the primary health care setting using WHO prescribing indicators. However, it is also very essential to evaluate the pattern of drug use in tertiary care setting that provides complex health services.

To improve the overall drug use, especially in developing countries, international agencies like the World Health Organization (WHO) and the International Network for the rational use of drugs (INRUD) are carrying out studies to develop standard drug use indicators [5]. In the present study, we employ the various WHO prescribing to determine the prescribing pattern of the physicians.

The periodic assessment of drug use pattern in a health care facility will help to identify the drug use problem and hence to promote rational drug use and assist policy makers to implement policies on drug prescribing practice in the health care facility [6]. Hence the assessment of drug use pattern is becoming increasingly essential to promote rational drug use in the developing countries [7]. The present study was carried out with the similar aim to identify the drug use pattern and to evaluate the rationality of the prevalent prescribing practices using various WHO prescribing indicators as outlined below:
1. Mean/Average number of drugs prescribed.
2. Percentage of drugs prescribed by generic name.
3. Percentage of prescriptions containing antibiotics.
4. Percentage of prescriptions containing injectables.
5. Percentage of drugs prescribed from the national EDL.

MATERIALS AND METHODS
A descriptive and quantitative survey was conducted for a period of 6 months, from December 2013 to May 2014 in the medicine department of Adichunchanagiri Hospital and Research Center (AH & RC), B.G. Nagara, Mandya dist., Karnataka, India.

Study criteria:
Inclusion criteria:
- Age 18 years and above.
- Inpatients (both sexes) in medicine departments.

Exclusion criteria:
- Inpatients of other specialties.
- Incomplete medical records.
- Pregnant and lactating women

Study procedure
An approval from the institutional ethical committee of AH & RC, B.G.Nagara was obtained prior to the study. Data collection form was prepared by using WHO designed criteria based data collection format which includes patient demographic details and patient medical and medication details. The specific types of data necessary to measure the prescribing indicators were recorded for each patient encountered and entered directly into an ordinary prescribing indicator form. A total of 205 inpatients were enrolled in the study and their prescriptions were studied for the data collection.

Statistical methods
All data were entered into a computer into a computer spreadsheet; Microsoft Excel and double checked before the calculation were done. Computations of drug use pattern were carried out as earlier described. Following literature review, the core prescribing indicators data from this study were compared with those obtained in previous similar studies. The study data were analyzed by using statistics such as average and percentages.
Statistical software
The statistical software namely SPSS 16.0 was used for the analysis of the data and Microsoft Word and Excel were used to generate bar graphs, pie charts and tables.

RESULTS
During the study period, a total of 205 patients were enrolled. Among them, male patients were more (57.07%) than the female patients (42.93%) as shown in fig. 1. A total of 1366 drug products were prescribed. Thus, the average/mean number of drugs per prescription was 6.66 with a range between 3 to 15 drugs. The majority (67.32%) of prescriptions were prescribed with more than 5 drugs as shown in fig. 2.

The brand prescribing dominated (60.91%) the generic prescribing (39.09%) as shown in fig. 3. Out of total 205 prescriptions 117 prescriptions (57.07%) were prescribed with antibiotics. The majority of the prescriptions (31.22%) were found to be prescribed with not a single antibiotic, as shown in figure 4.

As shown in figure 5, the majority of prescriptions (42.44%) was found to be prescribed with no injectables. Out of total 1366 drugs prescribed, majority of the drugs (71.03%) were included in National List of Essential Medicine of India 2011 as shown in figure 6.
Fig 5: Number of injections prescribed (N=205).

Fig 6: Number of drugs from NLEM (N=1366).

Table No 1: Prescribing Indicators (N=205).

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Parameters</th>
<th>Obtained values</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Average number of drugs per prescription</td>
<td>6.66</td>
</tr>
<tr>
<td>2.</td>
<td>Percentage of drugs prescribed by generic name</td>
<td>38.33%</td>
</tr>
<tr>
<td>3.</td>
<td>Percentage of prescriptions with an antibiotic prescribed</td>
<td>57.07%</td>
</tr>
<tr>
<td>4.</td>
<td>Percentage of prescriptions with an injection prescribed</td>
<td>69.26%</td>
</tr>
<tr>
<td>5.</td>
<td>Percentage of drugs prescribed from NLEM</td>
<td>71.03%</td>
</tr>
</tbody>
</table>

Table 2: Comparison of prescribing indicators obtained in current study with other studies.

