Greetings from Manipal to all our readers. IHPA successfully conducted its golden jubilee conference held at Lucknow. At the outset we congratulate IHPA for such a feat. Serving the pharmacy profession for five decades is a monumental achievement itself. In the conference IHPA passed important resolutions. Each and every one of those resolutions are critical issues needing focus and support. First and foremost issue is a creation of directorate of Pharmacy under ministry of Health. This will help our profession to attain its true stature as this directorate can sort out all the pertinent issues connected with our profession. Next important issue is bridging diploma pharmacy and degree level pharmacy and creating clinical pharmacist posts in hospitals are most laudable resolutions of IHPA. Many other important resolutions were also passed in this historic conference. The resolutions are presented in this issue for the readers to understand and think about these issues. All the pharmacy professional colleagues have to support IHPA in this endeavor. These issues when implemented will surely change the profession of pharmacy and take it to higher level with better recognition as an important health care profession.

There are articles pertinent to important issues of our profession. There is an article on the need for medicine information centers in India. The drug information provision is a key component of new generation pharmacy services and establishment of such centers will help young pharmacists. Our profession has to take up newer patient oriented services to become full-fledged patient oriented professionals.

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Research Articles

The Need for Medicine Information Centres in India

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Abstract

In India prescription medicines are sold without prescriptions at most of the retail pharmacies. This leads to the irrational use of medicines. In the urban population, in addition to the above problem, patients habitually consult with many physicians simultaneously which results in polypharmacy. The questionable effectiveness and safety of the numerous combination medicines available in the market further complicates the issue of health care professionals selecting the appropriate medicines. To address these issues, Medicines Information Centres and Medicine Information pharmacists are essential in providing unbiased medicines information to inform health care professionals who can then select the appropriate therapy for patients. To address these issues, Medicines Information Centres and Medicine Information Pharmacists are essential in providing unbiased medicines information to inform health care professionals who can then select the appropriate therapy for patients²,⁷.

The term “Medicine Information” is the provision of written and/or verbal information about medicines and medical therapy in response to a request from other healthcare providers, organizations, committees, patients or the general public. “Medicine Information Services” include the gathering, reviewing, evaluating, indexing, organizing, storing, summarizing and distributing of information about medicines in various forms through various methods in an accurate way. These activities are undertaken by pharmacists to provide information to optimize the use of medicines. “Medicine Information Centre” (MIC) refers to a facility specifically set aside for, and specializing in, the provision of medicine information. “Medicine Information Pharmacist” refers to a pharmacist who has completed a course of training in medicine information²,⁸. The first medicine information centre was established at the University of Kentucky Medical
Centre in North America in 1962. In the U.K., the first MIC was established in 1969 at London Hospital and at the Leeds General Infirmary.2

Each year the number of medicines entering the Indian market makes it difficult for the Drug Control Department as well as medical practitioners to monitor or to keep up-to-date records of all the marketed products. This is due to the limited availability of current medicine literature, poor documentation, and lack of funding.10 The lack of unbiased medicine information services in India is posing problems. Health care professionals rely on medical representatives who could be biased towards their products.3,4,10 An ever-increasing number of medicines as well as an exponential increase in the availability of published literature regarding medicines necessitate the establishment of MICs. The MICs play an integral and necessary role as an information resource and in teaching, research, and continuing education programs.2

Safety and efficacy are the two major concerns about any medicine. While the efficacy of a medicine can be detected with relative ease, the same cannot be said about safety because the adverse effect of a medicine may be uncommon but very serious and many patients may be affected or subjected to a potential risk before the safety of the medicine is established. This gave birth to a new branch of pharmacology called pharmacovigilance. By definition, pharmacovigilance is “the science and activities relating to the detection, assessment, understanding and prevention of adverse effects or any other possible drug-related problems. Recently, its concerns have been widened to include herbals, traditional and complementary medicines, blood products, biologicals, medical devices and vaccines”. An increased capacity to develop and launch new medicines through research has heightened the need of developing adequate Pharmacovigilance to detect adverse drug events (ADEs). Medicine information pharmacists can undertake pharmacovigilance programmes, which are essential to promote efficient monitoring of ADE. At present, the majority of physicians, pharmacists, nurses, students, and patients in India, have very few reliable, accessible sources of up-to-date information on medication. There is an imminent need for information on health and medicines at all the levels of users.1

The Role of Medicines Information Pharmacists

When a query on certain medicines arises with respect to the patient’s therapy, the busy physician does not always find the time to read the available literature. However, the most up-to-date information is needed to make a rational choice of therapy to give the best care possible to the patient. Similarly, when the nurses are in the midst of administering medication, they do not always have access to accurate and recent information on incompatibilities of co-administered medicines, stability of reconstituted fluids, as well as ADEs and precautions that have to be considered.

It is essential to have unbiased information before one can evaluate, prescribe, dispense or administer medication. The medicine information pharmacist knows where and how to obtain the answers to specific queries from the vast amount of medical literature available. They are able to deliver this information in an unbiased, organized, concise form to those who need it.11 A MIC supports health care professionals to make quicker and rational decisions with respect to the prescribing of medicines. The MIC acts as a bridge in the communication network between the wealth of information available and active health professionals.1,2

Conclusion

Medicine Information Centres can provide up-to-date, unbiased, critically evaluated medicines information. Successful MIC implementation is the result of better participation from trained pharmacists, especially in analyzing the quality of scientific publications and the underlying research.12,13 The responsibility of pharmacists to provide medicine information has increased substantially over the years. Several other factors are also stimulating the evolution of the pharmacists’ role as a medicine information provider, including information technology changes, knowledge of medicine therapy, changing philosophies of pharmacy practice, the education of pharmacists, and a more knowledgeable patient.14

The pharmacists of the future have to assume a greater role in the health care delivery system by contributing to the health information infrastructure.15 Pharmacists can become key players in the health care field by contributing to the rational use of medicines at the level of the patient and health care professionals.10,16 Medicines information pharmacists and medicine information services are well established in most developed countries. This is not the case in developing countries like India. This is because of lack of funds, lack of trained pharmacists and irrational prescribing by health care professionals.17 Medicines information pharmacists should set standards of quality for pharmaceutical services in health care settings. This could be possible if medicines information pharmacists and HCPs work together in furthering their common goal for providing quality patient care. This will result in a reduction of patients’ risk for medicines related problems and will improve the quality of prescribing practice by physicians.
References

1. Todd Clark. The Indian Pharmaceutical Marketing. 


Influence of Storage Conditions on the Shelf Life of Norfloxacin Tablets Stored in Hospital and Community Pharmacies in Different Parts of Kerala

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Abstract

**Background:** Stability is defined as the capacity of a drug substance or drug product to remain within established specifications to maintain its identity, strength, quality, and purity throughout the retest or expiration dating periods.

