ETHICS OF VALEOLOGICAL RESEARCH IN HIGHER EDUCATION INSTITUTIONS

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ABSTRACT

Background. Teaching valeological disciplines in non-medical higher education institutions is carried out by teachers with pedagogical education, medical education and medical practice (certified physicians). To successfully form valeological (health-saving) competence, the teacher needs to interview non-medical students not only regarding knowledge and practical skills in solving situational tasks using academic tests, but also to study his behavior models, for which special questionnaires with questions on sensitive topics have been developed.

Aim. To develop an algorithm for reliable storage of confidential information regarding the health and behavior of non-medical students studying valeological disciplines.

Materials and Methods. The research was conducted using the sociological method and the system analysis method.

Results and Conclusions. The openness of answers to sensitive questions is ensured only by the confidential storage of the received questionnaire data. For confidential data storage, paper tests-questionnaires should be divided into three parts: a non-confidential test (contains the personal data of the education seeker), a confidential questionnaire (contains an encryption code instead of the personal data of the education seeker), and a code key (contains the code and personal data of students for their identification if necessary to combine the test and questionnaire data). The forced transition to distance learning accelerated the transition to electronic testing-questionnaires and the digitization of paper test-questionnaire data. For confidential questionnaire data storage, encryption of the students' personal data and separation of access to confidential and non-confidential data using standard scripts of the Google Forms, which allows using confidential questionnaires instead of anonymous ones. For scientific purposes, the questionnaire data is statistically processed as anonymous. If necessary, use standard scripts allows decoding the key data and identifying the students.

Keywords: *valeological competence, trusted doctor, "Health Pedagogy", "Fundamentals of Medical Knowledge and Health-Saving", confidential surveys.*

Introduction

The formation of valeological competence consists in the maintaining a healthy lifestyle, changing forms of behavior to safer ones, and the ability to provide effective emergency pre-medical care to save life in critical conditions and during resuscitation [1]. In modern valeological research, valeological competence is considered as the basis for confronting negative genetic, environmental, and behavioral risk factors for diseases and for the fastest recovery after them [2]. Teaching valeological disciplines is an important part of the preventive work of the general public health system of Ukraine. The most qualified teachers of valeological disciplines are medical workers with medical and pedagogical education and medical practice [3]. Non-medical higher education institutions (in particular, Ukrainian Engineering Pedagogics

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Academy (UEPA), National Technical University "Kharkiv Polytechnic Institute" (NTU "KhPI"), V.N. Karazin Kharkiv National University, Ukraine), invite such specialists for systematic teaching at departments of the relevant profile or for conducting individual classes [4; 5]. In Kharkiv, the disciplines taught in these higher education institutions are "Valeology", "Health Pedagogy" and "Fundamentals of Medical Knowledge and Health-Saving". The latter two disciplines are related as they are built from 14 educational topics that are able to form valeological competence in students within the period of least one academic year. The valeological disciplines "Health Pedagogy" and "Fundamentals of Medical Knowledge and Health-Saving" contain topics, when teachers need to get honest answers about their health status and behavior that may go beyond the law (when using psychoactive substances) and traditional morality (sexual preferences). Answers to these and other questions about the health of students and their family members should be kept confidential, but at the same time not interfere with the assessment of academic performance. The teachers of valeological disciplines should offer students the conditions for confidential collection and use of such information [6; 7].

The **aim** of the study was to develop an algorithm for reliable collection and storage of confidential information regarding the health and behavior of non-medical students.

