

**THE INFLUENCE OF DIGITAL DEVICES ON THE PSYCHOEMOTIONAL  
STATE OF THE KNMU STUDENTS**

Шифр: психогієна

## **THE INFLUENCE OF DIGITAL DEVICES ON THE PSYCHOEMOTIONAL STATE OF THE KNMU STUDENTS**

**The purpose of the work.** Studying the complex influence of digital devices on students' psycho-emotional state.

**Actuality.** Youth health is the most important characteristic of the well-being of society and the state. At the same time, timely detection of the negative impact of various environmental factors is a guarantee of preservation of physical and mental health of the nation. Particular attention is paid to digital devices, which have become an integral part of modern society in recent years. Their integrated impact on the health of young people can lead to the emergence of somatic and mental illnesses.

**Research objects.** Identify the main adverse digital devices and their potential hazard for students' health, the most dangerous negative influence factors of digital devices on psycho-emotional state. Work out ways of prevention the negative impact of digital devices on the health of young people.

**Conclusions.** According to the results of the study, it was found that 100% of non-compliance by the students with the rules of using digital devices has occurred. It leads to deterioration of the psycho-emotional state: state of health, activity, level of anxiety, feeling of stress and resistance to it. Students have a high percentage (60.71%) of complaints of poor health after working with digital devices. The corresponding situation shows the lack of preventive measures and the low level of knowledge of the students themselves in preventing the adverse effects of digital devices and the conditions of their use on the psycho-emotional state.

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## INTRODUCTION

**Relevance of the theme.** Youth health is the most important characteristic of the well-being of society and the state. At the same time, timely primary prevention of the negative impact of various environmental factors and the education of young people is a guarantee of preservation of physical and mental health of the nation. Particular attention is paid to the latest digital technologies, in particular digital devices, which in recent years have become an integral part of modern society. Digital devices are being implemented very quickly in our everyday lives. Millions of people use tablets, computers, phones every day, and the number and variety of related devices grows every year. As research results show, practically all young people regularly use tablets, smartphones or other digital devices. The safety of digital devices for human health, in particular students, is still open. Thus, in the context of the observance of health-saving technologies, the issue of forming the psycho-emotional sphere of youth under the influence of the use of digital devices becomes of particular importance.

Currently, the most prominent negative aspect of the use of mobile phones and other digital technologies, which is covered in the scientific literature, is the harmful effects of electromagnetic radiation on human health. At the same time, other unfavorable factors of digital devices, which, due to their complex impact, are potentially harmful to the health and psycho-emotional sphere of young people, are almost not taken into account.

The relevant situation concerning the peculiarities of using digital devices and their influence on the psycho-emotional state of adolescents has allowed to select and formulate the topic of research work: "Influence of digital devices on the psycho-emotional state of students".

**The object of research** is the complex influence of risk factors of digital devices on the psycho-emotional state of students.

**The subjects of the study** are digital devices, the characteristics of the psycho-emotional state of students, the peculiarities of the use of digital devices.

**The purpose of the study is** to determine the peculiarities of the influence of unfavorable risk factors of digital devices on the psycho-emotional state of students and to determine the ways of primary prevention of violations of young people's mental health. The goal is achieved by solving the following tasks:

- Detection and analyzing the potential hazards and consequences of long-term work with digital devices;
- Developing a questionnaire which will allow to establish specific features of the conditions of use of digital devices by students of KhNMU;
- Carrying out research of the psycho-emotional state of students;
- Analyzing the most dangerous factors of the negative influence of digital devices on students' health;
- Working out ways of prevention the negative impact of digital devices on the psycho-emotional state of youth.

**Materials and methods of research:** in order to solve the research tasks, analytical, instrumental and questionnaire research methods were used. According to the methodology of organization of researches in the psycho-emotional sphere of youth, questionnaire methods were used, as well as the method of statistical processing of the obtained results.

**The scientific novelty of the obtained results** is that for the first time the study of the complex influence of adverse factors of the risk of digital devices in the psycho-emotional state of students of KhNMU has been carried out and the peculiarities of the conditions of use of digital devices have been determined.

**Ways of implementing the obtained results:** receiving peculiarities of the conditions of students' work with digital devices, as well as the results of the changes in the state of the psycho-emotional sphere of youth under the influence of digital devices, will give opportunity to improve the methods of organization of pre-nosological diagnosis and primary psychoprophylaxis on the influence of adverse factors of digital devices on the health of young people.

## **SECTION 1**

### **The main principles of the study of the problem of the influence of adverse factors of digital devices on the psycho-emotional sphere of students**

#### **1.1. Characteristics of the risk factors of digital devices**

Modern digital devices are complex electronic systems that can perform various functional tasks, namely: providing mobile communication, providing electronic textbooks, listening to music, providing access to Internet networks and improving leisure while listening to music or watching a movie. The aforementioned capabilities of modern digital technologies are just a small part of their real capabilities, but different in terms of names and functionality, all of them have essentially the same components, the adverse factors that determine the impact on human health [1-7].

The factors of the risk of adverse effects on the psycho-emotional state of a person can be attributed physical parameters that are due to the physical characteristics of digital devices, and non-compliance with hygienic recommendations regarding the mode of use of digital technology; Since the physical parameters of digital devices act on the user at the same time, it is more appropriate to analyze their complex impact on the psycho-emotional state of students. However, the individual structural components of the indicated devices determine the specific effect.

