ROLE OF UNDERGRADUATE CLINICAL PHARMACOLOGY TEACHING IN RATIONAL PRESCRIBING: AN INTERNEE’S PERCEPTION

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ABSTRACT: BACKGROUND AND OBJECTIVES: Rational prescribing of drugs and good clinical practice are the most important factors which prepares an intern to be an efficient doctor. This can be expected only if an intern’s clinical pharmacology knowledge is adequate. The aim of the study was to assess the clinical pharmacology (CP) knowledge of an intern and to know how far he is equipped to prescribe the drug rationally. METHODS: All the internees of Sri Siddhartha medical college were administered with a semi structured questionnaire. The questionnaire sought information about demographics, undergraduate CP teaching, experiences of adverse drug reaction and drug interaction and confidence in drug prescription. Suggestions regarding improving undergraduate CP teaching were also enlisted. RESULTS: It was observed that out of 66 subjects recruited only 46(70%) possessed average knowledge about clinical pharmacology and 41(62.1%) disagreed that undergraduate CP teaching had equipped them to prescribe. Internes were comfortable in prescribing certain drugs like antacids and antiulcer drugs 63(95.5%), laxatives 51(77.3%), and vitamins and minerals 59(89.4%) without supervision. However majority of them lacked confidence of prescribing to special groups like pediatric, geriatric and patients with liver and renal disorder. CONCLUSION: This study demonstrated that internees lacked confidence in prescribing for special groups. Hence there is a need to vigorously train them in clinical pharmacology during their graduation.

KEY WORDS: Internees; clinical pharmacology teaching; rational prescribing.

INTRODUCTION: Internship is the period when medical students consolidate the patho-physiology, clinical pharmacology and therapeutic knowledge to prescribe drugs. In our current medical education system in India, students need to undergo a compulsory rotatory residential internship (CRRI) after their final year. They are exposed to duties and patient care responsibilities during this period, focusing more on hands on experience. Application of the knowledge of pathophysiology and pharmacology gained during their earlier years is quintessential for patient care especially for rational drug use and prescription [1]. A gap in application of the theoretical knowledge is considered to be one of the reasons for occurrence of adverse drug reaction (ADR) among patients. Prescribing errors are most common during internship due to various attributes focusing on lack of experience and shifting of priorities [2] resulting in harm to patients [3]. These errors occur not only in developing nations like India [4] but also in developed countries like United States, United Kingdom and Australia [5-7]. One of the major factors for these prescribing errors is limited exposure to undergraduate clinical pharmacology teaching (CPT) which may be due to teacher related or curriculum related factors [8]. With health care and drug treatment becoming more complex by the day and people diagnosed with multiple problems needing multiple drug use, the magnitude, frequency and severity of ADR is also expected to increase. A sound...
surveillance system for ADR may help us to understand and manage this problem. This is possible only by enhancing knowledge levels of doctors with respect to rational drug prescribing and ADR reporting. Enhancement of knowledge would be possible and meaningful if there is prior evidence of the existing level and extent of knowledge of the internees/doctors with respect to ADR reporting and clinical pharmacology. This will help us plan and define the educational content, levels of knowledge enhancement and test the efficacy of educational interventions. Hence this study was conducted among the internees with the objective of assessing the perceptions regarding clinical pharmacology teaching during the under graduation and practices of ADR reporting.

METHODOLOGY: The present study was a cross sectional study conducted at Sri Siddhartha Medical College, Tumkur involving 66 internees. This was started after obtaining prior permission from institutional authorities and ethical committee.

All internees who had completed at least 6 months of internship and who were willing to participate in the study were included assuming that they would have been exposed to sufficient clinical case load and prescription. This might give some experience w.r.t to application of clinical pharmacology and also exposure to ADR.

Complete enumeration of all the 66 internees as study subjects during the study duration was done. A pre-tested semi-structured questionnaire was designed and developed to collect information with respect to demographics, undergraduate CPT and their opinion about CPT and its application in internship.

Self reported knowledge levels w.r.t to clinical pharmacology was assessed. Nine questions were related to clinical pharmacology training and scored from 1 to 5 (Likert scale) for each item. Nine questions were related to ADR and scored (“1” for yes, “2” for no and “0” for didn’t know) for each item and three questions related to confidence of prescribing.