Materials and Methods

The study was conducted using the sociological method and the method of system analysis. To establish the level of formation of valeological competence, the teacher assessed knowledge, practical skills, motivation for a healthy lifestyle [8], conscious attitude to the norms of a healthy lifestyle and safe behavior, adherence to one's own beliefs about possible diseases of the non-medical students and his family members, hygiene skills, ability to provide emergency pre-hospital care, risk factors for infection, injury, cessation of vital functions, etc. Issues of sexual behavior (preferences, number of sexual partners, use of contraceptives, unwanted pregnancies, sexual violence), sexually transmitted diseases, HIV/AIDS, use of legal and prohibited psychoactive substances, etc. were discussed with the non-medical students in private or through questionnaires. For effective influence (changing behavioral patterns to safer ones, forming a healthy lifestyle), frank answers to questions regarding personal health of students and their family members, the behavioral patterns of students and their sexual partners, are necessary. To obtain frank answers, a teacher with medical practice/medical education (hereinafter referred to as a trusted doctor) had to guarantee the student confidentiality and maintaining of medical secrecy, which is regulated by Article 40 of the Law of Ukraine 2801-XII of 19 Nov 1992 "Fundamentals of Ukrainian Legislation on Health Care" [9]. A test for knowledge of theoretical material of the valeological discipline and practical skills in solving situational tasks during the study of most topics of the valeological disciplines "Health Pedagogy" and "Fundamentals of Medical Knowledge and Health-Saving" was combined with a questionnaire. The use of this confidential technique was tested on more than 4,000 non-medical students between 2004 and 2024.

Results and Discussion

In March 2020, due to the COVID-19 pandemic, many higher education institutions in Ukraine were forced to switch to distance or blended learning [10]. In February 2022, the need to comply with quarantine measures was added to the risk of death of higher education students and teachers during the educational process from shelling by the russian terrorist army that attacked Ukraine. These facts increase the prospect of continuing distance learning in the coming years and push for the creation of new methods of ensuring confidentiality. Distance learning provides sufficient technical capabilities to meet these conditions, and even simplifies private communication between a non-medical student and a teacher.

Confidentiality issues are the most well-established in medical practice. During communication between a doctor and a patient, the doctor immediately offers a model that allows the patient to feel safe to answer the doctor's questions frankly [11]. During communication between a teacher and a non-medical student, similar conditions are created specifically within the framework of individual pedagogical research. And confidentiality conditions do not apply to pedagogical practice by default. The greatest demand for the creation of confidentiality conditions exists precisely in disciplines that provide for psychological and medical examination of non-medical students [12; 13].

The ethics of biomedical research with humans require anonymous surveys where possible. However, anonymous surveys do not correspond to the methodology for forming valeological competence by the disciplines "Health Pedagogy" and "Fundamentals of Medical Knowledge and Health-Saving " for the following reasons:

1) to form valeological competence, it is necessary to master the entire program of the discipline, which consists of 14 topics;

2) on 8 out of 14 topics, non-medical students must be asked personal questions, the answers to which must be kept confidential;

3) to assess the success of the formation of valeological competence of each non-medical student, the teacher must evaluate the answers to all questionnaires developed for each of the topic of the discipline, which is impossible to do in the case of an anonymous survey.

Confidential information received by the trusted physician was stored in a way that prevented access to it by unauthorized persons. Maintaining confidentiality when using both paper and electronic questionnaires was achieved through the following steps:

1) all pages of paper questionnaires-tests that required students' answers were filled out simultaneously (their questions are logically interconnected within each topic studied in the course of the disciplines "Health Pedagogy" and "Fundamentals of Medical Knowledge and Health-Saving"), but were stored separately;

2) the test-questionnaire contains separate blocks of information in the following sequence:

- demographic part, which indicates the date of filling out the questionnaire (first, second, or third time it is filled in), surname, first name and patronymic of the non-medical student, date of birth in the form dd.mm.yyyy, age (in full years), sex, course, group, e-mail address;

- the test part of the test-questionnaire, which contains the answers of student to theoretical questions and solutions to situational tasks, and is subject to academic evaluation;

