European Proceedings of
Social and Behavioural Sciences
EpSBS

www.europeanproceedings.com
e-ISSN: 2357-1330

DOI: 10.15405/epsbs.2021.05.187

ISCKMC 2020

International Scientific Congress «KNOWLEDGE, MAN AND CIVILIZATION»

GRAPHICAL MOBILE APPLICATION «HARMONY» HELPS IN STRESS-MANAGEMENT IN MEDICAL STUDENTS

Djemilya Lemarovna Katamanova (a), Olga Mikhailovna Bazanova (b),
Tatiana Pavlovna Sataieva (c)*
* Corresponding author

(a) Research Center of Living Systems, 39, Kuneshli, Simferopol, Russia, katamanowa_63@mail.ru,
(b) State Scientific-Research Institute of Physiology and Basic Medicine, 4, Timakova str., Novosibirsk, Russia,
(c) V.I. Vernadskiy Crimean Federal University, 4, Vernadskiy ave., Simferopol, Russia, tanzcool@mail.ru

Abstract

The digital application "Harmony" is a symmetrical graphic images, moving in a certain direction and sequence. The purpose of this research is to identify the effects of twenty-minute viewing the application "Harmony" on the functional state of the human bodies by evaluating the main indicators of vegetative regulation. The research involved 46 students of the Medical Academy aged from 19 to 22 years, the main group consisted of 40 people, the control group – of 6 people. To determine the functional state of the body, a mobile hardware-diagnostic complex "omega-2M" was used. The conducted researches allowed us to establish a fairly high prevalence of exam stress among students, to identify its manifestations that affect the activity of the main body systems. The research revealed a reliably significant difference between the initial indicator of the level of vegetative regulation and its value after viewing the application. The analysis of the functional state of the body was based on the level of vegetative regulation (OIA). In the experimental group, there was an increase in this indicator by an average of 28.4 % after viewing the program, the use of a graphical application can cause a decrease in the adverse impact of learning on the health of students. When analyzing the spectral power of brain rhythms, an increase in the power of alpha brain rhythms was observed in parallel with a decrease in theta rhythms. This indicates a decrease of anxiety, negative emotional experiences and confirms the relaxing effect of the mobile application "Harmony".

Keywords: Mobile application, stress, students, harmony

https://doi.org/10.15405/epsbs.2021.05.187
Corresponding Author: Tatiana Pavlovna Sataieva
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

1. Introduction

If a modern person was asked to spend a day without his or her smart phone, would he or she be able to do it easily? Researchers who asked participants not to use their phones for various time intervals found that breaking the technology habit, even for a relatively short period of time, can be extremely difficult. In any public place, you can find people using their phones for a variety of purposes, from business calls to checking email and updating their social networks. Our phones have undoubtedly become an integral part of modernity. Despite a great amount of data on the adverse impact of frequent phone use on human health (Croft et al., 2008), with the help of modern applications, the smart phone can act as an effective assistant in continuous monitoring of his or her health status (Cassidy, 2006). We believe that in addition to monitoring daily activity indicators, a smart phone can also become an effective and convenient assistant in the fight against everyday stress.

Undoubtedly, smart phones are most popular among young people (Bianchi & Phillips, 2005). Together with the acquisition of knowledge and skills of a scientific and technical nature, it is the period when attitudes, interests, values, and social skills necessary for a representative of the relevant profession are formed, which is inevitably associated with a high level of stress. The problem of psychological and physical health is one of the main ones in modern psychology. The emphasis is placed on preserving the psychological health of a person in modern social, constantly changing conditions. Psychologists and teachers develop various psycho-prophylactic programs for the correct formation of attitudes to their health among schoolchildren and adults, but it is obvious that a positive effect will not follow if the individual himself is not motivated to maintain his health in the conditions of modern multitasking and acute time deficit.

2. Problem Statement

The period of change of social roles arising the transition from child and adolescent to adult status with all its rights and obligations, the greater relevance of issues of gender relations, the need to forecast the compliance of their own abilities to select the direction in life, new possibilities in the use of extracurricular time, new team, sometimes a change of residence, large and unusually organized teaching load and so on with the appropriate predisposition is manifested in a relatively high frequency of psychosomatic reactions and disorders (Rosiek et. al., 2016). As the volume of information increases and the pace of life accelerates, the number of young people with cognitive disorders increases, which leads to a deterioration in performance and overall emotional background, and contributes to the development of addictive behaviours, including traditional bad habits and gambling (Mayer et al., 2016).

