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The Attitude of Medical Students of Tabriz University of Medical Sciences towards the Necessity of Clinical Pharmacology

Background: At the present time, teaching pharmacology for medical students mainly focuses on the basic principles of pharmacology. This study was conducted to assess the current situation of pharmacology teaching and the necessity of developing clinical pharmacology from the viewpoint of medical interns and externs in Tabriz University of Medical Sciences.

Methods: This descriptive cross-sectional study was conducted in 2009 on extern and intern medical students of Tabriz University of Medical Sciences. The subjects were a convenience sample of students. Each participant filled out a questionnaire and the data was analyzed by SPSS-16 software.

Results: The mean obtained from students' viewpoints toward necessity of clinical pharmacology was 90 percent. The proper time section was provided during the internship training or at the end of the externship period. At present, the students' satisfaction on teaching pharmaceutical dosage forms were approximately 30%, prescribing writing skills were 17% and teaching important drug interactions were 35%. The suitable contents of clinical pharmacology from the viewpoint of students were teaching the pharmaceutical dosage forms and their correct usages, important drug interactions and good prescription writing skills. Between the two groups of students, the satisfaction rate did not show any significant statistical difference except for the proper time section and teaching pharmaceutical dosage forms.

Conclusions: Regarding the results, it seems that clinical pharmacology is a necessary course for medical students prior to starting their clinical training in the hospital wards.

Keywords: Pharmacology; Clinical Pharmacology, Clinical Clerkship, Internship, General Practitioner

دراسة نظره طلاب المرحلة السريرية في كلية الطب في تبريز تجاه ايجاد وحدة تعليمية سريرية في مجال الفارماكولوجيا

التوصيف و الهدف: يتم التدريس الفعلي في مادة الفارماكولوجيا على نسط الاسس العلمية في هذه المادة و قد يكون من الضروري ان يتم تدريس مادة في هذا المجال على الاسس السريرية في الدورة التعليمية لطلبة الطب. ان الهدف من هذه الدراسة هو تعيين وضع هذه المادة حالياً و تحليل ضرورة ايجاد وحدة دراسية تعنى بمادة الفارماكولوجيا السريرية من نظره طلاب كلية الطب في تبريز.

الاسلوب: في هذه الدراسة التوصيفية - المقطعية التي تمت على عدد من طلاب المراحل السريرية في جامعه تبريز للمعلوم الطبية تم تجميع المعلومات عبر استمارات و قد تم تحليلها عبر برنامج SPSS النسخة ١٦.

النتائج: لقد اعتبر ٩٥% من طلاب مرحلة التعليم السريري ان من الضروري ايجاد وحدة دراسية تعنى بالفارماكولوجيا السريرية و اعتبروا ايضاً ان افضل وقت لتعليم هذه المادة هو في المرحلة السريرية. عندما تمت دراسة توقعات الطلاب في مادة الفارماكولوجيا المعروضة في مرحلة الفيزيوباتولوجيا كان مستوى الرضا عند الطلاب في مجال اشكال الادوية ٣٠ بالمئة، تعليم اصول كتابة الورقة الصيدلانية بشكل صحيح ١٧ بالمئة، تعليم التداخلات الرئيسية بين الادوية ٣٥ بالمئة و قد كان من الصم المسائل التي طالب الطلاب بوضعها في المادة السريرية هي:

١. تعليم اشكال الادوية و الطرق الصحيحة لاستعمالها

٢. التداخلات السرية في الادوية و كتابة الورقة الصيدلانية.

الاستنتاج: ان من روثيه طلاب المرحلة السريرية فذاك ضرورة لاجداد وحدة تعليمية سريرية في مجال الفارماكولوجيا

الكلمات الرئيسية: الفارماكولوجيا، الفارماكولوجيا السريرية، ستاجر، انترن، طبيب عام.

بررسی نگرش کارآموزان و کارورزان دانشکده پزشکی تبریز نسبت به ضرورت ایجاد واحد فارماکولوژی بالینی

زمینه و هدف: تدریس فعلی فارماکولوژی برای دانشجویان پزشکی عمدتاً بر اساس اصول پایه فارماکولوژی استوار است و به نظر می رسد ورود درسی مجزا به نام فارماکولوژی بالینی به دوره آموزش پزشکی یک ضرورت اساسی باشد. هدف از این مطالعه تعیین وضعیت موجود ارائه درس فارماکولوژی و بررسی ضرورت ایجاد واحد فارماکولوژی بالینی از دیدگاه دانشجویان دانشکده پزشکی تبریز بود.

