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INDEPENDENT DENTAL STUDENT WORK AS ONE OF THE MODERN EDUCATIONAL TOOLS TO ACHIEVE LEARNING OUTCOMES IN STUDYING THE EDUCATIONAL COMPONENT «PHARMACOLOGY»

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The base of successful modern professional activity and a future dentist in particular is independence. At the same time, integration of Ukraine to the European scientific-educational space promotes implementation of up-to-date forms and standards into the educational process of Ukraine and focuses higher education institutions on a motivated personality. That personality strives for self-development, is able to extend and update knowledge, to search for additional information independently, to be creative in doing educational tasks, and able to introduce new technologies into the practical activity within the public health care system. Therefore, the main task of higher education institutions of Ukraine is to ensure the quality of education.

***Objective** – to justify the feasibility of independent dental student work as one of the modern tools to achieve learning outcomes in studying the educational component «Pharmacology».*

***Conclusions.** 1. Independent student work as an integral part of the whole educational process results in more comprehensive understanding principles of Pharmacology, better preparation for clinical practical work, and improvement of general academic progress of future dentists. 2. Independent dental student work is an important integral part of modern educational tools to achieve learning outcomes in studying the educational component «Pharmacology».*

Key words:
pharmacology, independent work of dental students.

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САМОСТІЙНА РОБОТА СТУДЕНТА-СТОМАТОЛОГА ЯК ОДИН ІЗ СУЧАСНИХ ІНСТРУМЕНТІВ НАВЧАННЯ У ДОСЯГНЕННІ ПРОГРАМНИХ РЕЗУЛЬТАТІВ ОСВІТНЬОЇ КОМПОНЕНТИ «ФАРМАКОЛОГІЯ»

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Основою успішної сучасної професійної діяльності, зокрема майбутнього лікаря-стоматолога, є самостійність. Водночас, інтеграція до європейського науково-освітнього простору спонукає до впровадження новітніх норм та стандартів в освітній процес України й орієнтує заклади вищої освіти на високомотивовану особу, яка прагне до саморозвитку, здатна самостійно поповнювати та оновлювати знання, здійснювати індивідуальний пошук додаткового матеріалу, творчо ставитися до виконання навчальних завдань і готову впроваджувати нові технології в практичну діяльність у системі охорони здоров'я людини. Тому основним завданням закладів вищої освіти України є забезпечення її якості.

***Мета роботи** – обгрунтувати доцільність самостійної роботи студента-стоматолога як одного із сучасних інструментів навчання у досягненні програмних результатів освітньої компоненти «Фармакологія».*

***Висновки.** 1. Включення самостійної роботи в процес навчання призводить до більш повного розуміння принципів фармакології, кращої підготовки до клінічної практики та покращення загальної академічної успішності майбутніх стоматологів. 2. Самостійна робота студентів-стоматологів є важливою складовою сучасних інструментів навчання у досягненні програмних результатів освітньої компоненти «Фармакологія».*

Ключові слова:
фармакологія, самостійна робота студентів-стоматологів.

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Introduction

Since ancient times, the profession of a doctor has held an honorable place in society and enjoyed respect and honor. Medical workers have always been in demand, since they are professionals who help people overcome various diseases. Therefore, formation of a future dentist starts from the very first days of studies and continues during the whole career. Considering the conditions of increasing competition in the educational services market for the development of higher medical education, quality improvement of both theoretical and practical training of young specialists possessing a high level of knowledge is an important factor. In future, these young specialists will give highly qualified medical aid quickly and effectively [1].

The base of successful modern professional activity and a future dentist in particular is independence. At the same time, integration of Ukraine to the European scientific-educational space promotes implementation

of up-to-date forms and standards into the educational process of Ukraine and focuses higher education institutions on a motivated personality. That personality strives for self-development, is able to extend and update knowledge, to search for additional information independently, to be creative in doing educational tasks, and able to introduce new technologies into the practical activity within the public health care system [2]. Therefore, the main task of higher education institutions of Ukraine is to ensure the quality of education.

The educational process at a higher school is a system of organization of educational-learning activities consisting of a number of elements including independent student work, which is an important part of the educational process [3]. Here we are going to reveal the essence of the component. Independent student work is a form of organization of the teaching-learning process when planned tasks that are done by learners independently outside classes without supervision. Such kind of activity focuses on making theoretical knowledge more advanced and comprehensive, mastering and improving practical skills and abilities. At the same time, an important constituent of independent work and dental students in particular is formation of their cognitive activity, making their acquired knowledge deeper, and increasing their level of organization.

Objective

To justify the feasibility of independent dental student work as one of the modern tools to achieve learning outcomes in studying the educational component «Pharmacology».