- the questionnaire part of the test-questionnaire, which may contain confidential questions and is not subject to academic assessment, except for the self-examination skills of the student; the questionnaire part begins with an arbitrary code consisting of a randomly generated sequence of letters and numbers that are not related to the academic group, or the age of student, any other personal data of the student, by which this student can be uniquely identified among all other students; the questionnaire part begins with a new sheet so that it can be mechanically separated from the test part and the code key of the test-questionnaire; the questions of the questionnaire part are answered by the student, the code is invented and entered into the questionnaire part by a trusted doctor, until the test part of the questionnaire is separated from the questionnaire part and from the code key; the questionnaire part of the test-questionnaire without personal data of the student is anonymous, which meets bioethical requirements for medical research involving humans [14, p. 50];

- code key – the part of the test questionnaire, which is stored by a trusted doctor in a personal safe, and contains the passport data of the student and an arbitrary code assigned to the questionnaire part of the test-questionnaire; the code key of the test-questionnaire is filled in personally by the trusted doctor; the code key of the test questionnaire begins with a new sheet so that it can be mechanically separated from the test and questionnaire parts of the test-questionnaire.

The student's answers to the test-questionnaire allow the trusted doctor to provide recommendations on reducing the risks of diseases and injuries, if necessary, refer the student for consultation with a doctor of the appropriate profile or for examination in a laboratory [15–17]. This mechanism reflects the connection between the system of valeological education and the public health system of the country [18]. The questionnaire part of the text-questionnaire contains the data on the state of health, life history, family history, stigmatizing diseases and the results of their treatment, the psychological and mental state of the applicant for non-medical student, sexual behavior, cases of violence, and the use of prohibited psychoactive substances. Access to all questionnaires allows the teacher to comprehensively assess the behavior of the applicant for student. At the same time, only the test parts of the test-questionnaires were freely available to the department management, other teachers, technical staff, and the administration of the university (hereinafter referred to as third parties). The data from the questionnaire parts of the tests were summarized (statistically processed) in a form that excluded the identification of the student by characteristics that obviously distinguished him from other students. This approach required a certain autonomy of the teacher of the valeological discipline and trust in his decisions by the university administration [19].

Work with test-questionnaires could be carried out both on paper and in electronic form. Paper test-questionnaires were later converted to electronic form. After that, paper media were destroyed. Converting the questionnaire from paper to electronic form reduced the risks of third parties becoming familiar with the confidential results of the questionnaire, reduced the costs of storing the questionnaires (safes, special archives using large

areas, and the work of an archivist were not required). Also, such storage excluded the possibility of identifying the applicants who filled out the questionnaire part of the test-questionnaire by handwriting.

The most popular system for planning and evaluating the results of the educational process is Moodle [20–22], which also allows you to create questionnaires. But questionnaires in Moodle are stored in an unencrypted form, and the results of the questionnaire are available to many participants in the educational process (the student himself, the teacher, the head of the department, the management of the higher education institution, in some cases – also to specialists of the Ministry of Education and Science of Ukraine and the National (of Ukraine) Agency for Higher Education Quality Assurance, who carry out the inspection of educational institutions, if they have access and have created appropriate accounts on the university's distance education website. Learning using distance education websites also involves the use of other Internet platforms and services, which can be both integrated and non-integrated with Moodle. In the latter case, the assessment and text conclusion regarding the academic result of the test (knowledge, ability to solve situational tasks) cannot contain data that is reported to the trusted doctor in the confidential part of the test-questionnaire. The assessment and text conclusion regarding the questionnaire, which reflects the academic result of the questionnaire, but does not concern its confidential content, can be entered into Moodle by the teacher manually (not automatically).

For surveys on other platforms, Google Forms is most often used. Flexible settings for summarized survey results using Google Forms scripts [23–25] allow you to process survey results in a confidential manner for the purposes of personal counseling, and anonymously for statistical processing of a set of questionnaires for scientific purposes.