روش: در این مطالعه توصیفی - مقطعی، جامعه آماری شامل کارآموزان و کارورزان پزشکی دانشگاه علوم پزشکی تبریز بود که بر اساس سهولت دسترسی به دانشجویان انتخاب شدند. اطلاعات مورد نیاز به کمک پرسشنامه جمع آوری شد و با نرم افزار SPSS نسخه ١٦ و با استفاده از پارامترهای آمار توصیفی مورد تجزیه و تحلیل قرار گرفتند.

یافته ها: حدود ٩٠ درصد دانشجویان مقاطع کارآموزی و کارورزی ایجاد واحد فارماکولوژی بالینی را ضروری دانسته و مناسب ترین زمان ارائه آن را دوره کارآموزی و کارورزی اعلام نمودند. همچنین با توجه به نیازهای آموزشی مورد انتظار دانشجویان از درس فارماکولوژی ارائه شده در مقطع فیزیوباتولوژی، میزان رضایتمندی از آموزش اشکال دارویی حدود ٣٠ درصد، آموزش اصول نسخه نویسی صحیح بطور میانگین ١٧ درصد و آموزش تداخلات دارویی مهم حدود ٣٥ درصد بود. همچنین مطالب درسی مناسب و مورد تقاضا برای واحد فارماکولوژی بالینی، آموزش اشکال دارویی و نحوه مصرف صحیح آنها، تداخلات مهم دارویی و نسخه نویسی بود. بجز در مورد زمان ارائه واحد فارماکولوژی بالینی و میزان رضایت از آشنایی با اشکال دارویی در دوره فیزیوباتولوژی، میزان رضایتمندی کارآموزان و کارورزان تفاوت آماری معنی داری نشان نداد.

نتیجه گیری: به نظر دانشجویان پزشکی مقاطع کارآموزی و کارورزی، راه اندازی واحد فارماکولوژی بالینی در دوره پزشکی عمومی یک ضرورت است.

واژه های کلیدی: فارماکولوژی، فارماکولوژی بالینی، کارورز، کارآموز، پزشکی عمومی

کلینیکل فارماکولوجی یونٹ کے قیام کے بارے میں تبریز یونیورسٹی کے طلباء اور کارکنوں کی نظر

بیک گراؤنڈ: آج کل ہمارے یونیورسٹیوں میں طلباء کو کلاسیکل فارماکولوجی پڑھائی جاتی ہے تاہم ایسا لگتا ہے کہ کلینیکل فارماکولوجی اب ایک ضرورت بن چکی ہے۔ اس تحقیق کا هدف فارماکولوجی کی تدریس کی صورتحال اور کلینیکل فارماکولوجی یونٹ قائم کرنے کی ضرورت کا جائزہ لینا ہے۔ اس تحقیق میں طلباء کی نظر جانی گئی ہے۔

روش: یہ تحقیق تبریز میڈیکل یونیورسٹی کے طلباء اور انٹرن شپ کے طلباء کی شمولیت سے انجام دی گئی۔ ان طلباء کو سوالنامے دئے گئے جنہیں ایس پی ایس ایس سافٹ ویئر سے جانچا گیا اور توصیفی شماریات کے معیار کے مطابق ان کا تجزیہ کیا گیا۔

نتیجے: نوے فیصد طلباء اور انٹرن شپ کے طلباء نے کلینیکل فارماکولوجی یونٹ کی ضرورت پر تاکید کی، اور کہا کہ اس کی تعلیم کا مناسب ترین زمانہ ڈاکٹری کی تعلیم اور انٹرن شپ کا زمانہ ہے۔ فیزیو پیتھالوجی کی تعلیم کے دوران طلباء نے فارماکولوجی کے کورس میں اس بات کی نشاندہی کی تھی کہ انہیں ادویہ کے بارے میں پڑھائے جانے والے کورس سے اطمینان حاصل ہے جو تیس فیصد تھا۔ نسخہ نویسی کے کورس سے طلباء نے سترہ فیصد اطمینان کا اظہار کیا اور دواؤں کے باہمی فعل و انفعالات کے بارے میں پینتیس فیصد تک اطمینان کا اظہار کیا ہے۔