**Objectives:** To determine the influence of storage conditions on the shelf life of Norfloxacin stored in Hospital and Community Pharmacies situated in different parts of Kerala.

**Methods:** Different brands of Norfloxacin tablets were selected for this study. Samples collected from different time intervals were suitably coded and analyzed.

**Results:** The study data show that percentage strength of Norfloxacin was least in samples collected from Cochin (coastal area) compared with those collected from Kozhikode and Kannur.

**Conclusions:** The study identifies the importance of storage conditions of antibiotics in pharmacies for better pharmaceutical care. Hence the regulatory authorities and pharmaceutical organizations should highlight the importance of maintaining good storage conditions in hospital and community pharmacies functioning in state of Kerala.

**Keywords:** Shelf life, Storage, Regions.

Introduction

Pharmacy is the health profession that links the health sciences with the basic sciences; it is committed to ensuring the safe and effective use of medication (Hepler C, Strand L, 1990). Demographic and epidemiologic transitions have imposed demands on health service provision, as have health sector reforms, the challenges of aging populations, disease profiles, the changing pharmaceutical landscape, and new care models created to respond to changing disease patterns. These developments have had an impact on the different sectors of pharmacy. Pharmacy has moved from the historical orientation of product-focused service to patient-centered approaches (Malebona Precious matsoso, 2009).

The mission of pharmacy practice is to provide medications and other healthcare products and services and to help people and society to make the best use of them. All practicing pharmacists are obliged to ensure that the service they provide to every patient is of appropriate quality. Good pharmacy practice is a means of clarifying and meeting that obligation (SQPS, 1993).

Pharmaceutical manufacturers determine a drug’s shelf life or expiration date, through stability testing. This type of testing ensures that a drug’s potency and integrity are intact over a specific amount of time, which becomes the expiration date. Several factors can influence these dates, including type of active ingredients, storage conditions, preservatives and what kind of container the drug will be stored in. It is important to note that the manufacturers’ expiration dates apply only to the original packaging of the drug, and that once opened these dates no longer apply (Monika Bakshi and Saranjit Singh, 2002).

Improper storage of the pharmaceutical products is one the fundamental concerns in patient care. This study emphasizes the importance of proper storage of pharmaceuticals from the time of their movement from manufacturing premises till it reaches the consumers (Praveen Khullar, 2008). The last leg of its journey at wholesale dealer’s premises and retail outlets occupies a sufficiently long period of storage. Pharmaceuticals get exposed to varying temperature and humidity...
conditions during this part of movement, and with the prevailing conditions of the pharmacy outlets in India. Kerala is a tropical region and several places in the state are very hot and/or humid and at times with an intense light. Pharmaceutical products sometimes cannot remain stable in such conditions unless the labeled storage conditions on the products are adhered to. Accordingly, it becomes the duty of everybody in the distribution chain to value the storage conditions. The pharmacist in a pharmacy has the specific responsibility in this regards as the retention time of the product in the establishment is fairly long. This work will act as a guidance document for helping the community pharmacist and hospital pharmacist to recognize the importance of proper storage practices.

Methods and Materials

Different brands of Norfloxacin tablets were collected for this study from hospital and community pharmacies located in different regions of Kerala. Regions selected for study were Kannur, Kozhikode and Ernakulam (Cochin). Main reason for selecting these regions was convenience of collecting samples. Cochin is the largest city in Kerala and is located on the coast. Kozhikode is the capital of Malabar region of Kerala and has largest consumers for pharmaceuticals. Kannur was selected because it was nearest to the study center. The potency of the collected samples was estimated at different time intervals i.e. within six months of the date of manufacturing (Phase-I), after 6 months from date of manufacturing and before 6 months of date of expiry (Phase-II) and within 6 months of date of expiry (Phase-III). Samples collected from these intervals were suitably coded and analyzed (Table 1). Human ethical clearance was obtained from Ethical Committee of Academy of Medical Sciences, Pariyaram Medical College, Kannur (Order No.: B2.9799/04/ACME dated on 19/04/2006). All the analytical evaluations were done using UV spectrophotometric and HPLC method according to Indian Pharmacopoeia (1996) and Quantitative analysis of Drugs in Pharmaceutical formulations by P.D. Sethi (2004).Phys,ical, chemical, and microbiological data were generated as a function of time and storage conditions (e.g., temperature and relative humidity) (Ivanovic Ivanaa. et al., 2006). Pharmaceutical manufacturers determine a drug’s shelf life or expiration date, through stability testing. This type of testing ensures that a drug’s potency and integrity are intact over a specific period of time.

Different brands of Norfloxacin tablets were selected for the present study and selected antibiotic molecules were highly sensitive to temperature as well as humidity. There are more than 40 penicillins in clinical practice today and almost all of them follow the same degradation behavior at the beta – lactam moiety. Potency data of Norfloxacin tablets from different regions of Kerala are shown in Table No. 2. Data showed that percentage strength of Norfloxacin was least in samples collected from Cochin compared with those collected from Kozhikode and Kannur.

Table 2: Potency Data of Norfloxacin 400 mg Tab

<table>
<thead>
<tr>
<th>Sample Time</th>
<th>Sample No.</th>
<th>Kannur [Amt. (%)]</th>
<th>Kozhikode [Amt. (%)]</th>
<th>Cochin [Amt. (%)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIRST (I)</td>
<td>A</td>
<td>426.68 (106.67)</td>
<td>418.56 (104.64)</td>
<td>391.52 (97.88)</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>421.46 (105.37)</td>
<td>420.82 (105.20)</td>
<td>419.76 (104.94)</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>428.17 (107.04)</td>
<td>413.38 (103.35)</td>
<td>412.88 (103.22)</td>
</tr>
<tr>
<td>SECOND (II)</td>
<td>A1</td>
<td>411.13 (102.78)</td>
<td>399.64 (99.91)</td>
<td>401.06 (100.26)</td>
</tr>
<tr>
<td></td>
<td>B1</td>
<td>408.09 (102.02)</td>
<td>413.10 (103.43)</td>
<td>391.13 (97.78)</td>
</tr>
<tr>
<td></td>
<td>C1</td>
<td>03.21 (100.81)</td>
<td>404.29 (101.07)</td>
<td>402.17 (100.54)</td>
</tr>
<tr>
<td>THIRD (III)</td>
<td>A2</td>
<td>390.48 (97.62)</td>
<td>387.16 (96.79)</td>
<td>363.89 (90.97)</td>
</tr>
<tr>
<td></td>
<td>B2</td>
<td>379.21 (94.80)</td>
<td>392.73 (98.18)</td>
<td>372.92 (93.23)</td>
</tr>
<tr>
<td></td>
<td>C2</td>
<td>387.53 (96.88)</td>
<td>389.39 (97.35)</td>
<td>378.06 (94.52)</td>
</tr>
</tbody>
</table>

