Implementation of sustainable development principles in educational programs

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Abstract. The health status of students largely depends on the quality of the environment in educational institutions, but this connection often remains underestimated. This article provides a comprehensive analysis of the quality of the environment in educational institutions and its impact on the physical and psychological health of students. Initially, various aspects of the environment in educational institutions are assessed, including air quality, water quality, sanitation and hygiene conditions, as well as noise and pollution levels. This analysis identifies key problem areas where improvements need to be taken. Next, the relationship between environmental quality and student health is explored. This includes assessing the impact of the environment on physical health, such as allergies, respiratory diseases, as well as psychological health, such as stress levels and overall mental well-being. Finally, possible strategies for improving environmental quality in educational institutions are discussed to improve student health and create a positive educational environment.

1 Introduction

Through collaborative efforts and innovative initiatives, universities can ensure that foreign students are empowered to thrive academically, socially, and culturally, contributing to the overall sustainability and excellence of the learning environment.

The autonomic nervous system plays a leading role in ensuring the adaptive reactions of the body as a regulator of homeostasis and homeokinesis [1]. Therefore, the study of vegetative status in connection with morphofunctional parameters in foreign medical students is especially relevant, since early detection of disorders in this area plays a very important role in the timely determination of professional compliance. In this regard, the relevance of our study was to study the physical and functional readiness of foreign medical students, taking into account their vegetative status.

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Student youth are a special social group, united by certain age limits, intensive mental work in the process of professional training and lifestyle [2]. High mental and psycho-emotional stress, frequent violations of the training, rest and nutrition regime require students to mobilize their strength to adapt to new conditions [3]. The health status of Russian and foreign medical university students, as well as the medical and psychological adaptation of foreign students to the conditions of Russia and Belarus, have been studied by a number of authors [4,5]. However, until now, the adaptation features of students from countries of equatorial and subequatorial climate zones to the harsh climatic conditions and other sociocultural conditions of Kazakhstan have not been assessed.

The tone of the autonomic nervous system is a complex activity of the body aimed at regulating the functions of all organs in order to maintain life and balance external influences. Autonomic tone should not be considered as an absolute predominance of one function associated with a certain part of the nervous system. Rather, it represents a characteristic activity affecting the organism as a whole. With the help of all the mechanisms that regulate life processes, vegetative tone allows the body to successfully solve the problems of actual adaptation [6].

For residents of high latitudes, adaptation of the cardiovascular system to a complex of natural factors occurs gradually. A short stay in the conditions of the circumpolar region, that is, less than 3 years, leads to the activation of adaptive reactions of the circulatory system. This is accompanied by increased heart rate, increased blood pressure and increased peripheral vascular resistance [7].

When living in the North for more than 10 years, a gradual adaptation of the functioning of the circulatory system occurs. This adaptation is characterized by the following features [8]:

Bradycardia: Tendency to decrease heart rate.

1) Decrease in blood volumes: Decrease in systolic and minute blood volumes.

2) Increased blood pressure: Compensatory increase in pressure in the arteries.

3) Increase in peripheral vascular resistance: Vessels become less permeable to blood.

These changes are associated with depletion of regulatory mechanisms, increased parasympathetic control, and the development of negative effects on heart rate and contractile function. At the same time, the incidence of hypertension and myocardial infarction increases.

The educational process at the university must take into account the physiological characteristics and mechanisms of students' performance. To do this, it is necessary to develop reasonable work and rest regimes aimed at accelerating the recovery process and achieving the maximum period of effective work for students. Particular attention should be paid to the adaptation of foreign students. In this regard, the purpose of this study is to determine the indicators of successful adaptation of foreign students studying at Astana Medical University in Kazakhstan during their studies.

2 Research methodology

The study was conducted on the basis of Astana Medical University. The study involved 66 foreign students of AMU (Astana Medical University), based in Astana (Kazakhstan) 17 women and 49 men of different nationalities, 2 students from Ukraine, 31 students from Jordan, 33 students from India, by measuring pulse, blood pressure, height, weight, breath-hold time, and use of a standard varicard analysis protocol, which is performed in 5-minute recording sections that record electrocardiography and heart rate variability analysis.