سفارشات: اس تحقیق کے نتائج کو دیکھتے ہوئے یہ سفارش کی جاتی ہے کہ میڈیکل طلباء کی تعلیم اور انٹرن شپ کے دوران کلینیکل فارماکولوجی نہایت اہمیت کی حامل ہے۔

کلیدی الفاظ: فارماکولوجی، انٹرن شپ، عام طبابت

INTRODUCTION

The treatment of diseases by drugs (Pharmacotherapy) is the main therapeutic method in medicine. The correct prescription of drugs and their correct and rational usage are one of the essential factors in providing the community's health and safety. The consumption of drugs has significantly risen in our society in the past decade and the lack or absence of certain drugs has caused many difficulties. The incorrect prescription of antibiotics besides causing microbial resistance in the general population has imposed huge and unnecessary costs on both the patients and the health system of many countries. Drug interactions are another major problem; they either alter the drug's effect or induce drug toxicity due to the addition of another drug (1). In the United States more than 100000 deaths occurring each year are related to the undesirable effects of drugs (2). In our society, as the average rate of population growth has been around 1.5%, the consumption of drugs has grown more than 10%. According to the report by the food and drug vice chancellor of the Health Ministry, 8% of all hospitalizations have been due to drug adverse reactions (1). The available reports on the WHO website also confirm the unnecessary prescription and consumption of certain drugs. In the Nairobi conference in 1985, the global attempt for encouragement towards rational prescription of drugs was initiated. From then on WHO and other international organizations started their research on this issue with special attention to developing countries. In this regards, guidance brochures were published and teaching courses were designed by the WHO and in the Sydney (1995) and Thailand (1997) conferences practical strategies for improving the prescription and administration of drugs in developing countries were discussed (3).

Performing each program on rational prescription of drugs should consist of certain conjunct activities which includes all the influential factors. It seems that educating medical personnel is the first and most essential step in improving the drug prescription system. This necessity has been also taken into consideration in Iran and therefore different CMD courses have been designed for general practitioners. The studies have shown that qualitative and quantitative indexes in prescription writing in Iran, especially factors such as reducing drug interactions is yet not favorable enough. The main reason could be because such attempts are usually focused on graduated individuals and the long period before that has almost been ignored, which highlights the need for other strategies in order to define and improve such indexes (4). A very useful strategy is the target-based teaching of medical students.

It seems that adding a course named as Clinical Pharmacology to the medical education period is a true necessity. The present courses in pharmacology in medical schools are mainly based on teaching the basic principles, classification of drugs and defining their mechanism of action and do not develop the required skills for rational prescription and consumption of drugs. The evaluations for such courses are also based on theoretical learning and such practical skills are never examined in any tests.

Changes made in the medical education curriculums of medical schools has resulted in many challenges during the

recent decades but none of them have been as serious and important as the education of physicians in correct choosing and prescription of drugs (5). Some of the main reasons showing why such courses are so necessary are listed below:

1. The number of drugs in the health system are increasing day by day
2. Patients are more aged and more ill in comparison to older days
3. The patients are using a higher number of drugs simultaneously
4. Prescription errors and their side effects are a major cause of mortality
5. New drugs are stronger but more toxic than before
6. The patients expect their physicians to give adequate knowledge on all type of drugs
7. The availability of many sources of information such as the internet, has simplified the route of receiving incorrect data on the drugs for both the patients and their doctors.
8. The irrational prescription of drugs in addition to causing different side effects, drug interactions and elongating the treatment course imposes huge costs on the community health system.

In the current study we aimed on assessing the viewpoint of Tabriz medical students about the current situation of pharmacology teaching in the Physiopathology period and the need for enriching the present teaching lessons for better prescribing drugs. A survey was also conducted on the need for starting a clinical pharmacology course as a complementary to the current basic pharmacology course and also defining the educational content expected by the students from this course and also its proper time section.

METHODS

This was a semi-experimental investigation conducted in the medical faculty of Tabriz University of medical sciences in 2009. The study population consisted of medical externs (58) and interns (38). The sampling method was convenience and the data collection device was a designed questionnaire consisting of 8 sections.

