Grooming a competent drug information specialist

Sir,

The proliferation of drugs and dosage forms in the pharmaceutical market has led to the need for Drug Information Centers (DICs) to be established in the major hospitals and teaching institutions. Specialized personnel called Drug Information Specialists (DISs) should manage these DICs. A DIS is basically a pharmacist who specializes in the storage, retrieval and dissemination of drug information to all concerned namely, physicians, nurses and patients.

The hospital and clinical pharmacy aspects of the pharmacy profession have gained much popularity and as a result, several institutions have started offering postgraduate courses in these or allied disciplines. Modifications or additions have also been made to the undergraduate pharmacy syllabi to incorporate these aspects. A DIC is an important and essential segment of hospital and clinical pharmacy services and has a direct bearing on patient care. So, a lot needs to be considered as far as pharmacists manning a DIC are concerned.

The responsibilities of a DIS as mentioned by Hassan\(^1\) are

1. Critical selection, evaluation and utilization of the drug literature
2. Providing pharmacotherapeutic information
3. Serving on the pharmacy and therapeutics committee
4. Contribution to drug literature through appropriate participation in research activities which include but are not restricted to pre-clinical and clinical drug studies, surveillance of clinical drug experiences in his/her institution and experimentation in professional services.

We wish to propose the following points for consideration in policy-making vis-à-vis the selection, training and evaluation of pharmacists as DISs in the DICs:

**Designation**

*Drug Information Specialist (DIS)*

**DIS (Pharmacology)**

**DIS (General)**

**Job description**

**DIS (Pharmacology)**

He/she will respond to the queries on the pharmacological and toxicological aspects of drugs (e.g. mode of action, adverse drug reactions and drug interactions).

**DIS (General)**

He/she will answer the queries on aspects related to the dosage form (e.g. therapeutic incompatibilities and dosage schedule).

**Qualifications** (eligibility for training)

**DIS (Pharmacology):** M. Pharm. (Pharmacology)

**DIS (General):** M. Pharm. (Hospital Pharmacy/ Clinical Pharmacy/ Pharmacy Practice)

**Training**

The training methodology will include lectures, seminars, hospital ward rounds and interaction with the medical and nursing staff on therapeutic modalities and an apprenticeship under a qualified DIS.

They must be made to go through a set of intensive courses in the desired subjects which are not covered in their postgraduation syllabi at the advanced levels.

**These courses can include**

For **DIS (Pharmacology)**

1. Clinical pharmacology and pharmacokinetics
2. Drug interactions with drugs, food and various pathological and biochemical tests
3. Basic management of drug toxicity

For **DIS (General)**

1. Applied human anatomy, physiology and biochemistry
2. Basic clinical pharmacology

**Common to both DISs**

1. Communication with the general public
2. Applied patient psychology
3. Efficient, time-saving and speedy retrieval of information from various drug databases (online and CD-ROMs).

**Trainers**

Medical and pharmaceutical specialists (including serving DISs) along with computer applications specialists will be the trainers. The training will be imparted for a minimum of six months.

Training in advanced computer skills including management and utilization of databases will be imparted by computer applications specialists.

**Learning resources**\(^2\)

The learning resources can be broadly categorized into printed texts and CD-ROMs as mentioned in Table 1.

**Evaluation of DISs**

The training of the trainee DISs should be evaluated on the basis of objective type theory papers in each topic as well as
on performance in the hospital rounds and a real-time drug information session with a client at a DIC. A standard questionnaire carrying subject-specific questions about the overall functioning and handling of a DIC should also be formulated. The trainees may be evaluated by awarding marks on the basis of performance. A minimum percentage of marks (say, not less than 70%) may be made mandatory and those who fail to achieve the same may be given two chances with a gap of one month and inducted into the DIC only after satisfying these criteria.

**On-the-job training**

It must not be forgotten that learning is a lifelong process and while dealing with clinical situations, it is absolutely important to keep one’s knowledge updated. Hence, the DISs must be made to undergo continuing education programs for a minimum number of hours say, fifty hours a year.
After every five years in the service, their knowledge/progress may be reassessed and only those who qualify must be allowed to continue in the DIC cadre otherwise they may be seconded to teaching or industrial institutions depending on their aptitude.

Benefits

- Critical selection, evaluation and utilization of the drug literature is possible.
- Medical and non-medical personnel/academicians can get unbiased information on drugs in an efficient manner.
- Pharmacy and therapeutics committees can be better served by trained DISs.
- DISs can contribute to drug literature through appropriate participation in research activities, e.g. clinical and preclinical drug studies, monitoring of clinical drug experiences.