3 Results and Discussions

An analysis of strength qualities and endurance indicators showed that those surveyed with eutonia had good results in the 100-meter run test and the press test - the total number of bends. There were no differences in other physical parameters between groups. According to the survey, students complain of feeling weak in parts of the body, poor sleep, loss of interest in things, nervousness and trembling inside. This condition is called Vagotonia, which can manifest itself through bradycardia.

In our study, we found that 1 woman and 4 men had severe arrhythmia, accounting for 7.58% of cases. 9 women and 37 men had moderate arrhythmia (69.70%), and only 5 women and 10 men had normal heart rhythm (22.73%) (Figure 1).

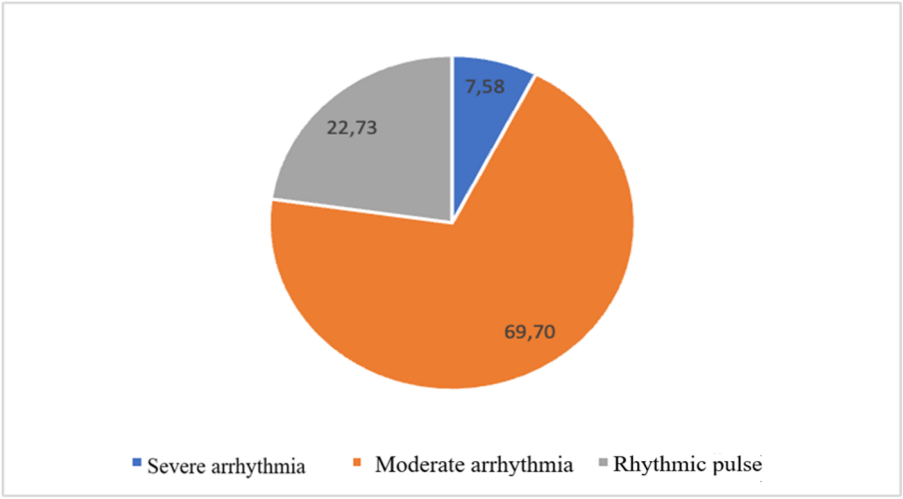

Fig. 3. Heart rate indicators in foreign students

A high rate of moderate and severe arrhythmia, as shown in Figure 3, in foreign students of a medical university can provoke dizziness, loss of consciousness, deterioration of blood supply to the heart and brain due to insufficient cardiac output.

Thus, according to the study of heart rhythm, 13 students, including 3 women and 10 men (52.0%), had moderate bradycardia. 11 students, including 2 women and 9 men (44.0%), had moderate tachycardia, and one male student (4.0%) had severe tachycardia. (Figure 4).

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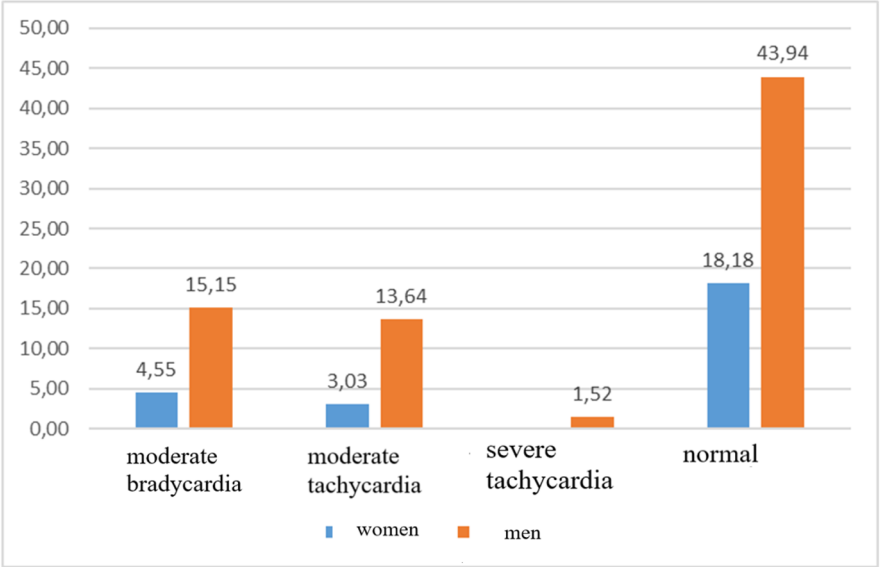

Fig. 4. Heart rate indicators in foreign students

As we can see, according to Figure 4, 37.87% of students had problems with heart function. Deviation from the norm of heart rhythm in foreign students of the International Academy of Sciences is a consequence of overstrain of the nervous system, stressful situations due to educational loads in the first years of study, as well as adaptation to environmental conditions.