An obligatory element of any digital device is the screen. In various models, it is presented as a monitor or display. They have a negative effect on the eyesight and the human nervous system [16]. The screen is directly a means of transmitting information and the main source of perception of visual information in a digital instrument, therefore, the work with the monitor and the screen is associated with significant strain of the human visual analyzer [8-9], which includes not only the eye

but also complex neurophysiological relationships of eye structures with central nervous system.

Currently, there are two types of monitors: Liquid-crystal (LCD) monitors and electron-emitting diode monitors (EED) that are almost unused. EED monitors had a number of disadvantages, including instability (flicker) and fuzzy image, which could result in poor vision. Because of this, the eyes quickly tired, and the person became annoyed. Some of these disadvantages are typical of the older generation of mobile phones equipped with a black and white screen, and they are small in size.

Particular attention should be paid to maintaining the safe distance between the digital display screen and the eyes of a person. Thus, according to hygienic recommendations, the safe distance between the head and the screen should be at least 50 cm. If this recommendation is not followed, it is possible not only the deterioration of vision, but also headaches and primary changes in the psychoemotional sphere of the adolescent. Particularly dangerous this violation is for children and adolescents, since headaches and constant stress can cause inattention and bad manners.

The results of numerous scientific works using the latest measuring equipment of foreign and domestic production have shown that digital devices are a source of:

- electrostatic field;
- electromagnetic radiation in the low-frequency, ultra-low frequency and high-frequency bands (2 Hz - 400 kHz);
- radiation of the optical range (ultraviolet, infrared and visible light), soft x-ray radiation.

Scientists have proven that low-frequency radiation in the first place negatively affects the central nervous system, causing headaches, dizziness, general weakness, depression, insomnia, lack of appetite, and stress. The nervous system reacts even for a short duration of influence of weak fields: changes in the hormonal state of the body, broken biocrases of the brain. Particularly suffering from this learning process, assimilation of material, analysis and concentration.

The levels of electromagnetic emissions of monitored monitors that are considered to be safe for health are prescribed by the IRA II 1990: 10 by the Swedish National Committee for Measuring and Testing, which are considered basic, and the more stringent provisions of the TCO 92,95,99,100 of the Swedish Confederation of Trade Unions. In Ukraine, the following normative legal acts, such as State building rules and regulations 0.00-1.31-99 and State sanitary rules and regulations 3.3.2.007-98, which include all rules, norms and mandatory recommendations for the operation of digital devices, are in force in Ukraine.

No less significant adverse factor in digital devices is noise [10, 17]. Noise is a mechanical wave-like vibratory motion of an elastic medium that is chaotic in nature. According to the sanitary normative base of Ukraine No. 3077-84 of August 3, 1984, the maximum noise level in residential and in educational premises during the day should not exceed 55 dB. Most often a student is dealing with constant noise, that is, noise, which does not change over time by 5 dBa or more, with measurements on the time characteristic "slowly".

The noise is usually observed when the cooler is active, as well as when listening to music or playing the computer. Sharp or loud noise can cause stress, insomnia, headaches, cardiovascular disease, reduce reflex activity, cause hypertension. The long-term effects of noise sources (listening to loud music, constant noise of the cooler) can be the cause of inattention, increased annoyance and stress. But first and foremost, noise during training can be the cause of poor learning of the material.

You should also pay attention to such an aspect as the mode of use of technology. Mode of use may be different, and depending on this overload of the nervous system. That is, the use of digital devices can be for different purposes: both for entertainment purposes and for educational purposes. In contrast to quiet reading, computer games are activated by a lot of nerve centers, and, accordingly, by the resources of the nervous system, than by reading, overloading it, so it is very important to adhere to hygiene norms, avoiding pathologies, because the more the load on the nervous system, the probability of occurrence of the primary psycho-



emotional changes higher. Violations of hygienic norms include: too long use, the wrong distance between the body and the monitor, the so-called factor of "inconvenient posture". The neglect of hygiene standards can lead not only to violations in the psycho-emotional sphere, but also to cause pathological illnesses.

Thus, the most significant adverse factors of digital devices are the influence of screen characteristics, physical parameters of the digital instrument and noise. A separate factor can be put on the mode of use of technology.

## **1.2. Features of the complete influence of digital devices on the psycho-emotional state of youth**

The problem of the impact of digital devices on the health of young people has many theories. The main undeniable fact is that the various characteristics of digital devices act on the body in a comprehensive manner, while removing one or the other most significant risk factor is practically impossible, as it is typical to use several digital gadgets throughout the day.

The most popular and the closest to the truth is the assertion that, in the event of a violation of the use of digital devices in young people, a "computer stress syndrome" [16] develops. Symptoms of the disease are diverse and numerous. They are grouped according to the principle of influence on one or another human body.

1. General anxiety: drowsiness, fatigue, non transient fatigue (even after a rest); headaches after work; headaches in the area of the eyebrows and forehead, eye pain, in the occipital, lateral and parietal parts of the head.

2. Diseases of the eye: fatigue, sensation of acute pain, burning, itching, tears; frequent blinking, feeling of gravity.