According to a number of authors, negative emotions that become stagnant are almost an unavoidable attribute of student life (Yusoff et al., 2013). The process of education and passing exams in medical universities lead to a significant strain on many systems of the students ' bodies. Intensive mental activity and increased static load caused by prolonged forced posture, restricted motor activity, violation of rest and sleep, emotional experiences, leads to significant fatigue, depression, and negatively affects the overall condition and immune resistance of the body (Masood et al., 2016). However, most students

https://doi.org/10.15405/epsbs.2021.05.187
Corresponding Author: Tatiana Pavlovna Sataieva
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

do nothing at all to reduce stress, so often the most popular way to reduce it is to use medications and psychoactive substances (Silva et al., 2017).

3. Research Questions

Exam stress of students is a real factor that can lead to deterioration of their health and quality of education (Hankir et al., 2014). The search for effective methods attracting students and suggested for correcting their stress is an important event that improves the quality of education. It is known that images of various forms have a certain influence on the emotional state of a person: a wavy line forms a sense of calm and balance, a circle is associated with a state of perfection and absolute harmony. Drawing circles calms and eliminates emotional crisis and internal agitation (Gudaitė & Lithuania, 2019). In connection with the above, this research was focused on two main issues.

1. Study of physiological manifestations of exam stress in students of medical university.
2. Identification of the effect of viewing certain graphic symbols on the main indicators of vegetative regulation in students.

4. Purpose of the Study

The purpose of this study is to identify the effects of twenty-minute viewing of the digital application "Harmony" on the functional state of the body of students of the Medical Academy by evaluating the main indicators of vegetative regulation.

5. Research Methods

At the Department of medical biology of the Crimean Medical Academy of S.I. Georgievskogo, Simferopol, a research on the study of the impact of viewing the application "Harmony" on the functional state of the body of students of both sexes was conducted. The research voluntarily involved 46 students aged from 19 to 22 years, the main group consisted of 40 people, the control group – of 6 people. The functional state of the body was determined before and 20 minutes after viewing the mobile application "Harmony".

The mobile application "Harmony" (authors Katamanova D.L., Bekirova Z.N., Ibadov Ia.S.) is symmetrical graphic images, moving in a certain direction and sequence. The application is the result of numerous scientific researches in the field of medicine, biology and psychology (patent of the RF №149915 dated 30.08.2013). It is assumed that viewing this application helps to reduce psycho-emotional tension, stress, and activate the processes of self-regulation and regeneration of the body.

To determine the functional state of the body the mobile hardware-diagnostic complex "Omega-2M" (NPF Dynamics, Saint Petersburg), which is based on the method of fractal neurodynamics, was used. "Omega-2M" allows you to determine the indicators of vegetative regulation using statistical, temporal and spectral (fast Fourier transform) analysis of heart rhythms. "Omega-2M" provides indicators of heart activity calculated using standard methods of variational analysis of heart rhythm. We have researched the following parameters (see Figure 1):

https://doi.org/10.15405/epsbs.2021.05.187
Corresponding Author: Tatiana Pavlovna Sataieva
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

AL – the level of adaptation of the body.

CRL – the level of central regulation.

PES – a psycho-emotional state.

IIH – is an integral indicator of health.

VRL and VRR – level of vegetative regulation and reserves of vegetative regulation

SRL and SRR – the level of self-regulation of the body and reserves of self-regulation of the body.