Demographic characteristics (3 Questions), satisfaction of the pharmacology teaching in the physiopathology period (5 Qs), the necessity of developing a clinical pharmacology course (1 Q), The educational content of the clinical pharmacology course (3Qs), the best timing section for passing this course (4 Qs) and the required facilities for simplifying learning of clinical pharmacology (3 Qs) and two open questions. The validity of the questionnaire was based on the literature review and consultation with experts in this field and its stability was based on the Cronbach's alpha method with $\alpha=0.64$. In order to estimate the attitude score the Likert scale was used which ranged from "complete disagreement" to "complete agreement" and scored from 1 to 5. The level of their satisfaction of the current pharmacology courses in the physiopathology period and also their viewpoint on the implementation of clinical pharmacology courses, the lesson's contents and the proper time section in different levels were studied. The study outcomes were reported as mean \pm SEM and analyzed by the SPSS software, version 16.

RESULTS

The externs consisted of 40% males and 60% females, the same values were 29% and 71% among interns. The mean age of externs and interns was 23 and 25 years, respectively. Analyses of the data obtained from the externs showed that considering the pharmacology lessons taught during the Physiopathology period, satisfaction on teaching pharmaceutical dosage forms were 39.2 ± 4.3 and their correct consumption route 44.3 ± 4.6 . The same values were 21.7 ± 4.8 and 25.7 ± 4.6 among interns. Comparing the externs and interns showed that a statistically significant difference exists between the satisfaction level of these two groups on the two above mentioned indexes of pharmacology teaching in the Physiopathology period, $p < 0.01$.

The satisfaction level of externs and interns of the pharmacology courses presented in the physiopathology period on learning about insurance principles was $16.5 \pm 3.9\%$ and $8.5 \pm 3.4\%$; on rational prescription writing skills $20.3 \pm 4\%$ and $15.8 \pm 4\%$; and on learning important drug interactions was $41.5 \pm 4.6\%$ and $28.9 \pm 5.1\%$, respectively. Comparing the externs and interns showed no significant difference regarding the latter mentioned indexes.

The externs and interns reported an $89.2 \pm 3.2\%$ and $91.4 \pm 2.5\%$ necessity for implicating pharmacology courses during the medical study period respectively which indicated no significant difference between the two groups. Regarding the favorable educational content of the possible clinical pharmacology course, the extern students mainly emphasized on learning pharmaceutical dosage forms and their correct usage instructions, important drug interactions and prescription writing skills with a necessity rate of $91 \pm 2.3\%$, $88.7 \pm 2.4\%$ and $77.4 \pm 3.5\%$, respectively whereas the interns also focused on the same indexes with a necessity rate of $90.7 \pm 3.8\%$, $91.4 \pm 1.9\%$ and $75 \pm 5.5\%$, respectively.

The difference in satisfaction rate between the interns and externs on the required educational contents was not significant. Considering the best time section for taking this course, the physiopathology period scored $52.4 \pm 5.1\%$ and $61.9 \pm 6.8\%$ among externs and interns, statistically not significant. For the same index the externship period scored $76.9 \pm 4.5\%$ and $57.2 \pm 6\%$ among externs and interns showing a meaningful difference ($p < 0.01$)

The best time section being the internship period scored $74.3 \pm 5.3\%$ among the externs which showed a much lower satisfaction among the interns ($56.6 \pm 5.4\%$), $p < 0.05$.

For both the externs and interns it was very favorable to be taught the required drugs for each clinical ward at least once in that same ward; this showed no statistical difference.

In the designed questionnaire two open questions on the viewpoint of students on pharmacology were proposed. Most students believed that drugs should be taught clinically and practically so that the unnecessary and extensive lessons in basic pharmacology courses are lessened. Correct and targeted teaching with increase in the pharmacology courses and dividing them into several semesters and repeating them in different levels during the medical education for better and deeper learning would

add a lot to the students' knowledge.

In the opinion of Tabriz University's medical students, the practical teaching of correct and rational prescription writing skills and writing prescription in the educational wards and clinics by them under the supervision of professors should be added as a separate curriculum to the medical education period. Or even as the current skill labs for clinical practice, developing similar labs and workshops for rational drug prescription should be taken into consideration. The students also admitted that the theoretical and unpractical lessons only lower their interest in pharmacology while having practical classes, learning drugs with focusing on their dosage forms, administration route, prescription writing, side effects and major food and drug interactions, would be highly appreciated. Also their presence in sample drug stores and being introduced with the dosage form of pharmaceuticals available in Iran, teaching prescription writing skills and insurance regulations before entering clinical wards rises their self-confidence and lowers the rate of medical errors both during their study and after graduation.

