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ABSTRACT

Objectives: To assess the urgency of development of post-graduate distance education (DE) program on antimicrobial therapy (AT) in Russia and to evaluate effectiveness of DE course as changes of level knowledge on AT after completion of DE course in comparison with baseline.

Methods: First Internet center of DE on AT in Russia was founded under the auspices of the Institute of Antimicrobial Chemotherapy, the Department of Clinical Pharmacology of Smolensk State Medical Academy with the support of the United States Pharmacopeia and the United States Agency for International Development. Web-site for medical professionals "Antibiotics and Antimicrobial Therapy" (<http://www.antibiotic.ru>) serves as the basis for this DE Internet-center. To assess the urgency of DE for physicians the on-line survey was performed on www.antibiotic.ru. To evaluate the effectiveness of the DE course the comparison of baseline level of knowledge in AT and the final test (after completion of the DE course) results of "students" was done.

Results: 491 of www.antibiotic.ru visitors took part in the on-line survey "Urgency of DE (via Internet) for physicians". 309 respondents (63%) answered "Yes, definitely!", 57 (11.6%) - "Yes, probably", 48 (9.8%) - "Doubtfully, Internet access is not available for everyone", 67 (13.7%) - "No, physicians are not ready to learn via Internet" and 10 (2%) - "I don't know, I am not a physician".

Since the implementation of the project, 87 doctors from 12 Russian regions have been trained using DE technology. Analysis of the DE results revealed the obvious increase in the number of the correct answers given by physicians in their preliminary test (62.6%) and the final exam (88.7% of correct answers), confirming the effectiveness of the DE. After passing the final examination all physicians received the official state certificate confirming the improvement of knowledge in the field of AT.

Conclusions: DE via Internet is a demanded form of post-graduate professional education among physicians in the field of AT in Russia. DE is an effective form of professional level improvement in AT.

BACKGROUND

Distance Education (DE) is a totally new, progressive kind of education. It appeared in the last decades of the 20th century due to new technological possibilities emerged as a result of the informational revolution. This type of education is based on the idea of a student's independent interactive work and on the maximal use of the modern informational technologies, i.e. PC, e-mail, Global Information Network - Internet. Other components and methods are aimed for making the educational process most comfortable and effective.

The ultimate use of informational technologies creates a number of advantages over traditional educational forms:

- the flexibility of the educational process: both the tutor and the student work in the convenient time, place and rate;
- studying the material does not require abstaining from the main occupation and leaving the place of permanent residence;
- the wide coverage of students and the possibility of obtaining the most up-to-date information in the particular field;
- tenfold decrease in the cost of education;
- possibility to apply the obtained knowledge right in the educational process;
- providing the equal possibilities for getting education independently of the residence workplace and financial position;
- the possibility of updating the learning material quickly and according to the latest data.

DE is well integrated in the educational process of humanitarian and technical universities, e.g. MESI, the University of South Ural, the Modern Humanitarian University, Moscow Higher Bank School and many others. It is worth mentioning that DE allows getting not only the first and the second higher education degree, but also allows getting post-graduate courses as well.

At the same time DE is not so widely spread among medical colleges and universities. That is why using DE in the post-graduate medical training is a truly promising issue. This thesis is reflected and supported in a number of official documents of the Department of Education of the Ministry of Health of Russian Federation.

OBJECTIVE

1. To assess the urgency of development of post-graduate distance education (DE) program on antimicrobial therapy (AT) in Russia.
2. To evaluate effectiveness of DE course as changes of "students" level of knowledge after completion of DE course in comparison with baseline.

MATERIALS AND METHODS

First Internet centre of DE in Russia and CIS was founded under the auspices of the Institute of Antimicrobial Chemotherapy (IAC), the Department of Clinical Pharmacology of the Smolensk State Medical Academy with the support of the United States Pharmacopeia (USP) and the United States Agency for International Development (USAID) on the basis of the web-site for medical professionals "Antibiotics and Antimicrobial Therapy" (<http://www.antibiotic.ru>), recognized as conforming to the principles of the HON Code foundation in 2003.

To assess the urgency of DE for physicians the on-line survey was performed on www.antibiotic.ru. To evaluate the effectiveness of DE course the comparison of baseline level of knowledge in AT and the final test (after completion of the DE course) results of "students" was done.

Linux and Solaris operating systems are used for organisation of domain's hosting www.antibiotic.ru; RDBMS PostgreSQL and MySQL are applied for management of the web-site's content.

Java was used as a basis for creating the system. J2SDK 1.3.x and 1.4.x from Sun Microsystems Inc. served as a software basis on working stations, powered by the Intel x86 class processors. After building and adjusting the system, it was moved to the Sun Netra T1 target platform with the Sun SPARC processor, connected to the Internet. In both cases Jboss 3.x served as a EJB server, with Tomcat 4.x as a servlet controller. As a DBMS either hsqldb or PostgreSQL is used, and as to the target platform SAP DB is used. The out-of-box DE system supports Russian and English language interface.