In order to comply with the principles of anonymity and confidentiality, it is necessary to determine how Ukrainian legislation defines the content of these concepts. Due to the frequent discrimination and stigmatization of HIV-infected/ AIDS patients, the details of anonymity and confidentiality of counseling in Ukrainian legislation are best worked out for this category of patients. The Law of Ukraine "On Combating the Spread of Diseases Caused by the Human Immunodeficiency Virus (HIV), and Legal and Social Protection of People Living with HIV" [26] grants patients the right to anonymous counseling on HIV infection (Article 4, Clause 1, Clause 4). Confidentiality is understood as the preservation by the counselor of information received from the patient: the fact of the person's application, the content of the services received, the result of the examination, data on the patient's personal life, and his passport data. Confidential information may be transferred to third parties in cases clearly defined by law: in relation to a minor or incapacitated patient – to parents or legal guardians, for the purpose of further examination and treatment – to health care institutions, for the purpose of revealing or preventing a criminal offense – to the prosecutor's office, investigation, inquiry and court bodies (upon a reasoned written request). Disclosure of confidential information by a medical or auxiliary worker, official who received such information in connection with the performance of their official duties or arbitrarily, entails criminal liability. When preparing, using and storing documentation containing confidential information about HIV-infected persons, medical workers, administrative and auxiliary personnel of medical institutions must prepare reports and speak in the media in such a way that HIV-infected persons are not identified. Such identification and disclosure of confidential information can lead to alienation and discrimination of the HIV-infected person by the family and society. The use of confidential documentation is carried out in such a way as to prevent unauthorized persons from getting acquainted with it, using archives, safes and drawing up appropriate orders from the head on the appointment of consultants. If the medical record (medical history) is stored in the file cabinet (archive) of a medical institution that does not belong to the Ukrainian network of AIDS prevention and control centers (these institutions maintain dispensary records only of HIV-infected people and children born to HIV-infected mothers), the codes assigned to HIV-infected people of various categories in accordance with the Order of the Ministry of Health of Ukraine No.120 [27] (HIV-infected pregnant women – code 109, HIV-infected injection drug users – code 102, etc.) are prohibited from being placed on the cover of the medical record (medical history) so that they cannot be seen by unauthorized persons.

The current Procedure (Protocol) for voluntary counseling and testing for HIV infection [28] provides for the possibility of receiving anonymous counseling by the patient, which takes place wi-

thout determining the patient's passport data (surname, first name, patronymic; date of birth; place of residence, work or study, etc.). In the questionnaire, this data is replaced by a code necessary to obtain the results of the examination. Counseling should also be accessible. Discussion of the HIV status of students who have contacted a teacher with medical education/medical practice who teaches the valeological discipline should also take place in compliance with the principles of anonymity and confidentiality, and the opportunity to discuss HIV status will contribute to timely referral to specialized medical institutions for HIV testing and correction of behavioral patterns to reduce the risk of infection. Counseling may be extended to spouses, fiancés, sexual partners, family members, friends, colleagues, etc. only with the patient's consent (clause 5, article 4 of the Order of the Ministry of Health No.415). It is desirable that the pre-test and post-test counseling of the patient be conducted by the same counselor. The result of counseling in the presence of a positive HIV test should be an invitation to examine the sexual partner of the HIV-infected person, if the HIV-infected person agrees to inform him of the test result. If the HIV test was not anonymous, the HIV-infected person must sign a document certifying his awareness of the criminal liability for endangering infection and infection of other persons with the human immunodeficiency virus.

A similar understanding of confidentiality and anonymity exists in other areas of medical practice: during the termination of unwanted pregnancy [29], in other matters of family planning (in particular, contraception) [30], including in "youth-friendly clinics" [31], in the presence of stigmatizing sexually transmitted diseases and the vulnerable position of prisoners [32], in the laws of Ukraine "On Information" (Article 11, paragraph 2) [33], "Fundamentals of Ukrainian Legislation on Health Care" [34] (Article 40), "On Personal Data Protection" [35] (Article 6, paragraph 8; Article 7, paragraph 1; Article 7, paragraph 2, paragraph 6). From a technical point of view [36], confidentiality is the property of information to be received only by an authorized user or process.

