

## ABSTRACT

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## PECULIARITIES OF ONLINE CALCULATORS USAGE DURING DISTANCE LEARNING AT SUMY STATE UNIVERSITY AMONG 5<sup>TH</sup> YEAR STUDENTS OF MEDICAL INSTITUTE

**Introduction.** Situation in Ukraine nowadays stimulates teachers to provide distance learning during practical classes. A lot of foreign students are able to do calculation online. It is reasonable to ask them about advantages and disadvantages of such method for further improvement of study process.

**The aim** is the determination of peculiarities of using online calculators among fifth year medical students.

**Materials and Methods.** We included 60 fifth year foreign medical students who studied online during 2021 year (the main group) and 54 students who learned internal medicine offline during 2019 (the control group) in our trial. Questionnaires were given to all of them at the last class of internal medicine. Most participants (54) from the main group and all participants from the control group have answered about the peculiarities of using online calculators during the process of study, advantages and disadvantages of such method. The results were analyzed by Microsoft Excel and GraphPad Prism.

**Results.** During distance learning of internal medicine at Sumy State University, the number of 5th year students who evaluated results online increased from 12 (22,2 %) to 44 (81,5 %). 46 subjects from the main group (85 %) used online calculators for cardiology, 32 (59 %) – for nephrology and 22 (39 %) – for rheumatology. A big percent of participants from the main (81.5 %) group and the control (50 %) group planned to use online calculators in their future professional activities. In the opinion of most participants from the main group (81.5 %), the main benefit was fast evaluation, which helped to save time. About quarter of them (24 %) decided that such method made learning easier and more effective. A fifth part of students (20 %) determined that more accurate calculation was the most important advantage.

**Conclusions.** During distance learning of internal medicine at Sumy State University, the number of students who did online calculation increased by four times which showed that teachers widely provided the method. In the opinion of majority of foreign students, dependence of internet connection was the main disadvantage of online calculators, while the benefits of this method were: fast, more accurate evaluation, making learning easier and effective.

**Keywords:** online calculators, distance learning, foreign students.

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## ОСОБЛИВОСТІ ЗАСТОСУВАННЯ ОНЛАЙН-КАЛЬКУЛЯТОРІВ ПІСЛЯ ВПРОВАДЖЕННЯ ДИСТАНЦІЙНОГО НАВЧАННЯ У СУМСЬКОМУ ДЕРЖАВНОМУ УНІВЕРСИТЕТІ СЕРЕД СТУДЕНТІВ 5-ГО КУРСУ МЕДИЧНОГО ІНСТИТУТУ

**Актуальність.** На сьогоднішній день ситуація в Україні сприяє впровадженню викладачами дистанційних технологій навчання. Чимало іноземних студентів у процесі вивчення дисциплін здійснюють розрахунки онлайн. Доцільно провести серед них опитування з метою визначення переваг та недоліків цього методу.

**Мета** – визначення особливостей застосування онлайн-калькуляторів серед англомовних студентів 5-го курсу медичного інституту СумДУ.

**Матеріали та методи.** До нашого дослідження включено 60 іноземних студентів 5-го курсу медичного інституту СумДУ, які навчалися дистанційно протягом 2021 року (основна група) та 54 студенти 5-го курсу, які опанували дисципліну в очному форматі протягом 2019 року (група контролю). Їм було роздано опитувальники на останньому занятті з внутрішньої медицини. Більшість із осіб основної (n = 54) та усі з контрольної (n = 54) групи відповіли на 12 питань стосовно використання онлайн-калькуляторів у навчальному процесі, переваги та недоліки цього методу. Дані було проаналізовано із використанням Microsoft Excel та GraphPad Prism.

**Результати.** Протягом дистанційного вивчення внутрішньої медицини кількість англомовних студентів 5-го курсу, які здійснювали розрахунки за допомогою онлайн-калькуляторів, збільшилася з 12 (22,2 %) до 44 (81,5 %). Під час опрацювання тем з кардіології серед опитаних основної групи 46 осіб (85 %) використовували зазначений метод, нефрології – 32 (59 %) та ревматології – 22 (39 %). Більшість студентів основної групи (81,5 %) та контролю (50 %) планують використовувати онлайн-калькулятори у своїй подальшій професійній діяльності. На думку значної кількості опитаних основної групи (81,5 %) головною перевагою зазначеного методу є швидкість, що допомагає їм заощадити час. Близько четвертої частини студентів (24 %) вважають, що розрахунки онлайн роблять навчання легшим та ефективнішим. П'ята частина опитаних (20 %) відповіли, що даний метод дозволяє отримати більш точні результати обчислень. На думку 80 % студентів, головним недоліком зазначеного методу є його залежність від наявності інтернету.