<table>
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<tbody>
<tr>
<td>Average number of drugs prescribed</td>
<td>6.66</td>
<td>3.4</td>
<td>3.7</td>
<td>9.03</td>
<td>2.97</td>
</tr>
<tr>
<td>% of drugs prescribed by generic name</td>
<td>38.33%</td>
<td>35</td>
<td>48</td>
<td>48.75%</td>
<td>23.6</td>
</tr>
<tr>
<td>% of encounters with an antibiotic prescribed</td>
<td>57.07%</td>
<td>56</td>
<td>54.2</td>
<td>100</td>
<td>20.4</td>
</tr>
<tr>
<td>% of encounters with an injection prescribed</td>
<td>69.26%</td>
<td>-</td>
<td>37</td>
<td>100</td>
<td>17.1</td>
</tr>
<tr>
<td>% of drugs prescribed from EDL</td>
<td>71.03%</td>
<td>-</td>
<td>94</td>
<td>45.71%</td>
<td>80</td>
</tr>
</tbody>
</table>

DISCUSSION

Drug prescriptions form a very important point of contact between the health care provider and the user. A prescription provides an insight into a prescriber’s attitude to the disease being treated and the nature of health care delivery system in the community. WHO developed a core prescribing indicators to determine the drug use pattern in the health care setting. This helps to assess the physicians prescribing pattern and to identify the drug use problem to improve the quality of patient care. The therapeutic success or failure is totally based on the prescribing practices. In this study, the assessment of the different WHO prescribing indicators provided an insight into the prescribing behavior of the physicians in the medicine department of AH & RC.
Number of drugs per encounter
Average number of drugs per encounter is an important index for identifying the poly-pharmacy practice in any healthcare setting. Our study showed that the average number of drugs per encounter was 6.66. Poly-pharmacy is quite common in inpatient setting. This practice results in adverse effects, drug interactions, increased cost of therapy and non-compliance. This indicates that the poly-pharmacy practice should be discouraged to decrease the risk of drug toxicity, reduced patient’s compliance, higher cost of treatment and greater chances of drug interactions.

Generic prescribing
In this study, most of drugs (60.91%) were prescribed by their brand names and only 39.09% were prescribed by their generic names. Prescribing the drugs with their brand name increases the cost of therapy to the patients. Increasing generic prescribing would rationalize the use and reduce the cost of drugs. on the other hand, using generic names also reduces confusion relating to drug names, costs and stock items.

Use of Antibiotics
Appropriate use of antibiotics is necessary to prevent emergence of drug resistant bacteria. The percentage of encounters in which antibiotics were prescribed at AH & RC was 57.07%. This indicates that the antibiotics were used for prophylaxis purpose rather than definitive treatment purpose. It is used more as a blanket therapy to prevent any or all types of infection. This increasing use of antibiotics not only leads to the increased cost of therapy, but also to increased incidence of adverse drug reactions and to the selection of drug resistant bacterial strains. This finding suggests that antibiotic prescribing needs to be regulated. The high percentage of antibiotic prescribed in our study setting can be due to the cultural benefits about antibiotics or the patients’ expectation to receive antibiotics.

Use of Injections
The percentage of encounters in which injections was prescribed at AH & RC was 69.26%. Possible reason for the use of high amount of injectables could be beliefs of patients and physicians about the high efficacy of injections as compared to oral medications and the other reason may be that our study setting is inpatient ward where patients with serious conditions are treated, and injection produces fast onset of action. Injections are expensive as compared to other dosage form and require trained health personnel for their administration. Moreover, the use of injections for the treatment is accompanied with variety of disadvantages like sepsis at administration, local irritation and costly.

Prescribing from the NLEM
In our study, out of 1366 drugs used, 971 drugs were included in National List of Essential Medicine of India, 2011, i.e. 71.03%. Use of the drugs from the essential drug list should be promoted for the optimal use of limited resources, for maximum safety and to satisfy the health care needs of the majority of the population. Selection of the essential drugs should be done based on the changing epidemiological conditions as well as considering the progress in the pharmacological and pharmaceutical knowledge.

CONCLUSION
To conclude, although this study had a small sample size it gave us an overall pattern of drug use profile in medicine departments of AH & RC. The present study revealed that poly-pharmacy and prescription by brand name were common. Use of generic name in the prescriptions needs to be promoted and encouraged. The encouraging data on the choice of drugs from EML can go a long way in creating awareness and application of essential drug concept.

It is thus necessary to make doctors aware about the use of drugs, importance of prescribing drugs with generic names and for patients’ point of view. Also, there is a need for the development of prescribing guidelines and educational initiatives to encourage the rational and appropriate use of drugs. Improvement through continuous education is desired on the part of prescribers to ensure a good standard of care. Drug information services including side effects and drug interactions for professionals and consumers at the hospital are to be promoted. The hospital administration should look into the availability of the essential drugs. Therefore it is advised to conduct such studies in other departments as well, to audit large number of prescriptions and educate the prescribers by means of short-term training sessions on rational drug therapy for benefits and safety to the patient. The prescriptions can then be re-audited to measure the impact of intervention. This will not also help in rationalizing the prescription practices based on the feedback from these studies but also we can compare these practices between different institutions, regions and countries. It is essential to extend this study to other health facilities across the country.

The present study used the WHO prescribing indicators to determine what is prescribed to the patients, but not why. In order to explain the answer of why, other techniques are needed. It is recommended that further research should be carried out in future in the various others departments to explore the prescribing pattern of the drugs that can help to rationalize the drug use in in-patient departments of tertiary care setting.

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AUTHORS’ STATEMENTS
Competing Interests
The authors declare no conflict of interest.

ETHICAL MATTER
The study protocol was approved by the Institutional Review Board and also written informed consent was obtained from all participants before enrolling them in the study.

REFERENCES