Main part

Teaching of future dentists at the Department of Pharmacology at Bukovinian State Medical University is carried out within the framework of an approved second level curriculum (Master) for higher education learners on specialty 221 «Dentistry», considering the higher education standards [4]. According to the working program and syllabus of the educational component «Pharmacology», independent student work includes preparation for classroom lessons; doing tasks on the subject during the semester; working on certain topics of educational subjects according to the curriculum and syllabus; preparation for all the kinds of activities (including tests). The main tasks of independent student work are complete mastery of the core curriculum and syllabus, and consistent development of skills for effective independent professional (practical and scientific-theoretical) activity at the level of world standards [5, 6].

The curriculum on «Pharmacology» consists of 55 hours of independent student work. It includes the following topics: Biotransformation and Drug Interaction; Side Effects of Drugs; Drug Addiction and its Social Value; Pharmacogenetics; H-cholinomimetics; Nicotine Toxicology; Ways of Struggling against Smoking; Pharmacology of Ganglioblockers; Pharmacology of serotonergic, dopaminergic, and histaminergic drugs; Pharmacology of Drugs for Inhalation and Non-Inhalation Anesthesia; Pharmacology and Toxicology of Ethyl Alcohol and Drugs for the Treatment of Alcoholism; Pharmacology of Antidepressants, Nootropics, Adaptogens and Actoprotectors; Pharmacology of Antidiarrheal agents; Probiotics; Prokinetics; Immunotropic Drugs; Pharmacology of Non-Steroid Cardiotonics; Plasma Substitutes, Drugs Containing Human Blood Components; Pharmacological Substances for Parenteral Nutrition; Radioprotectors and Medicines Promoting Excretion of Radionuclides. Thus, topics of the independent student work cover the most important issues that students are supposed to master while learning the subject.

As one can see, independent work assumes self-study of the educational material by students including separate topics after classroom lessons when students are free and can manage their time. They can learn from audios and videos as well as prepare for different kinds of tests. Educational material included into the independent student work is provided for by the curriculum and is included into the final testing together with other material studied in classroom.

Independent student work at BSMU uses adequate methods of learning: verbal – narration, explanation, briefings; visual – demonstration, illustration; practical – solving tasks. According to cognitive logics, the following methods are applied: analytical, synthetic, analytical-synthetic, inductive, deductive. According to the level of independent mental activity problematic, partially search and research methods are used. The use of modern interactive methods is of special attention in teaching and learning the subject. These are facilitation, role games, group work, brainstorm, buzz-groups. These methods allow checking the level of knowledge of learners that they have got during self-study. The topics included into the independent work are in the list of questions for final module tests. Moreover, they are essential for further growth of a qualified, competitive specialist in the defined area.

Every topics of a practical lesson is provided with methodological recommendations, materials to prepare for the lesson, and tests to check knowledge. For example, the topic «Biotransformation and Drug Interaction» assumes the study of metabolism of medicinal substances. When students study this topic, their attention is paid to the fact that in the process of transformation polar water-soluble metabolites are formed. They are excreted from the body much easier. Usually they are less active and toxic than original compounds. However, in the process of metabolism of certain medical substances, more active metabolites can be formed. When studying this topic, attention is focused on the fact that the metabolic reactions of medical substances in the body can be non-synthetic and synthetic. Non-synthetic reactions are those catalyzed by the enzymes of the endoplasmic reticulum (microsomal) and by the enzymes of another localization (non-microsomal): oxidation, reduction, and hydrolysis. Fat-soluble substances undergo microsomal transformation first. They easily penetrate through the membranes into the endoplasmic reticulum and bind with one of the cytochromes in P_{446}–P_{455} system. Non-microsomal enzymes catalyze the reactions of hydrolysis and reduction of medical substances. Non-microsomal biotransformation of medical substances occurs mainly in the liver, but it may happen in the blood plasma and other

tissues. It is important to understand that the metabolic volume of enzymes, metabolic rate and absorption determine the degree of transformation. If the medical substance possesses a considerable «first pass effect», its biological accessibility decreases with oral use.

When students study the topic «Side Effects of Drugs», safety of drugs is the priority. Side effects are any manifestation of undesirable, inappropriate response to pharmacotherapy, sometimes a dangerous effect of drugs on the body occurring within the range of therapeutic doses. The fact that side effect of drugs can contradict their main action, which is the purpose of their administration, is well known. At the same time, side effect of drugs may be variable due to their detection and occurrence. Therefore, it requires different methodological methods.