**Висновки.** У процесі дистанційного навчання у СумДУ кількість студентів, які здійснювали розрахунки за допомогою онлайн-калькуляторів, збільшилася у чотири рази, що свідчить про широке впровадження викладачами у освітньому процесі та наявністю чималої кількості переваг, серед яких більша швидкість, зручність, доступність, точність отримання результатів. На думку більшості іноземних студентів головним недоліком даного методу є залежність від наявності інтернету.

**Ключові слова:** онлайн-калькулятори, дистанційне навчання, іноземні студенти.

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## INTRODUCTION/ВСТУП

The COVID pandemic stimulates the providing of distance learning during practical classes, the quality of which depends on many factors [1]. Such method of study is able to avoid the disruption of the teaching-learning process irreversibly [2].

The advantages of distance education are flexibility, content availability, low cost, studying at home at any time you want. In the case of flexibility many students look for distance education courses just because they cannot or do not want to expose them to the rigidity required in physical classroom courses. In this sense, the flexibility offered by distance mode is configured as a great advantage. Content availability is one of the benefits. In most courses offered on site, the student attends classes that are offered only once and must write down and find other means for the given content is saved for future reference. In classes taught at distance, however, the content (usually recorded on video and audio) is available for this review whenever necessary. Low cost is the main advantages for some students. They can find lower prices compared to the prices of traditional classroom courses. Studying at home at any time you want is very comfortable. Accordingly, the lack of rigidity concerning time and study site may also characterize an advantage of the distance education for students from the standpoint. From the Brazil student's point of view, the main advantage of online study is the flexibility, because there is no need for classroom. That is why people can attend classes in another city. The student also has the opportunity to develop activities in his own time, when he wants or can do it [3].

There are some disadvantages for students. During regular classes, students can have the opportunity to ask questions, while in distance courses that does not happen so easily, causing the student to save his questions for some future time meeting or another contact with teachers [3].

The well-designed online learning can lead to students' enhanced motivation, satisfaction, and learning [4]. Some studies have reported positive attitude towards online learning in medicine [5; 6]. It is reasonable to determine peculiarities of distance study in our university.

**Materials and Methods.** Fifth year course medical students participated in our trial. Questionnaire was given for all of them at the last class of internal medicine. Students from the basic group (n = 60) studied internal medicine online during 5-th year course in 2021 year. Participants from the control group (n = 54) learned this discipline offline in 2019 year. As a result mostly of students from main group (n = 54) and all from control have answered.

Questionnaire includes such questions:

1. Did you use online calculators in the process of study before distance learning in Sumy State University in 2020?
2. In which disciplines did you use online calculators in the process of study before distance learning in Sumy State University in 2020?
3. Did you use online calculators in the process of study the discipline "Internal medicine" during online learning in Sumy State University?
4. How did you know about the possibility of using online calculators in the process of study the discipline "Internal medicine"?
5. Did the teacher explain to you in a clearly, accessible form about the methodic of using these online calculators?
6. In your opinion, is it expedient to perform calculations online in the process of solving situational tasks in the discipline "Internal medicine"?
7. In the process of study which section (cardiology, rheumatology, or nephrology)

- did you use online calculators during 5<sup>th</sup> year course?
8. What online calculators did you use in the process of solving situational tasks in "Internal medicine" during 5<sup>th</sup> year course?
  9. Have you used online calculators for interpretation the results of examination of your friends, relatives, family during distance learning?
  10. Do you plan to use online calculators in your future activities?
  11. What are the benefits of online calculators to your mind?
  12. What are the disadvantages of online calculators to your mind?

**Results and discussion.** Before distance learning in Sumy State University 34 students (63 %) from main group and 42 (78 %) from control did not use online calculators in the process of study. Only 20 persons (37 %) from main group and 12 (22 %) from control solved situational tasks with the help of this procedure ( $\chi^2 = 5.082$ ;  $p = 0.0242$ ). The majority of them use online calculators in few subjects.