Table 1: Sample Coded for Analysis

<table>
<thead>
<tr>
<th>Sampling Time</th>
<th>Sample Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>I Phase</td>
<td>A, B, C</td>
</tr>
<tr>
<td>II Phase</td>
<td>A1, B1, C1</td>
</tr>
<tr>
<td>III Phase</td>
<td>A2, B2, C2</td>
</tr>
</tbody>
</table>

Results and Discussion

Shelf life is the capacity of a drug substance or drug product to remain within established specifications to maintain its identity, strength, quality, and purity throughout the retest or expiration dating periods. Physical, chemical, and microbiological data were generated as a function of time and storage conditions (e.g., temperature and relative humidity) (Ivanovic Ivanaa. et al., 2006). Pharmaceutical manufacturers determine a drug’s shelf life or expiration date, through stability testing. This type of testing ensures that a drug’s potency and integrity are intact over a specific period of time.

Different brands of Norfloxacin tablets were selected for the present study and selected antibiotic molecules were highly sensitive to temperature as well as humidity. There are more than 40 penicillins in clinical practice today and almost all of them follow the same degradation behavior at the beta – lactam moiety. Potency data of Norfloxacin tablets from different regions of Kerala are shown in Table No. 2. Data showed that percentage strength of Norfloxacin was least in samples collected from Cochin compared with those collected from Kozhikode and Kannur.
conditioned pharmacies. The pharmaceutical products assay value being observed in warm zone of poorly conditioned outlets exceeded 30°C. The lowest Kinetic temperature of around 25°C while those in conditioned chemist outlets had an acceptable Mean to those with good conditioning facility. Only good with moderate and poor storage facility as compared higher fall in assay was observed in chemist outlets outlets in Delhi and result shows that comparatively short term, on site, quality monitoring studies of four pharmaceutical formulations stored in chemist retail regions. According to R. A. Lowe (2001) 12 10% degradation of drugs was relevant with regards to the effect of temperature conditions. M. Co’rdoba-Borrego. et.al. (1999)13 and M. Co’rdoba-Dí’a. et.al. (1998)14 explained that Norfloxacin was photosensitive and hydroscopic (Ahmed Alnajjar, 2007)15 drug may prolong exposure to direct sunlight results in the formation of different degradeate.

World Health Organization (WHO, 1996) defines the mission of pharmacy practice as “to provide medications and other healthcare products and services and to help people and society to make the best use of them”. According to International of Health Care Research (IHCAR, 2001) the “use of pharmaceutical not only deals with pharmacological issues. The conditions of safe, effective and affordable medicinal drugs of good quality and in the right quantity to the whole population and used rationally and appropriately, should be a priority in health and drug policies”. Evaluation made during the study provides significant evidences that the quality of an antibiotic under the influence of various environmental factors may change with time. Maintaining proper storage conditions at hospital and community pharmacies is essential to reduce such impact caused by environmental factors. The pharmaceutical products were found to retain their potency when stored in pharmacies having good storage facilities. Hence the regulatory authorities and pharmaceutical organizations should highlight the importance of maintaining good storage conditions in hospital and community pharmacies functioning in the study regions of Kerala.

**Conclusion**

Storage of drug products is an important requisite in efficient pharmacy practices. Optimum storage conditions and procedures ensure that the potency and integrity of medicinal products are maintained throughout their shelf life. Chief pharmacist should ensure that the Standard Operating Procedure (SOP) is followed in their pharmacies. Pharmacy staff and other personnel involved in storage must follow the SOP without deviation. Kerala is a tropical region and several places in the state are very hot and/or humid and at times have intense light. In such conditions the antibiotics sometimes cannot remain stable.
unless the labeled storage conditions on the products are adhered to. Accordingly, it becomes the duty of the pharmacist working in hospital and community pharmacy to adhere to the storage conditions.

Acknowledgement
The author thanks staff of Pariyaram Medical College and Sterling drug testing laboratory for providing required facilities to carry out this research work.

References
Clinical Profile and Prescribing Pattern of Diabetes in a Tertiary Care Referral Hospital

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Abstract

Objective: Diabetes is a part of growing epidemic of non communicable disease, expected to present one of the 21st century’s biggest challenge. The objective of the work is to study the clinical profile and prescribing pattern of diabetes in patients attending a tertiary care referral hospital.

Methodology: A non experimental (observational) prospective and cross sectional study was performed in out-patient department of endocrinology, Amrita Institute of Medical Science. 136 patients who satisfy the inclusion and exclusion criteria were included in the study. Informations on demographic variables with pharmacological treatments were compiled by using specially designed standard data collection form.

Result: Majority of the patients belonged to the age group 51-60 years (38.23%). More number of patients from rural area were affected (61.03%). Type II diabetes common among affected patients (73.53%). Majority of them were non vegetarian (79.41%). Positive family history was noted in 68.38% of patients. Most of the patients have irregular exercise (65.44%). Majority of the patients have overweight (44.12%). Oral hypoglycaemic agents were the most commonly used regimen for diabetes (47.79%).

Conclusion: From this study, clinical profile and the prescribing practices for diabetes was identified and found that Oral hypoglycaemic agents were the most commonly prescribed class of drug. Since these class of drugs used for long term treatment, monitoring of their use and its correlation with clinical outcomes and quality of life is essential to assure the best use of health care resources. Therefore patient counselling is needed for raising good standards of living.

Keywords: Clinical profile, Prescribing pattern, Diabetes mellitus.