The students believe that Pharmacology teaching should become realistic because describing some points such as the drugs' mechanism of action or vast teaching on drugs not available in Iran will not be helpful in this short period. They suggested that it will be much more desirable if half of the time of every pharmacology class is devoted to teaching clinical facts on drugs by clinical professors. Making pharmacology teaching more practical instead of focusing on mnemonics, holding periodical classes for teaching diseases and their related drug treatments, commissioning a practical clinical pharmacology course in the medical curriculum and taking exams both theoretically and practically would be very beneficial.

DISCUSSION

The irrational prescription of drugs is a problem which developed and developing countries are dealing with. Different studies have shown that the difficulties in drug prescription in different countries mainly include the following: polypharmacy, incorrect diagnoses and consequently incorrect prescriptions, the unnecessary prescription of expensive drugs, irrational prescription of antibiotics, etc. This problem has imposed huge mortality and financial costs on many communities worldwide. On the other hand the rational prescription of drugs has many advantages such as: reducing the amount of drug consumption (reducing the patient's costs), avoiding various drug interactions, lowering drug-induced side effects, less prescription errors, better compliance by the patients, reducing drug resistance for antibiotics and preventing drug dependence in certain drugs specially those affecting the central nervous system (7).

One of the main reasons for irrational and excessive drug prescription is the lack of useful educational courses on prescription writing. A single prescription paper beside its simplicity could be a whole reflection of the medical educational system, the efficacy of the planned regulations on the medical population, socio-cultural beliefs and even the drug status of a certain country. Considering that the physicians are the prescription writers, any factor

influencing their way of thinking and decision making could be very helpful in rational prescription writing (1).

The available literature also show that the physicians have a much greater role in comparison to the other members of the medical team in developing and promoting irrational drug usage or directing the society's drug culture towards correct ways of prescription, administration and consumption of drugs (8).

Analyzing the results of this study showed that medical externs and interns of Tabriz University of Medical Sciences do not consider the current educational status of pharmacology teaching as responsive enough to their educational needs, especially after entering clinical wards. The main reason is that the studied pharmacology lessons are basically theoretical mainly focusing on the indication and mechanism of action of drugs instead of having a practical approach.

In fact, the axis of the basic pharmacology lessons in the physiopathology period is drugs and therapeutic considerations are not valued enough. But the exact opposite takes place in clinical practice where everything is based on disease diagnosis while the students' therapeutic skills and prescription writing are an imitation of their clinical professors. This is why the prescription writing of most young physicians due to lack of skill and knowledge are incorrect or irrational. In a study by sohrevardi et al, it was shown that the medical graduates had chosen an inappropriate drug in 50% of the studied cases; 30% had wrote incorrect prescriptions and 60% had not given the basic and important information on the prescribed drugs to the patients (9).

In the present study, the medical students have insisted on the necessity of learning correct and rational prescription writing especially including major issues such as important food and drug interactions. The studied students in addition to suffering from a low self-esteem in drug therapy in medical wards causing confusion, might be unaware of this grave issue that prescription writing errors could end up in serious and lethal side effects and beside all other problems, medical and legal issues will threaten their future career. Various studies have confirmed that medical students should learn the basic medical principles in drug

prescription before entering clinical wards so that they will not encounter any major problem in the wards or after graduation and correct prescription writing turns to an admirable habit for them (7).

In accordance to all this, in a descriptive study the studied physicians considered having a separate lesson named as rational prescription writing a necessity whereas 90% of the medical universities have also confirmed this need (4). Even the studies conducted in other countries have emphasized on the actual need for prescription writing teaching before graduation from medical school (10).

A major point in this study was the difference in the level of satisfaction of the current pharmacology lessons in the physiopathology period between the interns and externs which shows a much higher satisfaction rate among the externs. This could be due to the merger plan taking place in Tabriz University. In this project which the studied externs benefited from, the pharmacology lessons of the physiopathology period were presented as courses, so that all the required drugs in each physiopathology course were taught at the end of that certain course. Nevertheless, we still did not obtain complete satisfaction in this respect due to the students' belief that as long as pharmacology is studied theoretically, it will not fulfill their common needs in drug therapy.

The results of this study showed that a great percentage of the medical interns and externs of Tabriz University of Medical Sciences do not consider the current state of pharmacology teaching responsive enough to their educational needs and consider the implementation of a clinical pharmacology course in the time period before entrance to the clinical wards, an absolute necessity.

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