RESULTS

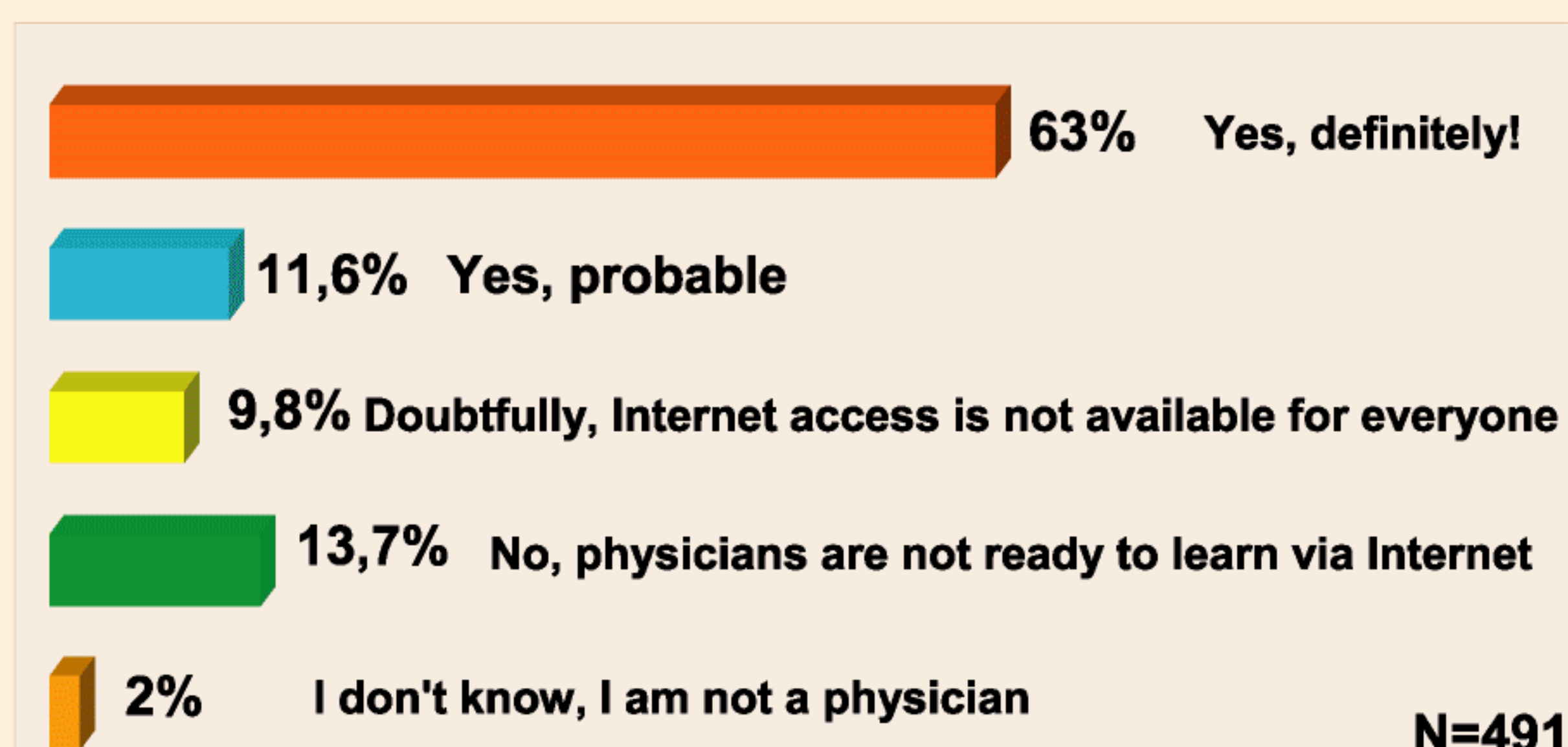


Fig. 1. Urgency of DE (via Internet) for physicians

491 visitors of www.antibiotic.ru took part in the on-line survey "Urgency of DE (via Internet) for physicians" (Fig 1). The program of DE starts with the preliminary testing on-line and consists of 20 questions randomly selected from database of 143 questions on antimicrobials, clinical microbiology, AT, ect. This testing allows to determine the basic level and detect the most crucial gaps in knowledge of AT in Russian health care professionals. The average percent of right answers on preliminary tests passed by

342 physicians was 61.3%. Less than 2% of doctors gave more than 80% right answers.



Fig. 2. Location of DE participants

In addition to the specially prepared topics DE ground base utilizes 7 full-text practical guides, 15 issues of the journal "Clinical Microbiology and Antimicrobial Chemotherapy", 36 practical guidelines and informational letters, 37 articles and presentations from Russian and international conferences from the www.antibiotic.ru library.