Introduction

Diabetes is the one of the most common endocrine disorder in India. Population growth, aging, urbanization and increasing prevalence of obesity are some of the root causes of increase in Diabetes burden in the world. As the World Health Organisation reports show that 32 million people have diabetes in the year 2000. The International Diabetes Federation estimates the total number of diabetic subjects to be around 40.9 million in India and this is further set to rise to 69.9 million by the year 2025. Among the diabetes patients more than 90% patients have Type II diabetes. Patients are treated with diet control and moderate exercise but some take antidiabetic drugs or insulin or both. Medication for diabetes mellitus need to be taken for entire life and factors like efficacy, side effect, drug interaction and cost of the therapy need to be taken into consideration.

With this background this study enables to identify clinical profile and most commonly used class of medications in diabetic patients. It helps to improve diabetic patient’s health further.

Methodology

The study was conducted in the out-patient department of endocrinology, Amrita Institute of Medical Sciences, Kochi. It was a non experimental (observational), Prospective and cross sectional study. Diabetic patients under all age groups and who were willing to participate in the study, were included in the study. Pregnant, breast feeding and psychiatric patients were excluded. 136 patients who satisfy these inclusion and exclusion criteria were included in the study. The duration of the study was 6 months.

A standardized data collection form was prepared and necessary data was obtained from Amrita Healthcare Information System (AHIS), and patient treatment chart. The data collection form provides the information regarding demography of the patient. It mainly includes age, sex, area of residence, family history, etc. The clinical data (Type of diabetes, medications etc.) was noted for each patient.
Results

During study around 136 in patients diagnosed with diabetes were studied in detail. It is evident from Table I that in the present study the majority of patients (38.23%) belong to 51-60 years, followed by age group 61-70 years (24.26%). In this study, there were 79 males and 57 females.

Table I: Age and Sex Distribution of Patients in Study Population

<table>
<thead>
<tr>
<th>Age (Years)</th>
<th>Males</th>
<th>Females</th>
<th>Total No.</th>
<th>Total Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-10</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11-20</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>21-30</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>1.75</td>
</tr>
<tr>
<td>31-40</td>
<td>6</td>
<td>7</td>
<td>13</td>
<td>9.56</td>
</tr>
<tr>
<td>41-50</td>
<td>16</td>
<td>10</td>
<td>26</td>
<td>19.13</td>
</tr>
<tr>
<td>51-60</td>
<td>32</td>
<td>20</td>
<td>52</td>
<td>38.23</td>
</tr>
<tr>
<td>61-70</td>
<td>18</td>
<td>15</td>
<td>33</td>
<td>24.26</td>
</tr>
<tr>
<td>71-80</td>
<td>6</td>
<td>4</td>
<td>10</td>
<td>7.35</td>
</tr>
<tr>
<td>&gt;80</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>0.735</td>
</tr>
<tr>
<td>Total</td>
<td>79</td>
<td>57</td>
<td>136</td>
<td>100</td>
</tr>
</tbody>
</table>

Table II shows that 79.41% of the patients having mixed diet and the remaining 20.59% Vegetarians.

Table II: Diet Pattern of Patients in the Sample Population

<table>
<thead>
<tr>
<th>Food Habit</th>
<th>Number of patients</th>
<th>Percentage of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegetarian</td>
<td>28</td>
<td>20.59</td>
</tr>
<tr>
<td>Mixed diet</td>
<td>108</td>
<td>79.41</td>
</tr>
</tbody>
</table>

Figure III shows the family history of the diabetes patients. 68.38% of the patients have positive history of diabetes in the family.

Table III: Physical Activity of the Patients in the Sample Population

<table>
<thead>
<tr>
<th>Physical Activity</th>
<th>Number of Patients</th>
<th>Percentage of Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exercise</td>
<td>47</td>
<td>34.56</td>
</tr>
<tr>
<td>Sedentary</td>
<td>89</td>
<td>65.44</td>
</tr>
</tbody>
</table>
Figure IV shows that (44.12%) of patients having overweight and 15.44% of patients were obese.

**Figure IV: Body Mass Index of the Patients in the Sample Population**

![Bar chart showing percentage of patients in different BMI categories]

Figure V shows type of regimen used in the diabetic population. Majority of patients (47.79%) use OHA followed by insulin (30.15%).

**Figure V: Type of Regimen in the Sample Population**

![Bar chart showing percentage of patients using different regimens]

**Discussion**

The study results are almost consistent with other reports. 136 patients who satisfied the inclusion and exclusion criteria were included in this study.

The present study observed that diabetes is prevalent in 51-60 year old male patients. A retrospective study conducted by Cramer shows that most of the Patients having more than 50 years. Most of the diabetes patients from the rural area. Geok H. Yeo, Mudassis Anwar et.al. conducted a survey based research involving 75 patients. In which 90% of the patients belongs to type II diabetes mellitus. Likewise most of the patient had type II diabetes mellitus. In this study majority of the diabetes patients having mixed diet. A previous study reveals that 95% of the diabetic patients belongs to non vegetarians and 4.85% were vegetarians. Another study found that red meat consumption was positively associated with hyperglycaemia, hyperinsulinemia. The positive family history has major role in diabetes. One of the previous study reveals that 82% patients having positive family history. While regular exercise is also play a major role and it helps to decrease the blood glucose level but most of the patients follow sedentary lifestyle. Other factor which is important for the diabetes patients was body mass index. Increases in the body mass index increase the prevalence of the diabetes. The present study shows that most of the diabetes patients having overweight. Patients managed diabetes with OHA, Insulin and OHA with insulin. In this study, majority of the patients follow OHA followed by insulin. In the previous study the percentage of patient used OHA was high (44%) and insulin (23%).

**Conclusion**

From this study, clinical profile and the prescribing practices for diabetes was identified and found that Oral hypoglycaemic agents were the most commonly prescribed class of drug. These drugs used for long term treatment, monitoring of their use and its correlation with clinical outcomes and quality of life is also essential to assure the best use of health care resources, therefore patient counselling is needed for raising good standards of living.

**Acknowledgement**

We, the authors would like to acknowledge our sincere thanks to the Principal of Amrita School of Pharmacy Dr. Sabita M. and all other teachers and friends who helped us during the research work.

**References**

Abstract

Objectives: To assess the quality of life of Parkinson’s patients on levodopa–carbidopa and entacapone regimens in Indian patients.

Methods: This prospective study included Parkinson's patients attending a Neurology Clinic at a multispecialty hospital in India. Patients already on levodopa were identified and entacapone was introduced into their therapeutic regimes. Quality of life was assessed by administering the Parkinson's disease Questionnaire 39.