3. Violation of visual acuity: obscurity of vision at a distant distance immediately after work at a computer (myopia); uncertainty of vision at close range (the image on the screen is poorly focused); obscurity of vision increases during the day; dichotomy in sight; the glasses become "weak" (need to change glasses), headaches, slow refocusing; strabismus.

4. Deterioration of concentration and disability (very often manifested as a result of visual violations): the inability to concentrate for a long time; increased emotionality (aggressiveness, instability of character, irritability); loss of the operating point on the screen, general inattention: the permutation of words or numbers in places.

5. Pain in the muscles: in the lower back, in the thighs, in the legs; numbness, numbness, pain in the hands, wrists and hands; joint pain; muscle tension of the upper part of the trunk (neck, back, shoulders, arms).

According to physicians, the causes of various symptoms of CSS are:

1. Failure to observe the hygienic recommendations regarding the distance between the eyes and the screen, resulting in increased eye strain;
2. Incorrect position of the body when working with digital devices;
3. Incorrect organization of the work schedule;
4. Overload of the nervous system;
5. Low level of visual readiness for work with a computer.

Specialists pay attention to the so-called "factor of an uncomfortable posture". Because the peculiar feature of working with digital devices is posture real estate. At the same time, the muscles are constantly tense, which leads to fatigue; promotes the development of pathological bends of the spine, thoracic kyphosis, flattening of the cervical lordosis and the formation of scoliosis. Wrong placement of digital gadget screens in height is the main reason for the roughness. Working with the monitor at an incorrect angle: Due to tension in the cervical unit, there is a risk of osteochondrosis. Immediate load and further complications can lead to aforementioned diseases, and in more severe cases is paralysis possible.

Intensive work with the keyboard causes pain in the elbow joints, forearms, wrists, hands and fingers. An intense and prolonged use of the keyboard while working on the computer can cause serious hand-related illnesses. The complex of these diseases, which received the general name "traumatic repetitive loads" (TRL), includes diseases such as tendinitis, traumatic epicondylitis, Kerven's disease, tendosinitis, carpal tunnel syndrome. Working with the keyboard is the cause of 12% of occupational diseases caused by repetitive movements.

Diseases associated with TRL include diseases of the nerves, muscles and tendons of the hands. The brush, wrists and forearms are most commonly affected, although it sometimes happens that the disease affects the shoulder and neck area. In computer operators, the disease usually occurs as a result of continuous operation of the inconvenient or improperly located keyboard.

Unlike heart attacks and headache attacks, TRL is an injury as a result of an accumulation of ailments. Mild pain in the hand, if not timely cured, can lead to complete disability.

In foreign literature, the concept of the so-called computer vision syndrome (CVS) is commonly found (Computer Vision Syndrome). His symptoms are manifested differently, but for the most part, they are manifested by headache, reddening of the eyes, inflammation and dryness of the mucous membrane of the eye, which can lead to chronic stress. The causes of the syndrome are not in electromagnetic radiation, but in the peculiarities of working with the computer. The causes of the computer syndrome are unsuccessfully selected color gamut, computer problems, misfires, miscreated workplace, schedule, and more. When long-term work on the computer may be affected by the receipt of tear fluid, that is to be the cause of inflammation of the eye.

Also, in recent years, the great concern of doctors and parents is the issue of developing computer-game or online dependence [13]. At the same time, real social ties with the environment are negatively affected. Often, indifference, manifestations of aggression, social disadaptation become frequent. Lack of time and constant fatigue, which are the result of excessive working time with digital devices (more than 4 hours a day, if the work is not related to computer work), adversely affect learning success and may lead to the development of chronic fatigue syndrome [ 13, 14, 17]. Also, in recent years, the great concern of doctors and parents is the question of the development of computer-game or Internet addiction [13]. At the same time, real social ties with the environment are negatively affected. Often, indifference, manifestations of aggression, social disadaptation become frequent. Lack of time and constant fatigue, which are the result of excessive working time with digital devices (more than 4 hours a day, if the work is not related to computer work), adversely affect learning success and may lead to the development of chronic fatigue syndrome [ 13, 14, 17].

Thus, the negative impact of digital devices on the psycho-emotional state of students is a complex effect of the simultaneous influence of their physical

characteristics that are characteristic of certain types of digital technology, as well as the peculiarities of the conditions of use, which are individual for each person. At the same time, the most vulnerable are the organs of vision, the psycho-emotional sphere and mental functions, the musculoskeletal system and the limbs. Formation of psychic dependence on excessive use of digital devices can lead to social maladaptation, the development of chronic fatigue syndrome and worsening of learning outcomes.

The relevant situation makes it necessary to study the complex impact of digital risk factors and the conditions of their use on the psycho-emotional state of students, with subsequent correction of the lifestyle of adolescents in the context of the formation of valeological culture of life.

## SECTION 2

### Materials and methods of research

In order to determine the influence of the physical characteristics of digital devices and the conditions of their use on the psycho-emotional state of students, a scientific research was conducted on the basis of the Kharkiv National Medical University, which included the following steps:

- 1) A questionnaire survey of students on the conditions of use of digital devices and their influence on the psycho-emotional state;
- 2) Study of the level of concentration, stability and switching attention, as an indicator of fatigue;
- 3) Determination of the voltage level of the electromagnetic field of digital devices;
- 4) Statistical processing of the results.