After completion of each topic, "students" are offered control tests so that tutors can assess the level of knowledge. Upon completion of each level an intermediate examination is conducted (on-line tests and practical tasks). In total 247 clinical cases and 706 test questions to be answered on-line, were designed.

Since the implementation of the project, 87 doctors from 12 Russian regions have been trained using DE technology (Fig. 2).

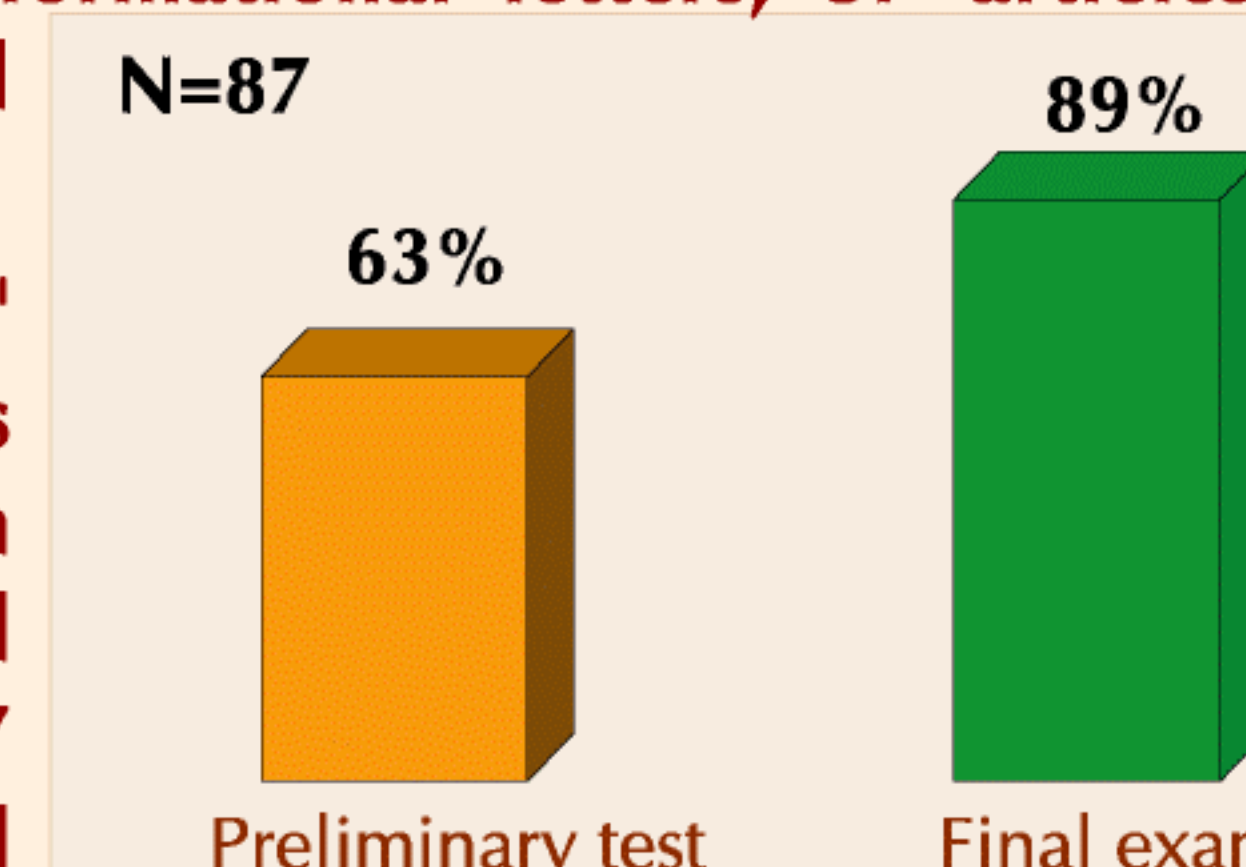


Fig. 3. The percent of correct answers given by "students"

Analysis of the DE results revealed the obvious increase in the number of the correct answers given by physicians in their preliminary test and the final exam, confirming the effectiveness of the DE (Fig. 3). After passing the final examination all physicians received the official state certificate confirming the improvement of knowledge in the field of AT (Fig. 4).



Fig. 4. Official certificate

CONCLUSIONS

1. DE via Internet is a demanded form of post-graduate professional education among physicians in the field of AT in Russia.
2. DE is an effective form of professional level improvement in AT.

PS: Students' opinion about DE course:

«... I would like to appreciate the course that is so well and clearly organized! I didn't expect and was really surprised by the quality and scope of the information and how quickly a student can get the answer to his question from his tutor...»

«On the whole, the course produces a very favorable impression.

Feel really nervous before the final examination ...»