Results: A total of 15 patients with Parkinson’s disease were assessed. The mean age of the study population was 69.9 years. Improvement of quality of life, with the introduction of entacapone is mirrored by the Parkinson's Disease Summary Index Scores (PDSI) at baseline, Visit I and Visit II.

Conclusion: Add-on Entacapone to Levodopa therapy improves the quality of life and therapeutic outcome of the Parkinson’s patients of Indian origin.

Keywords: Add-on entacapone; India; Parkinson’s disease; quality of life.

Introduction

As with other chronic neurological diseases, quality of life is an important treatment outcome indicator in Parkinson’s disease. Activities of daily life are affected from the onset but with the progression of disease; physical emotional and socioeconomic aspects of a patient’s life are disturbed, leading to a decrease in the quality of life.1 Levodopa has been the cornerstone for Parkinson’s disease therapy.2 However long term levodopa treatment has been associated with the development of motor fluctuations.3 Entacapone, a catechol-ortho-methyl-transferase inhibitor, when administered along with levodopa, has been found to improve the efficacy of therapy in patients experiencing motor fluctuations.4 The aim of this study was to assess the quality of life of Parkinson’s patients on a levodopa & carbidopa regimen with entacapone as add-on therapy, attending a neurology clinic in India.

Method

The study was a prospective study with duration of six months from June 2008 to December 2008. Male and female Parkinson’s patients, above 40 years of age, attending the Neurology Clinic at a multispecialty hospital in were included.

Patients with severe cognitive impairment, evaluated by using the Mini Mental State Examination (MMSE), were excluded. Entacapone was introduced into the therapeutic regimens of the patients already on levodopa. The Unified Parkinson’s Disease Rating Score (UPDRS) scores were used to quantify the disease stage. These scores were collected from patient treatment charts.

The quality of life of the patients was assessed by administering the Parkinson’s disease Questionnaire - 39 (PDQ – 39). The PDQ – 39 comprises 39 questions divided into 8 dimensions: mobility, activities of daily living, emotional well-being, stigma, social support, cognition. Communication and bodily discomfort. Score for each dimension was calculated as given in literature.3 The dimension score ranges from 0 to 100 in a linear scale, in which zero is the best and 100 is the worst quality of life.3 The questionnaire was administered to the patient at baseline and then at Visit I and Visit II, which were one month and two months from baseline respectively.

Statistical Methods

The differences in the scores from baseline were evaluated statistically by the paired ‘t’ test by using Textra soft winks SDA software package version 7.0.3.
Results

During the study period, 15 patients with Parkinson’s disease were identified assessed. The mean age of the study population was 69.9 years (86.6%) were male and 2(13.33%) were female.

All the patients were stabilized with levodopa for one month before commencement of entacapone. The HY staging for all the patients was stage 3 at baseline, Visit I and Visit II.

The total Parkinson’s Disease Summary Index Score (PDSI) values at baseline was found to be 22.35 ± 14.87. The mean total PDSI score at Visit I and Visit II were 18.64 ± 10.99 and 13.52 ± 9.93 respectively. There was an improvement in the quality of life as indicated by a decrease in the PDSI score at Visit I and Visit II (P ≤ 0.01 vs. baseline).

Table 1 depicts the mean scores of all dimensions for all the three visits, at the first visit, there was a decrease in the scores in all the dimensions, except for emotional well-being (25.24 ± 14.81) which showed a significant increase (P < 0.05) from baseline. Of the other dimensions, mobility; communication, social support and bodily discomfort significantly (P < 0.05) improved, as is evident from the lower scores in each category.

The second visit showed a further improvement in the quality of life. The scores for the eight dimensions are shown in Table 1.

Table 1: Mean scores of the different dimensions of the Parkinson’s disease Questionnaire - 39 scale at baseline, Visit I and Visit II in the study population

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Dimension</th>
<th>Baseline Mean Score (S.D.)</th>
<th>Visit I Mean Score (S.D.)</th>
<th>Visit II Mean Score (S.D.)</th>
<th>Percentage of improvement Baseline Vs Visit I</th>
<th>Baseline Vs Visit II</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Mobility</td>
<td>24 (21.1)</td>
<td>20.5 (18.7)*</td>
<td>15.16 (15.27)*</td>
<td>14.5%</td>
<td>36%</td>
</tr>
<tr>
<td>2.</td>
<td>Activities of Daily Living</td>
<td>19.15 (20.3)</td>
<td>17.49 (22.3)</td>
<td>15.51 (18.29)</td>
<td>8.6%</td>
<td>19%</td>
</tr>
<tr>
<td>3.</td>
<td>Emotional</td>
<td>23.6 (20)</td>
<td>25.24 (14.8)*</td>
<td>18.85 (13.45)</td>
<td>-6.9%</td>
<td>20.12%</td>
</tr>
<tr>
<td>4.</td>
<td>Stigma</td>
<td>20.4 (20.7)</td>
<td>11.6 (14.3)</td>
<td>10.83 (14.26)</td>
<td>43.13%</td>
<td>46.91%</td>
</tr>
<tr>
<td>5.</td>
<td>Social Support</td>
<td>7.2 (23.5)</td>
<td>2.22 (8.61)**</td>
<td>0(0)**</td>
<td>69%</td>
<td>100%</td>
</tr>
<tr>
<td>6.</td>
<td>Cognition</td>
<td>32.9 (18.1)</td>
<td>28.75 (14.1)</td>
<td>22.91 (15.43)</td>
<td>12.6%</td>
<td>30.3%</td>
</tr>
<tr>
<td>7.</td>
<td>Communication</td>
<td>32.21 (25.8)</td>
<td>20.55 (17.2)*</td>
<td>10.52 (12.38)*</td>
<td>36.1%</td>
<td>67%</td>
</tr>
<tr>
<td>8.</td>
<td>Bodily Discomfort</td>
<td>19.43 (12.9)</td>
<td>20.55 (19.1)*</td>
<td>14.43 (16.49)*</td>
<td>-5.7%</td>
<td>25%</td>
</tr>
</tbody>
</table>

* P≤ 0.005, **P ≤ 0.001.

Discussion

It is well known that Parkinson’s disease significantly affects a person’s quality of life. Along with medication, it is essential to assess the quality of life of the patients in order to improve the therapeutic efficacy. Motor fluctuations in Parkinson’s disease cause a fast decline in the quality of life when compared to those without fluctuations. Addition of a catechol-ortho-methyl – transferase inhibitor to levodopa therapy has been found to reduce the fluctuations in patients and thereby improves the quality of life.