In order to establish the specifics of the use of digital devices by students of the KhNMU, a questionnaire was developed that consists of 19 different questions in accordance with the purpose of the research work (see annex A). The psychoemotional state was determined using standard methods for determining the state of health, activity and mood (subjective self-esteem test, feeling of well-being, activity and mood), anxiety level (Ch.D. Spielberg's anxiety self-esteem test in the adaptation of Yu.L.Khanin). Also, with the help of questionnaires, the level of stress and resistance to it was determined [15]. The survey was attended by 112 students of the second year of the KhNMU. These techniques are presented in annexes B, B, G and D, respectively. Also, in order to determine the level of concentration, stability and switching attention as an indicator of fatigue of students, the Bourdon method "Correctional Sample" (appendix E) was used.

Determination of the level of electromagnetic radiation was carried out using the indicator of the electromagnetic fields "Impulse" of the «COEKC». The total number of measurements of the voltage of the electromagnetic field was 174 studies. The statistical processing of the results was carried out by calculating the percentages of answers specified in the questionnaires and the calculation of the average values of the indicators in the study groups with the subsequent comparison.

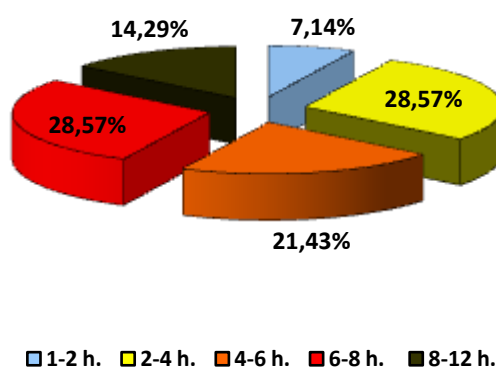
## SECTION 3

### RESULTS OF THE STUDY

#### 3.1. Characteristics of the use of digital devices by students of KhNMU

According to the results of the study, the following features of the use of digital devices were established.

According to the questionnaire survey of students of the 2nd year of the KhNMU, it was found that 100% of students use digital devices in their everyday lives. By the factor of daytime use of digital devices, it was found that only 7.14% of people adhere to the time recommended by physicians working with computers, which is 1-2 hours a day. 28.57% of students spend 2-4 hours a day; 4-6 hours - 21.43%; 6-8 hours - 28.57%; Almost all day time, namely 8-12 hours, is spent on working with digital technologies by 14.29% of people (pic. 3.1).



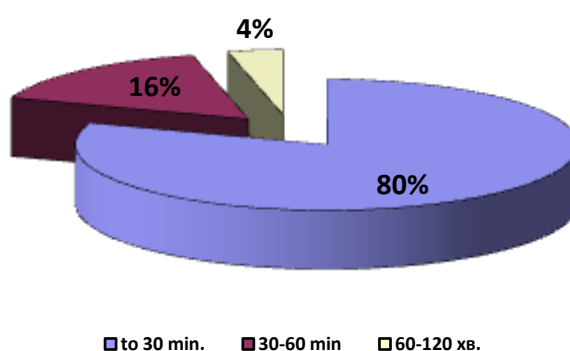
Pic. 3.1. Distribution of students to spend time on working with digital devices per day

Thus, in the area of risk of pathological health effects, 92.9% of the population are at risk, and 64.3% of students experience a real threat of computer-game or online dependence development. The last group includes the person using the computer for gaming purposes, the use of the Internet and social networking more than 4 hours a day.

It should be noted that the number of digital devices that students use during the day does not depend on the time they work with them. The distribution is as

follows: 96.42% of smartphones are available, only 3.58% of students use ordinary mobile phones, namely 4 out of 112 respondents. 8.93% of students use the two devices in the course of the day; the most commonly used combinations are a mobile phone or smartphone and a stationary computer or laptop. 66.1% of students work with digital devices for a day in a combination of a smartphone, tablet, stationary computer or laptop. Four and more digital devices per day use 24.97% of students.

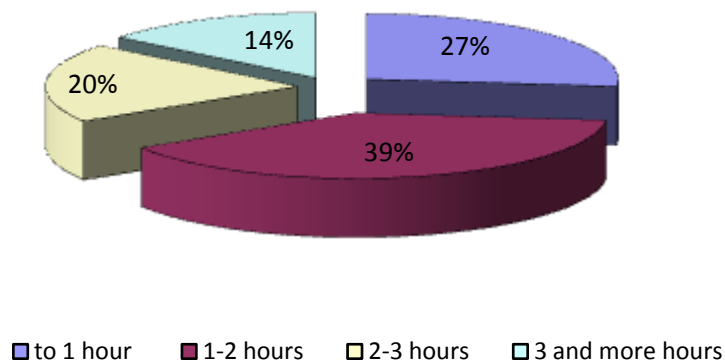
Particular attention needs to be given to the rational use of digital devices. So, useful time with digital devices, which included the duration of telephone conversations and the time required for preparation for training, is almost the same in all groups. So, students spend on telephone conversations: up to 30 minutes per day - 80.35% (90 people); 30-60 minutes a day - 16,07% (18 people); 1-2 hours - 4 students. The percentage of time spent on telephone conversations is presented as follows (pic. 3.2).