Access to confidential information in computer networks is administered on the basis of trust. The principle of delimiting access to information is natural for computer systems, so its use by means of computer communication during forced distance learning simplifies the task of ensuring confidentiality. This fact prompted our research group to necessarily translate paper tests of the questionnaire into electronic form. And the imperfection of the Moodle platform in terms of confidentiality has confused teachers with medical education to look for ready-made solutions on other platforms. Convenient ready-made solutions turned out to be Google Forms and Google Apps Script [37]. They are used in parallel with Moodle in accordance with the academic rules of UEPA and other universities, which taught the valeological disciplines "Health Pedagogy" and "Fundamentals of Medical Knowledge and Health-Saving".

Work with paper and electronic questionnaires has thus been synchronized and now consists of four stages:

1) collecting information (surveying and testing);

2) division of information into confidential and non-confidential;

3) storage and evaluation of information;

4) constant access to information.

Working with information obtained from non-medical students of UEPA in the form of questionnaire tests during the study of the valeological discipline "Health Pedagogy" showed that the proposed method of maintaining the confidentiality of information led to an increase in the trust of students in the teacher of the discipline "Health Pedagogy", as evidenced by a decrease in the number of rejected questionnaires due to unreliable answers in the 2021/2022 academic year compared to the 2020/2021 academic year by 2.5 times – from 11.8% to 4.7%. To check the reliability of the questionnaires, special "trap" questions were included in them: essentially the same, but different in the wording of the questions. The questionnaire was considered reliable only if the answers to such questions coincided. We also rejected the questionnaires of students who did not fully study the course of the discipline, who did not study consistently throughout the semester, but quickly completed all the tasks of the discipline on the last day before the exam, and who were suspected of academic dishonesty (copying other people's works).

The proposed algorithm satisfied all the requirements for conducting confidential research and allows its use in further valeological research during the training of non-medical students.

Conclusions

1. Confidentiality of information about the health and diseases of non-medical students, obtained by a teacher of valeological disciplines of engineering universities of Ukraine for academic purposes, is a prerequisite for honest answers to personal questions, without which it is impossible

to fully assess the success of the formation of valeological competence, and therefore to fairly assess the academic success of non-medical students.

2. We propose combining the pedagogical process with medical consultation by a teacher with medical education/medical practice (trusted doctor); combining academic test questions on knowledge and practical skills of health preservation and health restoration with a questionnaire on risk factors for diseases, family history, life history, behavioral patterns, healthy lifestyle, treatment results, – with further separation of these data for assessing academic results, studying personal health issues and generalization with statistical processing for scientific purposes; encryption of personal data with Google Forms scripts to enable confidential consultations instead of anonymous ones. To maintain confidentiality, encryption of personal data and restriction of access to personal information are used.

3. For confidential storage of questionnaire data, encryption of the student's personal data and separation of access to confidential and non-confidential data using standard Google scripts were used. Forms, which allows you to use confidential questionnaires instead of anonymous ones. For scientific purposes, the questionnaire data is statistically processed as anonymous. If necessary, use standard scripts of the Google Forms allows you to decode the data of the code key of different questionnaires of one applicant for higher non-medical education, identify him to obtain a comprehensive picture of his current state of health and the level of formation of valeological competence. The proposed methodology reduced the number of rejected questionnaires due to unreliable answers in the 2021/2022 academic year compared to the 2020/2021 academic year by 2.5 times.

DECLARATIONS:

Disclosure Statement

The authors have no potential conflicts of interest to disclosure, including specific financial interests, relationships, and/or affiliations rele-vant to the subject matter or materials included.

Statement of Ethics

The authors have no ethical conflicts to disclosure.

Data Transparency

The data can be requested from the authors.

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All authors give their consent to publication.

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