The fifteen patients in this study were on levodopa & carbidopa therapy and had entacapone, an inhibitor of catechol-ortho-methyl-transferase, added to their regimen. The study population had a mean age of 69.91 years – further corroborating the fact that Parkinson’s is a disease of old age. As mentioned in literature, this Asian population exhibited a predominance of males (87%) over females.

Studies on the efficacy, safety and tolerability of entacapone as adjunct therapy to levodopa in patients with Parkinson’s disease, have found that there is a significant improvement in the management of the disease and the quality of life.

Conclusion

The results of the present study demonstrated the efficacy of add-on entacapone in decreasing disease severity and improving quality of life of Parkinson’s disease patients.

References


RESOLUTIONS PASSED IN IHPA GOLDCON – 2014
March 1st & 2nd, 2014, Lucknow

(A) NATIONAL ISSUES

1. Creation of the Directorate of Pharmacy Services, Education and Research under the Ministry of Health & Family Welfare, Govt. of India.

2. Bridge Course to Diploma in Pharmacy holder Pharmacists should be started without any further delay to equalize them with B. Pharmacy and Pharmacists may get recommendation for better pay structure and promotional avenues through 7th Central Pay Commission.


4. Creation of the posts of Pharmacists all Health Sub Centers of India.

5. Switching over the uniform Degree Pharmacy syllabus through Pharmacy Council of India.

6. Amendment in rule 71 and 76 of Drugs & Cosmetics Act, 1940 (rules 1945) to have B. Pharmacy as only qualification for competent person and competent technical staff respectively and registered Pharmacist for the grant of wholesale license under rule 64.

7. Amendment in Food Safety & Standard Act, 2011 to establish B. Pharmacy as one of the eligibility for the post of Food Safety Officer (previously called as food Inspector).

8. Amendment in NIPER Act, 1998 to prefer the Master Degree in main Pharmacy stream for appointment in teaching posts.

9. Pharmacy main stream subjects must be added in civil services examinations and CSIR research programs.

10. To Establish Generic Drugs Stores in all District Hospitals of India and granting of new licenses, under Jan Aushadhi Abhiyan of Govt. of India, only to the registered Pharmacists to ensure the physical presence of the qualified person (Pharmacist) and develop professionalism rather than tradership.
(B) UP STATE ISSUES

1. Pharmaceutical Faculty should be established in U.P. Technical University to deal with Pharmaceutical subjects & advise the Vice Chancellor in technical matters of Pharmaceutical Technology. It should be headed by a Professor rank person possessing Master Degree in main Pharmacy Stream.

2. One State Pharmacy Institute should be established in Lucknow under the Ministry of Technical Education and one under Medical Education U.P. Govt., so that Pharmacy Degree and Master Degree Holder Pharmacists may be available for State Drug Industry, R & D, teaching and serving as Clinical Pharmacists in specialized hospitals and working Pharmacists of State may get different type of skill up gradation training & proposed Bridge Course by Pharmacy Council of India.

3. Posts of Pharmacists should be created in all Health Sub Centres of Uttar Pradesh to provide Health Care and effective First-Aid facilities in remote areas.

4. Pay scale of the allopathic Pharmacists working in different departments of Uttar Pradesh should be revised, as granted in Uttara Khand State vide G.O. dated 31-12-2013.

5. U.P. Pharmacy Council Rules 1955 should be amended immediately, so that Pharmacy Degree and Master Degree Holder Pharmacists may also get representation and the council may serve the society in scientific and transparent way.

6. U.P. Pharmacists Service Rules 1980 should be amended to add Pharmacy Degree (B. Pharm.) one of the qualification for appointment as Pharmacist and Director General Medical & Health Services as “Appointing Authority of Pharmacists.”

7. One representative of IHPA should be nominated as Member in State Pharmacy Council and Pharmacy Council of India. Refresher courses should be arranged regularly for Hospital Pharmacists through NRHM to update their technical knowledge and build-up confidence and decision making capacity while dealing with emergency cases.

8. Pharmacy Degree and Master Degree Holder Pharmacists should be appointed as Food Safety Officer (previously named as Food Inspector).

9. Services of young Allopathic Pharmacists (Diploma & Degree holder) should be taken in NRHM run all schemes.

10. Special economic package and concession in taxes would be announced for the Drug Industry of the State, which is most essential for the growth of Drug Industry and make the State self dependent in drug production & quality assurance.

R. A. Gupta
Organizing Secretary GOLDCON – 2014
Vice President IHPA
Mobile No.: +919839027172
E-mail: ihpalko@gmail.com
Lucknow, 01 March, 2014: Inaugural function of the Golden Jubilee Conference of the Indian Hospital Pharmacists Association was held on 1st March, 2014 in Babasaheb Bhimrao Ambedkar Central University, Lucknow. The theme of the conference is Re-Structuring Pharmacy Curricula: Need of Health Sector. Dr. (Mrs.) Madhu Gupta, a well known Social Activist, Member, Legislative Council, Uttar Pradesh and National Secretary Samajwadi Party inaugurated the function by enlightening the lamp & Padam Shree Dr. Nitya Anand (ex-Director CDRI) presided over the function. Dr. B. S. Arora, Director General, Family Welfare Department, UP, Dr. Ajay Sachan, Asst. Drugs Controller General India, Dr. Pradeep Mishra (FIP), Mr. Atul Nasa, President, Indian Pharmaceutical Congress Association (IPCA) and Mr. S. L. Nasa, President, IHPA were guest of Honor.

Addressing the delegates, Chief Guest Dr. Madhu Gupta told that the Pharmacists, Pharmaceutical Scientists and Pharmacy Educationists have done a lot in making the country self-dependent in drug manufacturing and R & D, now have to work hard for making the Uttar Pradesh self-dependent in drug production and quality assurance. She assured the Association to negotiate with UP Chief Minister in this regard.

Dr. B. S. Arora, Director General, Family Welfare, UP told that Pharmacists are integral part of the health team, they are doing good job in providing first aid and management of emergency cases in PHCs & CHCs of the state, even in absence of allopathic doctors and its appreciable that UPTU has redrafted B. Pharmacy course accordingly. It will open door for number of jobs to pharmacy graduates. Pharmacy Council of India should also come forward and redesign the D. Pharm. Course as per need of the rural areas, where Pharmacist has to play a crucial role to deal with patients and accidental cases. In Uttar Pradesh, Hospital Pharmacists are being given the training in logistic and store management regularly.