Pic. 3.2. Distribution of time spent on telephone conversations

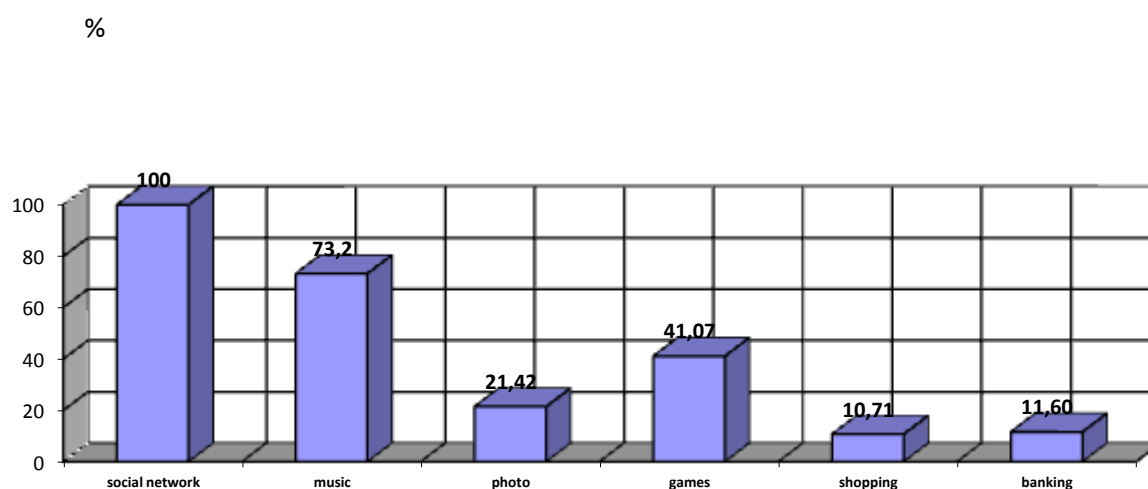
The time spent by students for learning through the use of digital features such as: reading e-books, preparing essays, searching for information for reports, etc., depending on the time spent working with digital devices, also largely does not differ and is distributed as follows: up to 1 hour per day spend 30 students, 1-2 hours - 44 people, 2-3 hours - 22 students, more than 3 hours to study during the day spend 16 students (Pic. 3.3.).





Pic. 3.3. Distribution of time spent on training with digital devices.

The time, free of telephone conversations, students spend 112 people on social networks, listening to music - 82 students, working with photo editors - 24, computer games 46, 12 people using Internet-shopping, 13 internet-banking opportunities (Pic. 3.4.).



Pic. 3.4. Percentage of time-free education by type of activity

The comparative characteristics of groups distributed over the use of digital devices allowed to establish that for students who use digital devices up to 2 hours a day, the time spent on telephone conversations, training and free use on average was up to 30 minutes, 52 minutes. and 38 min per day. In the group of people who

spend 2-4 hours a day, the time distribution was: telephone conversations on average took 34 minutes, training - 1 hour 35 minutes, free time - 1 hour 51 minute. Students who spend 4-6 hours a day working with digital devices spend an average of 45 minutes on phone calls, training takes 2 hours 23 minutes, so the time spent on other activities is an average of 52 minutes. up to 2 hours 52 minutes. In calculating the time distribution of students who spend with a digital device from 6 to 8 hours a day, it was found that they spend an average of 45 minutes on telephone conversations, for preparation of abstracts and reading - 2 hours 10 minutes, thus " entertainments »students of this group spend from 3 hours 5 minutes. up to 5 hours 5 minutes during the day. Young people in the group formed on the principle of spending 8 and more hours of time spent on digital devices, said that they also spend 45 minutes on average for telephone conversations. per day, they use an average of 2 hours and 20 minutes for training, thus, the largest portion of time is spent on electronic entertainment and ranges from 4 hours 55 minutes. and more.

The recommended distance from the screen to the eyes less than 50 cm is noted only by 2 students, which was 1.78% of all respondents. At the same time 33.93% of people work at a distance of up to 25 cm with a digital device.

It should be noted that 100% of the interviewed students consider digital devices to be a useful device, but only 7.14% of them admit that digital devices can distract from learning and worsen the level of real social life.

Thus, the issue of rational use of digital devices by young people arises as the useful time spent on communication in the cellular network or training for students who spend 4 hours a day or more is not effective.

The study of the level of electromagnetic radiation of digital devices, including tablets (34 pieces) and smartphones (mobile phones) (53 pieces), showed that its value during operation, except for the mode of the call, do not exceed the hygienic norms. During the call and telephone conversation, it was found that in 88.7% of cases the level of electromagnetic radiation exceeded the maximum permissible standards.

The results of the study suggest that 100% of 2 year students do not adhere to the rules of working with digital devices. The most pronounced adverse factors in the use of digital devices are the non-observance of the time of use of digital devices and the reduction of the distance between the eyes and the screen of a digital device. Also, attention is drawn to the inappropriateness of the use of time with digital devices by those who participated in the study.