According to the words of students from main group more than half of them (60 %) did it during internal medicine classes, about third part (35 %) – infectious disease, quarter of them (25 %) – child infection. From main group quarter of foreign students calculate online during social medicine, fifth part (20 %) – pediatrics. In the process of learning pharmacology 15 % of persons from basic group used online calculators, pediatrics – 10 %, physiology – 5 %, medical physics – 5 %. From control group during previous courses 6 students (50 %) calculated the doses of antibiotics online in pediatrics; 3 (25 %) – in internal medicine and 3 (25 %) – in biochemistry.

During distance learning of internal medicine in Sumy State University the number of fifth year students from main group which did online calculation increased from 20 (37 %) till 44 (81,5 %). Persons from control did not have distance learning at that time when they were asked, but 11 of them (20 %) use online calculators during writing case history in cardiology. According to the words of them teachers explained about the possibility of using such method. Majority of students from main group 52 (96 %) decided that the interpretation was clearly and accessible. On the opinion of 2 persons (4 %) the explaining can be better.

Among persons from main and control group respectively 38 (70 %) and 25 (46 %) think that it is expedient to use online calculators during solving

situational tasks in internal medicine; 16 (30 %) and 29 (54 %) – that it is reasonable only in some cases such as severe mathematical calculations ( $\chi^2 = 15.01$ ;  $p = 0.0001$ ).

When we proposed to choose the section in which students had from main group use such method a lot of them remembered few columns. This is pleased for teachers. In the process of learning cardiology 46 persons (85 %) use online calculators, 32 (59 %) – nephrology and 22 (39 %) – rheumatology.

As a result with providing distance learning the quantity of 5<sup>th</sup> year course students which use online calculators in cardiology increase from 11 (20 %) till 46 (85 %) ( $\chi^2 = 180$ ;  $p < 0.0001$ ).

In the case of cardiology half of the students (23) from those who choose such method used calculators for assess glomerular filtration rate (GFR) and evaluation the severity of kidney damage in hypertensive patients, 5 (11 %) determined atherosclerotic cardiovascular disease risk and 5 (11 %) – body mass index to confirm overweight and the degree of obesity. About quarter (26 %) of persons defined risk of bleeding by HASBLED Score, post-MI Bleeding Risk by CRUSADE Score, thromboembolic risk in atrial fibrillation by CHA2DS2-VASc Score. The GRACE Score were used by 4.35 % of students for risk stratification in patients with diagnosed acute coronary syndrome to estimate of in-hospital and 6-month to 3-year mortality. Such percent of people (4.35 %) did calculation with the help of pulmonary embolism severity index (PESI) score.

In the case of rheumatology 20 students (91 %) from main group evaluated the severity of rheumatoid arthritis by DAS28 score; 2 (9,1 %) calculated body surface area for further determination the dose of disease modified antirheumatic drugs; 2 (9,1 %) systemic lupus erythematosus severity index; 1 (4,6%) analyzed SLEDAI score for assess systemic lupus erythematosus disease activity index.

When we speak about nephrology from those 32 persons who have used online calculators in this issue 25 (78 %) have evaluated GFR for definition the category of chronic kidney disease. In addition about fifth part of them (6 students) determine doses of drugs (antibiotics, disease-modifying anti-rheumatic drugs).

From main group 34 (63 %) participants used online calculators for interpretation of results of their friends, relatives, family, acquaintances after

studying internal medicine. Other 20 students (37 %) did not do this.

A big percent of participants from the main group (81.5 %) vs. 50 % from the control group planned to use online calculators in their future during professional activities. Ten students (18.5 %) and 27 (50 %) from control did not plan to do this.

We asked students from main group to determine the advantages and disadvantages of using online-calculators. On the opinion of most of participants (81.5 %) the main benefit is fast evaluation, which help to save time. About quarter (24 %) of them decided that such method make learning easier and more effective. Fifth part of students (20 %)

### CONCLUSIONS/ВИСНОВКИ

During distance learning of internal medicine in Sumy State University the number of students which did online calculation increased in four times which confirmed the good providing by teachers and presence a lot of benefits of such method.

### PROSPECTS FOR FUTURE RESEARCH/ПЕРСПЕКТИВИ ПОДАЛЬШИХ ДОСЛІДЖЕНЬ

Perspectives for future research is to provide evaluation with the help of online calculators

### CONFLICT OF INTEREST/КОНФЛІКТ ІНТЕРЕСІВ

The authors declare no conflict of interest.

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### AUTHOR CONTRIBUTIONS/ВКЛАД АВТОРІВ

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