Conclusion

A judicious and rational approach is the need of the hour in order to groom DISs to provide specific drug information.

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References


Is oestrogen a ‘biological neuroprotective’?

Sir,

The present article outlines two interesting observations related to schizophrenia research:

A. The biological ‘sex bias’ i.e. males usually develop the illness early,1 sustain a more vulnerable course and often have poorer prognosis than females.2 On the other hand, females develop the illness during their lifetime when the serum estrogen level is low, for example at a particular phase of the menstrual cycle,3 after childbirth4 and after menopause.5

B. Despite equal exposure to birth-related complications male babies are more vulnerable to schizophrenia than females.6

Therefore, it would be appropriate to surmise that females are blessed with some ‘biological boon’ which is absent in males. Researchers have studied many factors (genetic, anatomical, epidemiological, socio-cultural and biological) that could be involved in such male-female heterogeneity in the schizophrenic population. This article emphasizes the possible role of estrogen as a biological variable in the pathophysiology of schizophrenia.

Estrogen is known to influence the pathophysiology of several diseases including psychiatric illnesses through its nuclear receptor gene expression. Genetic studies of estrogen metabolism show that estrogen is responsible for breast, endometrial and colorectal cancers, polycystic ovarian disease (PCOD), Parkinson’s disease, alcoholism and schizophrenia.7

Studies have also shown the symptom-alleviating roles of oral estrogen therapy in postmenopausal females,8 of transdermal estrogen in puerperal psychosis9 and female schizophrenics,10 and of estrogen-progesterone combined pills in schizophrenic females having PCOD11 and premenstrual tension.12

Many studies have shown that the level of serum estrogen has got a strong correlation with cognitive function, especially global cognition, verbal, spatial deceleration, memory and perceptual motor speech. Further, higher estrogen levels in female schizophrenics are associated with better cognitive ability.13

While evaluating the molecular process of such benefits of estrogen in the brain, it has been observed that estrogen prevents toxin-related neuronal degenerations, maintains normal neuronal growth and thus may have tremendous implications in alcoholism, Alzheimer’s disease, mood disorders and schizophrenia.14 It has also been found that estrogen prevents several neurodegenerative processes by virtue of its nuclear receptor-mediated-alteration of estrogen-responsive-gene-expression that modulates the rate of apoptosis, axonal degeneration and offers a generalized support to the neurons.15

A recent study has found that synthetic conjugated estrogens exert some neuroprotective effects in the brain and prevent the insult related to Alzheimer’s disease.16 Another study has shown that estrogen also protects retinal ganglionic cell lines from ischemia-induced-damage observed especially in sickle cell disease and diabetes-induced retinopathies.17 Moreover, it is also seen that estrogen has a potent antioxidant effect as it moderates the potency of superoxide dismutase (an antioxidant enzyme) in the circulating monocytes and reduces the amount of free radicals.18 Therefore, it can be inferred that estrogen physiologically confers a neuroprotective effect on the female brain due to its biological abundance.

Detailed studies on the pathophysiology of schizophrenia hypothesize excessive dopaminergic activity in the mesolimbic and mesocortical regions of the brain along with other neurotransmitters, like serotonin and GABA.19 In this context, a large number of studies have shown that estrogen has modulating roles on dopamine and serotonin receptors in the relevant part of the brain affected in schizophrenia. In support of such postulations and to understand the molecular mechanisms of estrogenic action at the cerebral neurotransmitter level the following animal studies have been reviewed.

Studies on animal models have shown that estrogen is a potent dopamine receptor blocker, especially D1 and D2.20 A few studies had also mentioned that estrogen is a potent GABA-A receptor manipulator and thus reduces the load of tardive dyskinesia due to antipsychotic drugs.20 A series of studies have documented that apart from dopamine and GABA, estrogen can also block serotonin receptors, especially 5-HT1A and 5-HT2A.21-25

One study has shown that progesterone also expresses D5
receptors in the atrial natriuretic peptide neurons in the hypothalamus although the effect is less potent than estrogen.46 The authors mention that there might be a possibility that progesterone could enhance the effect of estrogen46 and thus it could lead to an estrogen-progesterone combination therapy in schizophrenia!

It is possible to infer that estrogen is a natural neuroprotectant and by blocking dopamine and serotonin neuroreceptors in the brain, probably acts in a manner similar to neuroleptics, which are either purely dopamine blockers (e.g. chlorpromazine, haloperidol and clozapine) or dopamine plus serotonin blockers (e.g. risperidone). Estrogen is thus better called a schizophroprotectant, as it not only prevents the development of schizophrenia but also improves the external psychological functioning in the patients. Although a large body of studies has substantiated this view, it needs to be tested further on a large sample of first-onset drug-naive female schizophrenics (preferably post-menopausal) using an inter-disciplinary program.