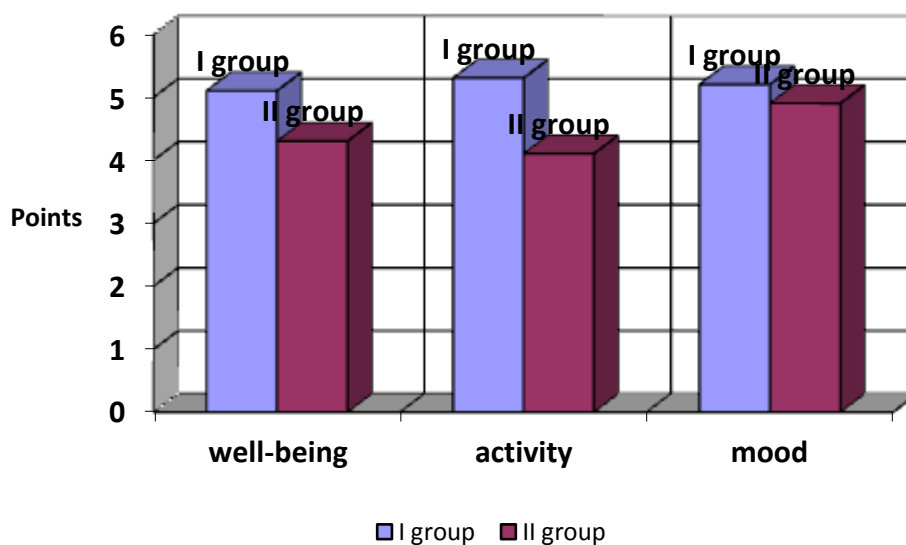
### **3.2. Influence of adverse factors of risk of digital devices on the psycho-emotional state and health of students of KhMMU**

In order to conduct a comparative analysis of the peculiarities of the influence of the conditions of use of digital devices by students of the KhNMU on their psycho-emotional state and state of health, the questionnaire of the students interviewed was divided into two groups. Thus, the first (control) group included 8 students, while the use of digital gadgets that meets hygiene standards and is up to 2 hours a day. Also included in this group are 32 people who use digital devices 2-4 hours a day and belong to the risk group on the harmful effects of the physical risk factors of these devices, but most of their time with digital devices is devoted to a useful activity. Thus, the number of the first group was 40 people.

The second group was presented by 72 students, the time of using computer technologies is more than 4 hours. It should be noted that the participants in this group are at risk for the emergence of diseases associated with inappropriate use of digital devices of various categories.

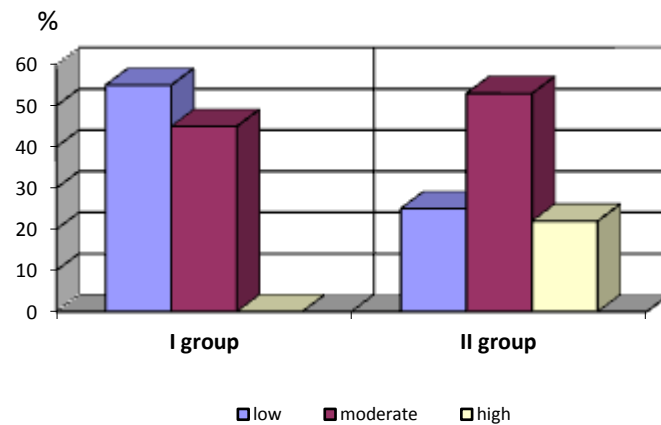
The evaluation of the test results of subjective self-esteem, well-being, activity and mood showed that the rates of students in the first and second groups have significant differences in the criteria of well-being and activity. Thus, the self-esteem of self-esteem among schoolchildren in the control group averaged 5.1 points, which is characterized as a good indicator of health, with the representatives of the 2nd

group the average value of this indicator is registered at the level of 4.3 points. The corresponding distribution indicates the worst indicators of state of health for students who entered the second group. The distribution of the average indicators of activity and mood in the first and second groups was 5.2 and 4.1; 5.3 and 4.9 points respectively (Pic. 3.5).



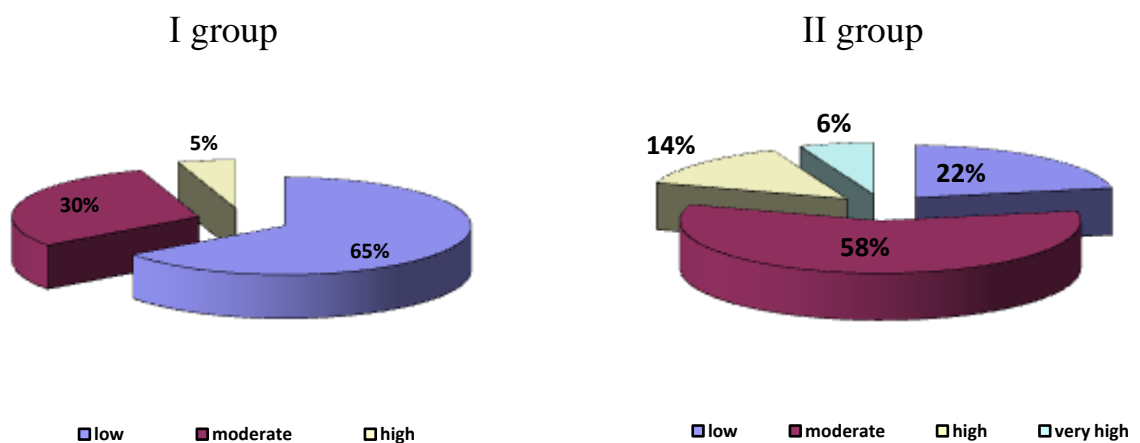
Pic. 3.5. Distribution of the mean values of the WbAM-test by study groups.