All the subjects were explained regarding the study purpose and instructions for completing the questionnaire. After obtaining the consent from the study subjects, duly filled questionnaire were collected within 1 Hour. Qualitative data like gender, educational status and CPT, knowledge regarding Clinical Pharmacology, attitude towards safe prescribing and safety of a drug were expressed in frequency and percentages. Data was analyzed using SPSS Version 20.

RESULTS: Among the 66 subjects recruited in this study, males were 41 (62.1%) and females 25 (37.9%). Majority of them were in the age group of 22-25 (84.8%). All the internees were graduated from Sri Siddhartha Medical College, Tumkur and Response rate was 100%.

<table>
<thead>
<tr>
<th>Grading of knowledge</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Poor</td>
<td>4</td>
<td>6.1</td>
</tr>
<tr>
<td>Poor</td>
<td>12</td>
<td>18.2</td>
</tr>
<tr>
<td>Average</td>
<td>46</td>
<td>69.7</td>
</tr>
<tr>
<td>Good</td>
<td>4</td>
<td>6.1</td>
</tr>
<tr>
<td>Total</td>
<td>66</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 1: Self reported knowledge levels by internees: regarding Clinical Pharmacology
It was interesting to observe that nearly 70% of the internees reported that they possessed average knowledge levels with regards to clinical pharmacology and around 24% reported poor knowledge or even lesser. (Table 1). Since it is a subjective perception of each individual, it may not be an exact reflection of the training need.

As shown in Table 2, 42 (63.6%) of the subjects witnessed ADR during their internship.

It was observed that 38 (58.5%) of internees reported that ADR's witnessed by them had resulted in hospitalisation, 27.3% opined that ADR had resulted in prolongation of hospital stay and 3% told ADR had resulted in death.

Most important is 38 (58.5%) felt that ADR was avoidable and 36.4% felt it was predictable.

<table>
<thead>
<tr>
<th>Items (n=66)</th>
<th>Yes</th>
<th>No</th>
<th>Don't know/Did not answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Witnessed ADR during internship</td>
<td>42 (63.6)</td>
<td>23 (34.8)</td>
<td>1 (1.5)</td>
</tr>
<tr>
<td>• ADR resulted in hospitalisation</td>
<td>32 (48.5)</td>
<td>18 (27.3)</td>
<td>16 (24.2)</td>
</tr>
<tr>
<td>• ADR resulted in prolongation of stay</td>
<td>18 (27.3)</td>
<td>24 (36.4)</td>
<td>24 (36.4)</td>
</tr>
<tr>
<td>• ADR resulted in morbidity/disability</td>
<td>6 (9.1)</td>
<td>29 (43.9)</td>
<td>6 (9.1)</td>
</tr>
<tr>
<td>• ADR resulted in death</td>
<td>2 (3.0)</td>
<td>31 (47.0)</td>
<td>2 (3.0)</td>
</tr>
<tr>
<td>Felt that ADR was avoidable</td>
<td>38 (58.5)</td>
<td>5 (7.7)</td>
<td>22 (33.8)</td>
</tr>
<tr>
<td>Felt that ADR was predictable</td>
<td>24 (36.4)</td>
<td>20 (30.3)</td>
<td>22 (33.3)</td>
</tr>
<tr>
<td>Felt that ADR was unpredictable</td>
<td>19 (28.8)</td>
<td>18 (27.3)</td>
<td>29 (43.9)</td>
</tr>
<tr>
<td>Felt that Improved training could have prevented ADR</td>
<td>33 (50.0)</td>
<td>7 (10.6)</td>
<td>26 (39.4)</td>
</tr>
<tr>
<td>Have been taught how to avoid ADR in UG</td>
<td>23 (34.8)</td>
<td>29 (44.0)</td>
<td>14 (21.2)</td>
</tr>
<tr>
<td>Have been taught how to avoid ADR in Internship</td>
<td>31 (46.2)</td>
<td>19 (28.8)</td>
<td>13 (19.7)</td>
</tr>
<tr>
<td>Aware that ADR has to be reported</td>
<td>45 (68.2)</td>
<td>14 (21.2)</td>
<td>7 (10.6)</td>
</tr>
<tr>
<td>Reported ADR ever</td>
<td>19 (28.8)</td>
<td>32 (48.5)</td>
<td>11 (16.7)</td>
</tr>
</tbody>
</table>

Table 2: Adverse Drug Reaction: Experience of study subjects
The attitude of internees towards CP training in prescribing as shown in table 3 indicates that they disagreed with the fact that undergraduate training had equipped them to prescribe in 62.1% to prescribe safely in 71.2% and to prescribe rationally in 60.6%. The other factors which affected their ability to prescribe was lack of confidence (49.4%), lack of experience (78.8%) and need for supervision (50%). Safety and efficacy was considered as criteria for prescribing drugs in 95.4% and 69.7%. Cost effectiveness was considered in 63.7%. The knowledge about antidotes in over dosage were known only to 31.8% and drugs of medical emergencies in 39.4%.