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References


Srir.

Herbal medicines are the oldest remedies known to mankind. Herbs had been used by all cultures throughout history but India has one of the oldest, richest and most diverse cultural living traditions associated with the use of medicinal plants.1 In the present scenario, the demand for herbal products is growing exponentially throughout the world and major pharmaceutical companies are currently conducting extensive research on plant materials for their potential medicinal value. In many journals, national and international, we find an increasing number of research publications based on herbal drugs. Many analysis-based studies regarding pharmacological research in India have been conducted in the past. Out of these, one study has shown an upward trend in indigenous drug research but there are only few studies on the exclusive analysis of herbal drug research in India. Therefore, the present study was undertaken to analyze the recent trends of herbal drug research in India keeping the Indian Journal of Pharmacology as a marker. The issues of the Indian Journal of Pharmacology from 1995 to August 2003 were reviewed manually in the central library of Govt. Medical College, Jamunu, and the Herbal Drug Research Trend Index (HDRTI) was worked out for presentations at IPS conferences as well as for paper
publications in the Indian Journal of Pharmacology. Abstracts of the annual IPS conferences and articles (full communications/short communications/letters/correspondence) published in the Indian Journal of Pharmacology were reviewed in the present study. HDRTI was worked out as a three-year average percentile of herbal drug research for both the parameters respectively. For this, yearly data were collected first and then a three-year average percentage of herbal drug research for the parameters was calculated for the years (1995-1997), (1998-2000) and (2001 to August 2003) by dividing the total percentage for three-year herbal drug research by number of years.

Herbal medicines form a major part of remedies in traditional medical systems such as Ayurveda, Rasa Sidha, Unani, and Naturopathy. Hence all animal and clinical studies on herbal medicines were reviewed. The data for the years 1981-1983 were taken as baseline for the comparison of recent herbal drug research trends.

The present study showed that interest has increased in herbal drug research in India, which supported the findings of Adithan (1996), with maximum utilization of the phytotherapeutic approach wherein crude plant preparations were used. The maximum work was observed with polyherbal preparations.

The results are shown in Table 1.

**Presentations at IPS conferences**

The study revealed a steady increase in HDRTI of presentations at IPS conferences from 21.2% (1995-1997), and 21.8% (1998-2000) to a maximum of 27.6% (2001-August-2003), which was 32.3% more as compared with the baseline HDRTI.

**Research publications in IJP**

The HDRTI of research publications in the Indian Journal of Pharmacology increased from 22% (1995-1997), and 22.6% (1998-2000) to a maximum of 26.2% (2001-August-2003) which in comparison to the baseline HDRTI recorded a 58.9% increase.

This inclination seems to be a result of people all over the world looking to various alternative systems of medicine, especially herbal drugs which are claimed to be safe, equally effective in comparison to allopathic drugs and which provide some answer to chronic diseases. Secondly, either these herbal drugs are marketed with exaggerated claims or in some cases are credited with innumerable pharmacological activities which are not mentioned in the text of various traditional systems of medicine. Thirdly, if we compare the strength and weaknesses of herbal medicines with those of modern medicines we find that herbal medicines have a strong traditional or conceptual base and the potential to be useful as drugs in terms of safety and effectiveness but they lack an experimental base and therefore have second class status whereas modern medicines have a very strong experimental basis for their use but are potentially toxic. Thus, it seems, to get a new class of drugs, the researchers are increasingly blending the traditional knowledge with modern experimental methodology for testing the efficacy and safety of herbal drugs. Hence, it is for the readers to decide whether this shift of focus in research interests from allopathic to herbal drugs is desirable for better health care of mankind or not.

In conclusion, the present study revealed an upward trend of herbal drug research in India over the last ten years.

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**References**


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<thead>
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<th>Table 1</th>
<th>Herbal drug research trend index (%) (Average three-years percentile of herbal drug research)</th>
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</thead>
<tbody>
<tr>
<td>Years</td>
<td>Presentations at IPS conferences</td>
</tr>
<tr>
<td>1981-1983</td>
<td>18.7</td>
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<tr>
<td>1995-1997</td>
<td>21.2</td>
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<tr>
<td>1998-2000</td>
<td>21.8</td>
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<tr>
<td>2001-Aug-2003</td>
<td>27.6</td>
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- The data are expressed as percentages
- All clinical and animal studies of herbal drugs were included in this analysis
- The data for the years 1981-1983 were used as baseline for comparison