In the Recommendations issued by the Department, we pay attention that in Ukraine side effects are mostly registered when antibacterial drugs, blood substitutes, anti-inflammatory medicines, painkillers, cardiologic medicines, antiseptics, vitamins and antitumor drugs are administered. According to the International Classification, side effects of drugs are divided into reactions of A, B, C and D types. In addition, according to the mechanism of occurrence side effects may be allergic and non-allergic in nature. Side effects of non-allergic nature belong to A group. It is found most often (about 75% of all cases). It is caused by pharmacological properties of a medicinal substance. It is predicted, depends on the dose, and can be examined experimentally. Similar side effects are most typical for non-selective drugs. Increased selectivity promotes their decrease. For example, $\beta_{1,2}$-adrenoreceptor blockers – propranolol, oxprenolol, pindolol etc., when administered for hypotensive, antianginal, antiarrhythmic purposes often cause an increased tonus and secretion of the bronchi caused by the block of β_2-adrenoreceptors. Cardioselective drugs acebutolol, nebivolol, bisoprolol etc., usually do not possess such action.

When studying the topic «Nicotine Toxicology», students get the information that nicotine was first isolated from tobacco in 1809 by Louis Nicolas Vauquelin who considered nicotine as an active substance of tobacco. Later in 1828, the German scientists W. Posselt and L. Reimann described a pure nicotine alkaloid for the first time. Nicotine is an oily, clear liquid with a spicy, burning taste and an alkaline reaction. Nicotine boils at a temperature of 140-145 °. It is soluble in water, ether, alcohol, and is a rather strong poison [7]. Nevertheless, the potency of this poison is not the same for all animals. While small birds die from a single approach to their beak of a stick moistened with nicotine, rabbits die from a dose of ¼ drop, and a dog from ½-2 drops. Amoebas tolerate nicotine at almost the same concentration as sodium chloride and are not killed by a 1% solution. The degree of tolerance of animals to nicotine is inversely proportional to the development of their nervous system. Animals with more developed nervous system are less tolerant to nicotine. All mammals are very sensitive to nicotine. In this respect, sheep and goats are exceptions, especially the latter ones. They can eat much tobacco leaves without any harm.

It is difficult to indicate a toxic human dose exactly, since it depends on individual peculiarities of the body and nicotine addiction. The method of nicotine administration plays a significant role. Its administration through the conjunctiva and rectum produces much stronger effect than subcutaneous use.

Nicotine is as toxic as hydrocyanic acid, and a lethal dose of nicotine produces a fatal effect on an adult in the same period as the same dose of hydrocyanic acid. A 6 g cigar contains 0,3 g of nicotine. In case an adult swallows such cigar, he may die. 20 cigars or 100 cigarettes per day may also cause death if they are smoked. It is an interesting fact that a leech applied to a heavy smoker falls off in convulsions and dies from the human blood containing nicotine it sucks.

The body is known to get used to nicotine. The amount of nicotine consumed by a moderate smoker will cause signs of poisoning in a non-smoker. Animals can get used to nicotine as well. If you inject 1 ml of a 1: 10000-1: 20000 nicotine solution (i. e. 0,1-0,2 mg of pure nicotine) under the skin of a frog, it begins to get very anxious, jumps and becomes covered in foam. 2-3minutes later, this excitement is replaced by depression. The front legs are pulled towards the belly, the thighs are at right angles to the spine, and the shins are convulsively bent towards the thighs. If the shins are pulled back, they return to their previous position. Respiratory arrest may occur later. Meanwhile, dissection shows that irrespective of respiratory arrest the heart continues beating for some time. A frog presents certain anxiety and excitement when 1 ml of 1:1000000 nicotine solution is administered. Based on this, the frog id believed to be an excellent biological object to determine minimal amounts of nicotine. It is very important to know, since the chemical action of minimal doses of nicotine are not found yet. First, nicotine produces its effect on the nervous system. Its action on certain portions of the vegetative nervous system is specific.

Thus, practically every topic suggested for individual student work is supplied by relative recommendations for its better learning. In this respect, students who study dentistry can benefit significantly from independent work as one of the modern tools to achieve learning outcomes in pharmacological component in their curriculum. Such an approach enables students to learn the subject deeper, to carry out research and develop the skills of critical thinking necessary for their future practical dental work. Working independently, students can improve their understanding of pharmacological concepts, drug interaction, and the impact of medicines on dental treatment.

Finally, introducing independent work into the educational process results in more comprehensive understanding principles of pharmacology, better preparation for clinical practical work and improvement of general academic progress of future dentists.

Conclusions

1. Independent student work as an integral part of the whole educational process results in more comprehensive understanding principles of Pharmacology, better preparation for clinical practical work, and improvement of general academic progress of future dentists.

2. Independent dental student work is an important integral part of modern educational tools to achieve learning outcomes in studying the educational component «Pharmacology».

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