The level of anxiety determined by Spielberg's test showed that students who spend 4 or more hours a day working with digital devices have worse performance than those with a digital clock of less than 4 hours. So in the 1st group, the number of students with low and moderate anxiety levels was 22 and 18, respectively, students with a high level of anxiety in group I are absent. Among the students of the second group, there were 18 people with a low level of anxiety, 38 with moderate and 16 students with high anxiety. The percentage distribution of test results to determine the level of anxiety is as follows (pic. 3.6.).



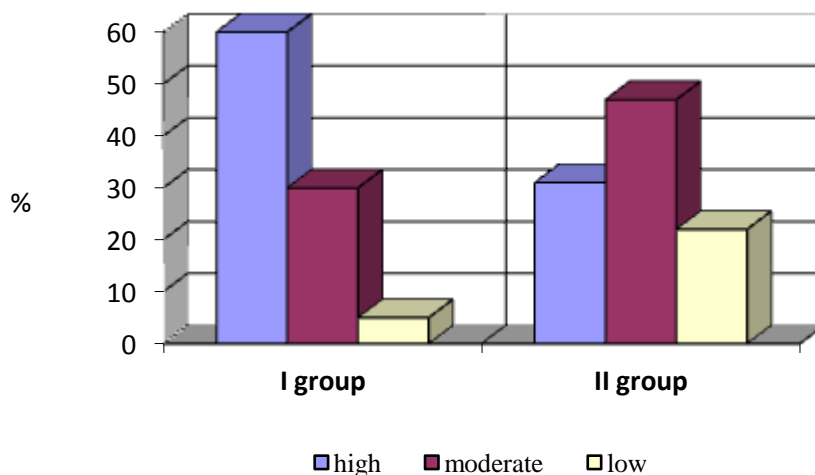
Pic. 3.6. Percentage distribution of test results to determine the level of anxiety.

The determination of the level of stress also showed a marked difference between the indicators of the representatives of groups I and II (pic. 3.7.).



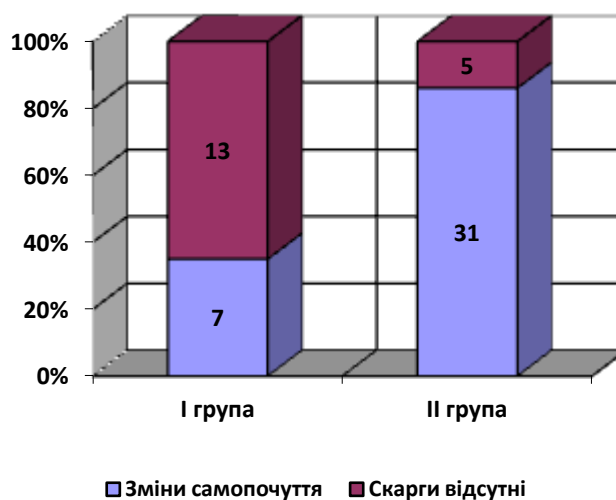
Pic. 3.7. Distribution of indicators of stress in the 1st and 2nd study groups.

Also, differences were found during the study of students' stress tolerance (pic. 3.8.). Persons who spend less time working on digital devices have a higher resilience rating than stressors.



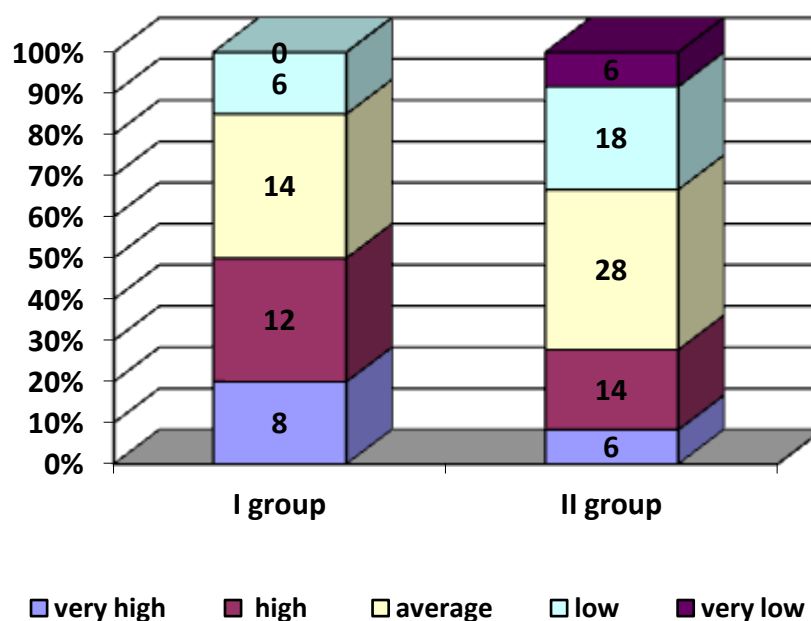
Pic. 3.8. Comparative characteristics of levels of stress resistance among representatives of the 1st and 2nd study groups.