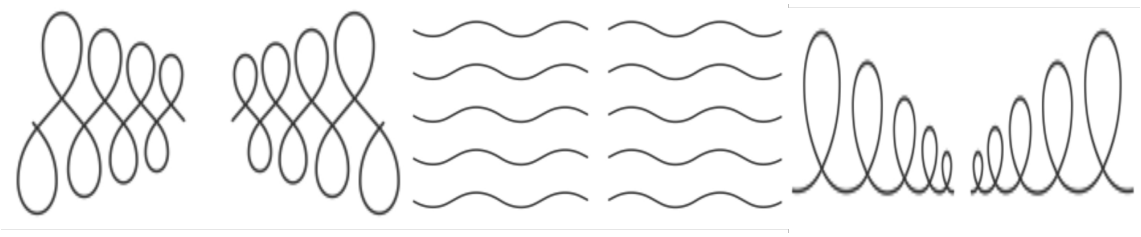

Figure 1. Example of graphic symbols used in a mobile application

Also, the analysis of the spectral power of beta-, alpha-, theta- and delta- brain rhythms was performed in the mode of neurodynamic analysis.

Statistical data processing was performed using licensed software Microsoft Office Excel 2007 and Statistica 10.0. Statistical analysis included the construction of variational series of the obtained data, calculation of the arithmetic mean, standard deviation, the error of the average, coefficient of variation and the value of the deviation of the indicator from the control as a percentage. The obtained quantitative data were subjected to preliminary analysis for the normality of the distribution using the Kolmogorov-Smirnov criterion. The assessment of the statistical significance of deviations of the obtained results from the control was carried out using a nonparametric method for comparing two independent samples – the Mann-Whitney U-test. The difference was considered statistically significant at a value of p (error probability) < 0.05.

6. Findings

The conducted research allowed us to establish a fairly high prevalence of exam stress among students. A subjectively high level of stress was observed in the survey in 56.4 % of the respondents. The most frequent manifestations of exam stress are changes in the cardiovascular system and the autonomic nervous system. No significant gender differences were found, but it should be noted that girls tend to change more frequently from the emotional sphere.

The research revealed a significant difference between the initial indicator of the level of vegetative regulation and its value after viewing the application ($p= 0.02$). The analysis of the functional state of the body was based on the level of vegetative regulation (OIA). The experimental group showed an increase in this indicator by an average of 28.4 % (Table 01).

https://doi.org/10.15405/epsbs.2021.05.187
Corresponding Author: Tatiana Pavlovna Sataieva
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

Table 1. The main indicators of vegetative regulation of the students ' bodies before and after viewing the application "Harmony" according to the complex "Omega-2M»

Baseline indicators	Value	Indicators after viewing the "Harmony" application	Value
VRL (level of vegetative regulation)	51.45±20.94	VRL (level of vegetative regulation)	71.90±19.98*
SRL (level of self-regulation)	54.18±16.82	SRL (level of self-regulation)	61.78±18.23 *
SRR (self-regulation reserves)	51.64±17.07	SRR (self-regulation reserves)	59.22±11.28*
The beta rhythms of the brain	17.36±7.40	The beta rhythms of the brain	18.83±10.12
Alpha rhythms of the brain	17.85±9.92	Alpha rhythms of the brain	21.84±5.34
Theta rhythms of the brain	20.43±9.48	Theta rhythms of the brain	16.87±18.55
Delta rhythms of the brain	44,35±17,86	Delta rhythms of the brain	42,43±22,97
AL (the level of adaptation)	48.73±18.91	AL (the level of adaptation)	58.00±25.29*
CRL (the level of central regulation)	54.09±17.04	CRL (the level of central regulation)	63.90±17.98*
PES (psycho-emotional state)	51.45±18.28	PES (psycho-emotional state)	64.60±19.17*
IIH (integral indicator of health)	53.45±18.26	IIH (integral indicator of health)	67.10±9.37*
HR (heart rate)	86.27±10.50	HR (heart rate)	79.10±20.68*
VRR (reserves of vegetative regulation)	57.64±24.55	VRR (reserves of vegetative regulation)	63.56±24.27

*Note: – differences in indicators are significant compared to those of the control group $p<0.05$.

According to the results of changing this indicator, the students of the experimental group were divided into 3 subgroups.

1.Unchanged (refractory) – 6 people. The increase in VRL in them by 2.0 % is not statistically reliable.

2.Expressed improvements in VRL – 32 people. VRL increased from 21 to 248 %, with an average increase of 72 % in this subgroup.

3.Reduction of OIA. After viewing the application, 2 students' VRL decreased by 25 %.