Dr. Nitya Anand told that Pharmacy course need specialization, even at degree level and re-designing at regular intervals and it should be mandatory to the agencies accountable for this job.

Other invited speakers of the event were Dr. P. K. Halami, Chief Scientist, CFTRI, Mysore, Dr. S. B. Katti, Chief Scientist, CDRI, Dr. Pradeep Mishra (FIP), Atul Nasa (IPCA), Dr. S. R. Sarvdekar (Mumbai), Prof. Meenakshi Bajpai, Director, ITS, Ghaziabad, Dr. Prasad Thota & Dr. Rajiv (PvPI) and Mr. Arvind Gupta (Pharmasynth Formulations) from different facets of Pharmacy and Pharmacists representative are participating in two days event. Prof. Shubhini Saraf co-ordinated the scientific session.

On day-2 Mr. R. A. Gupta (Luchnow) was awarded with Bhojraj Poonjamool National Award for Hospital Pharmacists for his dedicated services as Hospital Pharmacist, clinical work and as state trainer to the Pharmacists of UP. Dr. A. K. Adhikari (Delhi) was conferred with Appreciation Award of IHPA. Award for the winner of Poster Presentation and other activities were distributed by Prof. Meenakshi Bajpai, Prof. Shubhini Saraf, Head Phama. Sciences (BBAU) and Mr. S. M. Kabeer, President, IHPA, UP State,
Br. Main objective of the Conference was to elaborate the potential of the Pharmacy Profession, discussion for amendment in Pharmacy Act, 1948, Education Regulation 1991, Drugs & Cosmetics Act, 1940, Food Safety & Standard Act, 2011, in view of public health and accessibility of quality medicines to all in cheaper rates through Jan Aushadhi Abhiyan and to suggest the State & Central Government for posting the Pharmacists in Health Sub-Centers, as well as to ensure the physical presence of the qualified Pharmacists in all medicine outlets to save the public health.

Pharmacy students of BBD University, BBDNIIT, BBAU & AMITY University performed in the cultural event. More than 700 delegates from various states attended the conference and 170 posters were presented.

R. A. Gupta
Organizing Secretary
IHPA GOLDCON – 2014

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International Researcher
Scholar Honored at USciences’
193rd Founders’
Day Ceremony Philadelphia
Pa, USA (Feb. 25, 2014)

To the applause of the University of the Sciences Community, Harkishan Singh, PhD, Professor Emeritus at Panjab University in India, received an honorary doctor of science degree during the University’s 193rd Founders’ Day ceremony on Thursday, Feb. 20.

“Professor Singh is a world-renowned pharmaceutical academic, researcher, and science historian with more than 50 years of experience,” said University President Helen Giles-Gee, PhD. “His experience and contributions to the science and healthcare industries aligns with the mission and vision of our institution.”

Professor Singh is no stranger to higher academia. He has taught abroad at Banaras Hindu University, University of Saugar, Panjab University in India, and University of London; as well as within the U.S., at University of Maryland and University of Mississippi. Beyond his time in the classroom, Professor Singh has also conducted scientific research in the fields of organic chemistry, medicinal chemistry, and natural products; and his research group has been successful in designing a clinically useful drug: candocuronium iodide, which is a synthetic azasteroid.

He has presented his research at several institutions and conferences across the world, including Harvard School of Medicine and the International Symposium on Molecular Structure in Beijing. Under Professor Singh’s supervision, nearly 50 master and doctoral theses have been completed. Furthermore, he has published 125 original scientific research papers, and obtained 14 patents for his work.

“I am grateful the University has considered me worthy for the honor which has been bestowed upon me,” said Professor Singh. “For students from India, USciences has been an institution of choice for higher pharmaceutical studies. Several of them have returned to India upon graduation and contributed to progress of the pharmaceutical profession and industry.”

Each year, Founders’ Day at USciences recognizes its establishment on Feb. 23, 1821, as Philadelphia College of Pharmacy – the first college of pharmacy in North America, which is now a part of USciences. As part of the ceremony, merit awards were presented to current students and a faculty member, and faculty members were formally installed into their respective endowed positions.
Book Review

Fundamentals of Pharmaceutical Care

Edited by
Dr. N. Udupa and Dr. Anantha Naik Nagappa

Publisher: Prism Books Pvt. Ltd., Bengaluru

Fundamental of pharmaceutical care gives basic information to the working pharmacists who wanted to provide pharmaceutical care to the patients. An overview of the pharmaceutical care process and systematic approach for pharmaceutical care was explained in the introductory chapter.

Legal requirements and Ethics in conduct of pharmacist with various other professionals and other regulatory bodies while providing pharmaceutical care. Role of community pharmacist in case of minor ailments and handling of OTC medications and what are the professional skills required for the pharmacists to provide pharmaceutical care was discussed in different chapters of this book. How to conduct evidence based search while providing pharmaceutical care in current clinical practice with its barriers, counseling skills and basic patient counseling for some of the chronic diseases, Factors and approaches towards understanding of effective communication between health providers and patients and implications and directions for future research have been presented.

Essential components and documentation of pharmaceutical care (different format), Interactions between herbs and allopathic medicines when used concurrently, what it is effect different services rendered by the pharmacists during their practices like patient education providing drug information, ADR reporting and monitoring, Home medication review, therapy management etc. Detailed pharmaceutical care procedure for HIV and Tuberculosis, Some aspects of medicine prices and drug control order, Role of community pharmacist in immunizations and pharmaceutical care to the neonatal, pediatric and geriatrics patients, Assessment of quality of life during pharmaceutical care and also briefly given different methods of pharmacoeconomics in different chapter of this book.

This Book will be useful for the budding pharmacist for practicing pharmaceutical care in community setup.