The study of the basic characteristics of the state of health of the students showed that 14 representatives of the 1st group and 62 representatives of the second group feel changes in the state of health after working with digital devices (pic. 3.9.).



Pic. 3.9. The comparative characteristic of the percentage of I and II groups, in relation to these complaints of a change in well-being after working with digital devices.

Determining the level of concentration, stability and switching attention according to the Bourdon method "Correctional Sample" allowed to determine the difference between the corresponding indicator for the students of Groups I and II (pic. 3.10).



Pic. 3.10. Distribution of productivity and sustainability indicators among high school students

Thus, the concentration, productivity, and sustainability rates of the students in Group I were higher than that of the second group. A very high and high result was recorded in 50% and 27.78% of patients in Groups I and II, respectively, with an average level in both groups with a percentage distribution of almost the same 35% and 38.89%, a significant difference was observed in the number of students with low and very high the low level of attention was 15% and 33.33% in the 1st and 2nd groups, respectively. It should be noted that among the students of the II group there are those with a concentration and sustainability score registered at a very low level of 3, which was 8.33%. In group I, students with the corresponding result are absent.

The corresponding situation shows the negative influence of digital devices on the psycho-emotional sphere of youth, in particular their ability to suppress concentration, decrease productivity and stability of attention. That is, the characteristics are an indicator of mental working capacity and a prerequisite for mastering the curriculum.

Studying the state of health of students by their subjective assessment showed that the most frequent are complaints of deterioration of vision, dry eyes, the desire to often blink, a sense of ripples in the eyes. Among the respondents, this indicator was

60.71%. The corresponding symptoms are experienced by 20% and 83.3% of the representatives of groups I and II, respectively. The second frequency was a deterioration of general health, which led to decreased activity, a desire to rest after working with a digital device, a sense of fatigue of 10% and 69.4% in the 1st and 2nd groups, respectively. Only 30.56% of group II representatives expressed complaints of sleep disturbance. It should be noted that despite complaints, in 10.7% of both groups. The students' knowledge of the possible adverse impact of digital devices on their health was also studied. Particular attention deserves the fact that students are not well informed about the possible adverse impact on the health of the digital devices used by them. Thus, despite the fact that 92.86% of all respondents know or suspect the probable danger of digital devices for their health, only 13.9% of people were able to name the possible negative effects of the impact of digital technology on their health.

The obtained results allow us to conclude about the significant complex influence of digital devices on the psycho-emotional state of students of the KhNMU, subject to their long-term use and a low level of health-preserving culture of the students themselves. Thus, during the study, students who use digital devices for more than 4 hours a day showed a deterioration of self-esteem and activity indices, reduced stress resistance, increased anxiety and higher levels of stress compared with the control group of pupils with a duration work with digital devices 4 hours a day. Special attention should be paid to the negative impact of digital devices on the processes of mental performance, in particular the ability to concentrate, produce and sustainability of attention, which was found to be lower in senior students who spend more than 4 hours working with digital devices.



## CONCLUSIONS

The study of the peculiarities of the influence of the physical characteristics of digital devices and the conditions of their use on the psycho-emotional state of students of the KhMMU showed that:

- Study of the physical characteristics of digital devices should be complex, since the degree of changes in the psycho-emotional state is determined by the simultaneous influence of all adverse factors originating from different sources. Thus, it has been established that students of KhMMU use during the course of the day from 2 and more digital devices with various qualitative characteristics;

- Violation of the rules for using digital devices by students is 100%. So, in time use only 7,14% of people work with this technique 1-2 hours a day. Recommended distance to the eyes less than 50 cm adheres to 1.78% of the respondents;

- For students who use digital devices for more than 4 hours a day, a deterioration of the psycho-emotional state was observed, which is manifested by a decrease in the state of health and activity, a reduction in stress resistance, an increase in anxiety and higher levels of stress compared with the control group.

- • The rates of concentration, productivity and sustainability of attention in group I students were higher than that of group II. Very high and high results were registered in 50% and 27.78% of students in groups I and II respectively, the average level in both groups with a percentage distribution is almost the same 35% and 38.89%, a significant difference was observed in the number of students with low and very low the level of attention is 15% and 33.33% in the 1st and 2nd groups, respectively. It should be noted that among persons of the II group there are those with a concentration and sustainability score of 3 at a very low level, which was 8.33%. In group I, students with the corresponding result are absent. The corresponding situation shows the negative impact of digital devices on the psycho-emotional sphere of students, in particular their ability to concentrate, productivity and sustainability of attention, which is an indicator of mental working capacity and a prerequisite for mastering the curriculum.

- The obtained data testify to the low level of young people's awareness about the possible harmful effects of digital devices on their health, and the lack of an adequate level of health protection of a person's culture, since only 13.9% of the respondents know about specific health threats.

Thus, we can conclude that the negative impact of digital devices on the psycho-emotional state of students, which can lead to a deterioration of feelings, a decrease in mental performance, and especially attention to the emergence of complaints about physical health.

The ways of preventing the adverse effects of digital devices on the psycho-emotional state and health of students should be: improving information and explanatory work, strengthening control over compliance with the requirements of digital devices and more active implementation of the primary prevention system of psycho-emotional disorders in youth, through the cultivation of valeological culture and Acquire knowledge about healthcare behavior when working with digital devices.

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