This condition is observed when the physiological stress of the regulatory systems, which

provides activation of higher levels of regulation and activation of the sympathetic-adrenal system (as a process of natural restoration of the functional state of the body).

It should be noted that in the experimental group, along with an increase in VRL, there was a significant increase in such indicators as

- LA (level of adaptation of the body) by 19.02 %, p-value 0.038;
- LCR (level of central regulation) by 19.43 %, p-value of 0.008;
- PES (psychoemotional state) by 25.56 %, p-value 0.008;
- IIH (integrated indicator of health) by 25.54 %, p-value of 0.005.

When analyzing the spectral power of brain rhythms, an increase in the power of alpha brain rhythms was observed in parallel with a decrease in theta rhythms. This indicates a decrease in anxiety, negative emotional experiences and confirms the relaxing effect of the mobile application "Harmony".

The experimental group also showed a slight decrease in heart rate from 88.2 to 79.1 (9.16 %).

https://doi.org/10.15405/epsbs.2021.05.187
Corresponding Author: Tatiana Pavlovna Sataieva
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

7. Conclusion

The functional state of the body of students of the main and control groups before the beginning of the research, conducted at the end of the academic semester, is characterized by a violation of the balance of the links of regulation of vegetative functions. A decrease in energy resources and a change in the energy balance is characterized by a violation of the harmony of biorhythms.

As a result of viewing the application "Harmony", the majority of students in the experimental group (32 people) showed a statistically significant difference between the initial indicators of the functional state of the body and the indicators obtained after 20 minutes of viewing the application "Harmony". Such as the level of vegetative regulation of the body, the level of adaptation, the level of central regulation, the integral indicator of health and psychoemotional state. A decrease in the index of vegetative regulation VRL indicates the mobilization of functional reserves of the body, the physiological stress of regulatory systems, which ensures the inclusion of higher levels of regulation and activation of the sympathetic-adrenal system (as a process of natural restoration of the functional state of the body).

The research data confirm that the application "Harmony" is an innovative, relevant and effective tool for improving the functional state and adaptive capabilities of the body. Each line in the process of drawing as a pictographic resonator interacts with the brain. This contributes to increased brain neuroplasticity, so that a person can improve both physical and mental health, as well as the quality of their life.

References

Bianchi, A., & Phillips, J. G. (2005). Psychological predictors of problem mobile phone use. *Cyber Psychol. and Behavior, 8*, 39–51.

Cassidy, S. (2006). Using social identity to explore the link between a decline in adolescent smoking and an increase in mobile phone use. *Health Ed., 106*, 238–250

Croft, R. J., Hamblin, D. L., & Spong, J. (2008). The effect of mobile phone electromagnetic fields on the alpha rhythm of human electroencephalogram. *Bioelectromagnetics, 1*, 1–10.

Gudaitė, G., & Lithuania, V. (2019). Psychotherapy research: an interplay between inner and outer and a succession of meanings. *J. of Analyt. Psychol., 64*(4), 512–529.

Hankir, A. K., Northall, A., & Zaman, R. (2014). Stigma and mental health challenges in medical students. *BMJ Case Rep.*, pii: bcr2014205226.

Masood, A., Sumaira, R., Musarrat, R., Mazzahir, S. (2016). Nonclinical Depression and Anxiety as Predictor of Academic Stress in Medical Students. *Int. J. of Med. Res. and Health Sci., 5*, 391–397.

Mayer, B. F., Souza, S. I., & Silveira, P. S. (2016). Factors associated to depression and anxiety in medical students: a multicenter study. *BMC Med. Educ., 16*(1), 282.

Rosiek, A., Rosiek-Kryszewska, A., Leksowski, L., & Leksowski, K. (2016). Chronic stress and suicidal thinking among medical students. *Int. J. Environ. Res. Public. Health, 13*(2), 212.

Silva, V., Costa, P., Pereira, I, & Faria, R. (2017). Depression in medical students: insights from a longitudinal study. *BMC Med. Educ., 17*(1), 184.

Yusoff, M. S., Abdul Rahim, A. F., & Baba, A. A. (2013). Prevalence and associated factors of stress, anxiety and depression among prospective medical student. *Asian J. Psychiatr*., *6*(2), 128–133.