Dr. Leelavathi D. Acharya
Associate Professor
Department of Pharmacy Practice
Manipal College of Pharmaceutical Sciences
Manipal

Recent Trends in Novel Drug Delivery

A review by Dr. R. Nagaraju
Professor, Institute of Pharmaceutical Technology
Sri Padmavati Mahila Visvavidyalayam
(Women’s University) Tirupati
prof Nagaraju@gmail.com, +919440179194

Development and evaluation of Novel drug delivery systems is a unique aspect and feature of Pharmaceutics and Industrial Pharmacy. At present Novel drug delivery systems have been considered as one of the common subjects in undergraduate and postgraduate curriculum of pharmacy. Novel drug delivery systems including nanopharmaceuticals have become an integral part of research programs (like M.Phil. and Ph.D.) and research projects dealing with drug delivery systems, pharmaceutics, industrial pharmacy, nanotechnology or pharmaceutical technology and biotechnology. There are no many text/reference books available in the area of novel drug delivery systems. The present book edited by Dr. N. Udupa and Dr. Srinivas Mutalik contains many useful chapters pertaining to novel drug delivery. It is a multi-authored book and all the chapters are written by the experts in the area. Various aspects such as introduction, different types, advantages, disadvantages, methods of preparation, applications etc. for different novel drug delivery systems including nanocarriers like Nanoparticulate drug delivery systems, Dendrimers, Hydrogel based drug delivery systems, Lipid based drug delivery systems, Modified release drug delivery systems, Self-Regulated drug delivery systems and Implantable drug delivery systems. The book also aims at giving ideas on the development of novel and targeted drug delivery systems for important diseases such as Colon targeted drug delivery, Novel approaches for brain targeted drug delivery and Targeted drug delivery to cancer. Scale up and regulatory affairs pertaining to novel drug delivery systems are important aspects which help in the large scale production of these systems. Last two chapters Scale-up implications of novel drug delivery systems and Regulatory affairs in the pharmaceutical industry provide insight into these aspects critically. The book is devoid of grammatical, typographical and punctuation errors and is printed and published by a prestigious publishing company (Prism Books Pvt. Ltd.). The book is very useful to undergraduate students, postgraduate students, research scholars, industry professionals and regulatory agencies in the area of novel drug delivery systems.
Authors should submit two hard copies of manuscripts and electronic version of the manuscript in a Compact Disc to the Editor. Authors also encouraged submitting a copy of manuscript to the Editor by electronic mail. Accepted papers will be processed further, if the papers are rejected, the decision will be communicated to the corresponding author but the manuscripts will not be returned.

Preparing a Manuscript
Authors should keep their manuscripts as short as they reasonably can. Manuscripts should be typed double spaced on one side of good quality A4 size paper. Page number should appear in the upper right hand corner of each page, beginning with the title page.

The language of manuscript must be simple and explicit.
Author’s/Co-author’s name or any other identification should not appear anywhere in the body of the manuscript to facilitate blind review.

Articles were accepted under following headings:

- a) Letter to Editor.
- b) Original Research Articles.
- c) Short Communications.
- d) Perspectives (Innovative Teaching Methods, Debates, view points)
- e) Invited Articles.
- f) Case Reports.
- g) Drug Reviews.
- h) Events.
- i) Book Reviews.

Original Research Articles
It should be arranged into the following sections:

1) Title Page,
2) Abstract and Keywords,
3) Introduction,
4) Materials and Methods,
5) Results,
6) Discussion,
7) Acknowledgement,
8) References,
9) Tables,
10) Figures.

The total number of words should not exceed 3200.

Title Page
It should be paginated as page 1 of the paper. It should carry the title, authors’ names and their affiliations, running title, address for correspondence including e-mail address.

Title
Must be informative, specific and short and not exceed 150 characters.

Authors and Affiliations
The names of authors and their appropriate addresses should be given. It should be made clear which address relates to which author.

Address for Correspondence
The corresponding author’s address should be given in the title page. The fax number (if available) may be mentioned. The e-mail ID of the corresponding author or the contact e-mail ID must also be provided.

Abstract and Keywords
Abstract: It must start on a new page carrying the following information: (a) Title (without authors’ names or affiliations), (b) Abstract, (c) Keywords, (d) Running title. It should not exceed 250 words excluding the title and the key words. The abstract must be concise, clear and informative rather than indicative. New and important aspects must be emphasized.

The abstract must be in a structured form consisting of OBJECTIVES, METHODS, RESULTS and CONCLUSIONS briefly explaining what was intended, done, observed and concluded. Authors should state the main conclusions clearly and not in vague statements. The conclusions and recommendations not found in the text of the article should not be given in the abstract.

Introduction
It should start on a new page. Essentially this section must introduce the subject and briefly say how the idea for research originated. Give a concise
background of the study. Do not review literature extensively but provide the most recent work that has a direct bearing on the subject. Justification for research aims and objectives must be clearly mentioned without any ambiguity. The purpose of the study should be stated at the end.

**Material and Methods**

This section should deal with the materials used and the methodology—how the work was carried out. The procedure adopted should be described in sufficient detail to allow the experiment/study to be interpreted and repeated by the readers, if necessary. The number of subjects, the number of groups studied, the study design, sources of drugs with dosage regimen or instruments used, statistical methods and ethical aspects must be mentioned under the section. The methodology—the data collection procedure—must be described in sufficient detail. If a procedure is a commonly used one, giving a reference (previously published) would suffice. If a method is not well known (though previously published) it is better to describe it briefly. Give explicit descriptions of modifications or new methods so that the readers can judge their accuracy, reproducibility and reliability.

**Results**

The results should be stated concisely without comments. It should be presented in logical sequence in the text with appropriate reference to tables and/or figures. The data given in tables or figures should not be repeated in the text. The same data should not be presented in both tabular and graphic forms. Simple data may be given in the text itself instead of figures or tables. Avoid discussions and conclusions in the results section.

**Discussion**

This section should deal with the interpretation, rather than recapitulation of results. It is important to discuss the new and significant observations in the light of previous work. Discuss also the weaknesses or pitfalls in the study. New hypotheses or recommendations can be put forth.

**Acknowledgements**

It should be typed in a new page. Acknowledge only persons who have contributed to the scientific content or provided technical support. Sources of financial support should be mentioned.

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It should begin on a new page. The number of references should normally be restricted to a maximum of 25 for a full paper. Avoid citing abstracts as references.

The list of references should be typed double spaced following the Vancouver style.

Examples are given in Annexure II.

**Tables**

Each table must be self-explanatory and presented in such a way that they are easily understandable without referring to the text. It should be typed with double spacing and numbered consecutively with Arabic numerals. Provide a short descriptive caption above each table with footnotes and/or explanations underneath. The number of observations, subjects and the units of numerical figures must be given. It is also important to mention whether the given values are mean, median, mean±SD or mean±SEM. All significant results must be indicated using asterisks. Appropriate positions for the tables within the text may be indicated.

**Figures**

Each figure must be numbered and a short descriptive caption must be provided. All significant results should be indicated using asterisks. For graphs and flow charts, it is not necessary to submit the photographs.

**Methods**

The format and other requirements are same as that of short communication.

Copyright statement by authors is Annexure – I & Examples of references is Annexure – II and these annexures are available at the URL.

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