Internees encountered specific problems during prescribing especially with certain drugs like antihypertensive and anti-arrhythmic drugs (59.1%), and to some extent with brand names, dosages of drugs and anti-diabetics. Lack of confidence was observed in prescribing to special groups like renal and liver diseases (95.5%), pediatric patients (92.4%), elderly patients (84.8%), and pregnancy (72%).

Majority of the internees were comfortable in prescribing without supervision with antacids and antiulcer drugs (95.5%), laxatives (77.3%), antihistamines (83.3%), NSAIDs (81.8%), antiemetic (81.8%), Antimicrobial agents (AMAs) (48.5%), and vitamins and minerals (89.4%). However they were reluctant in prescribing without supervision with the remaining group of drugs as shown in table 3.

**DISCUSSION:** The present study was conducted to assess the internee’s perception regarding clinical pharmacology teaching in their undergraduate curriculum. Sufficient training regarding this will help the medical graduates in prescribing rationally and safely. Of the 66 internees recruited in this study the clinical pharmacology knowledge was average indicating adequate undergraduate CP teaching. But this can be upgraded by incorporating more problem based learning, prescription writing especially in special populations, multiple choice questions, extended questions etc. (8)

Although Significant number of internees were aware of the need to report ADR but they lacked the knowledge of how to avoid ADR during under graduation or internship which is similar to other study (3). CP teaching is not just preparing a medical graduate to become a good doctor but also to train them in improving patient safety. This can be done by integrated clinical program or a separate structured format or both. (9). Confidence of internees in prescribing for special groups was low. (10)

Clinical pharmacologist play a crucial role in the development of prescribing skills by teaching clinical pharmacology to medical students making them more competent. It is also important that what the internee does when he is independent of clinical practice. This can be improved by inclusion of bed side clinics during under graduate curriculum (11) Majority of them felt that Undergraduate teaching was not adequate to prescribe rationally and safely which is similar.

<table>
<thead>
<tr>
<th></th>
<th>Cost effectiveness is most important criteria of prescribing drugs</th>
<th>15 (22.7)</th>
<th>27 (40.9)</th>
<th>10 (15.2)</th>
<th>11 (16.7)</th>
<th>3 (4.5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>Do you have enough knowledge about antidotes in drug over dosage</td>
<td>1 (1.5)</td>
<td>20 (30.3)</td>
<td>15 (22.7)</td>
<td>23 (34.8)</td>
<td>7 (10.6)</td>
</tr>
<tr>
<td>22</td>
<td>Do you have enough knowledge about drugs used in medical emergencies</td>
<td>2 (3.0)</td>
<td>24 (36.4)</td>
<td>23 (34.8)</td>
<td>11 (16.7)</td>
<td>6 (9.1)</td>
</tr>
</tbody>
</table>

Table 3: Distribution of responses to attitude assessment towards Drug prescription
to another study conducted among first year post graduate students in India. (12) Poor prescribing ability of an internee can be assessed by extended structural clinical examinations (WUSCEs) and the domain in which they are lacking can be identified and targeted applied teaching can be adopted. (13) Introduction of Clinical pharmacology in 4th year can also help in improving knowledge and learning of all medical students. (14)

Many internees opined for the need of a crash course in clinical pharmacology just before starting their internship training. (15)

Prescribing error are human errors and cannot be attributed to poor CP teaching. This can be prevented at different levels like nursing staff reviewing medication before administering (16) and Pharmacists before dispensing (17). Guidelines and drug information must be readily available for prescribers like handbook of medicines stressing on risk groups and common problems. (18) Medication errors can also be prevented using information technology systems like electronic medicines re-cannulation, automated transcription, bar coding of medicines.

Although most of the exercises required for rational prescribing are dealt during their pharmacology training, the critical nature of this is not understood as their focus is more on examinations only. They tend to realize only when they start their internship training program.hence are of the opinion that all these extended teaching should be included in final year.large number of internees should be included in the study to get better opinion and can be incorporated in the curriculum which is suitable for all the first to contact doctors.

REFERENCES:


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