A breath holding time test was conducted among the subjects. For 20 students, including 6 women and 14 men (30.3%), the breath-hold time was less than 30 seconds, and for most of the rest it was no more than 70 seconds. Normal breath holding time is usually between 30 and 90 seconds. However, the majority of students who have already recovered from Covid-19, especially from the countries of India and Jordan, showed less breath-holding time. This may be due to the long-term effects of the virus, which can cause pulmonary fibrosis.

The impact of environmental factors on students' educational background and future performance is intricate and multifaceted. Numerous studies underscore the significant influence of various environmental elements, including family background, socioeconomic status, parental education level, and access to educational resources such as quality schools, teachers, and materials, on students' academic achievements. It is evident that students from disadvantaged backgrounds are more prone to encountering educational obstacles, including lower academic attainment, higher dropout rates, and fewer opportunities for post-secondary education. Additionally, they are disproportionately affected by socio-economic challenges such as poverty, inadequate housing, limited access to healthcare, and restricted availability of technology.

4 Conclusions

While environmental factors can profoundly influence students' educational outcomes, it's important to recognize that they are not determinative. Many students from disadvantaged backgrounds have overcome these challenges to achieve remarkable success academically and professionally. To counteract the negative effects of environmental factors, students may require additional resources such as mentoring programs, after-school activities, access

to academic support, and other interventions that foster academic success and future readiness.

In conclusion, although environmental factors shape students' educational trajectories significantly, with adequate resources and support, students can surmount these challenges and excel in their academic and professional endeavors.

Here are several implications that could help mitigate the environmental impact of students' education:

1. Reduce paper usage: Encourage the use of electronic devices like laptops, tablets, and smartphones for note-taking, reading materials, and assignments to minimize paper consumption.

2. Promote waste reduction and recycling: Schools can implement recycling programs and advocate waste reduction through composting and minimizing the use of single-use plastics.

3. Encourage sustainable transportation: Promote biking, public transit, or walking to school instead of using cars to reduce greenhouse gas emissions and air pollution.

4. Integrate sustainability into the curriculum: Incorporate topics such as climate change, conservation, and renewable energy into the curriculum to raise awareness and foster a culture of environmental responsibility among students.

5. Reduce energy consumption: Schools can adopt energy-efficient lighting, heating, and cooling systems and encourage turning off lights and electronics when not in use to conserve energy.

6. Engage in eco-friendly activities: Encourage students to participate in activities such as tree planting, litter cleanup, and water conservation to learn about environmental protection and develop a sense of responsibility.

By implementing these measures, schools can significantly reduce their environmental footprint and instill a culture of sustainability among students.

References

1. L.N. Gushchina, Adaptation of foreign students to the sociocultural environment at the Grodno State Medical University. Journal of Grodno State Medical University, **1**, 112-116 (2016)
2. A.V. Malashchenkova, A.Yu. Makarova, Assessing the quality of life of medical university students. Issues of school and university medicine and health, **3**, 47-51 (2017)
3. S.V. Mironov, The health status of Russian and foreign medical university students and ways to improve their medical care: abstract of thesis. dis.cand. honey, 26 (2014)
4. G.A. Sevryukova, Yu.N. Kartushina, I.A. Bocharova, Ecological and hygienic aspects of adaptation of foreign students who arrived to study in Russia (using the example of the Volgograd region), **4(14)**, 15-19 (2015)
5. M. Avdeeva, Adaptation to university studies affects on functional state of freshmen. Acta Scientiarum: Health Sciences, **44(1)**, 1-10 (2022)
6. E.P. Mountain, Human ecology DOC 2007, 544 (2007)
7. V.A. Baronenko, S.I. Bugreeva, Yu.V. Kuznetsova, Heart rate in assessing aerobic capacity and adaptive potential of lyceum students studying under different modes of physical activity, 30-33 (2008)
8. S.I. Soroko, E.A. Burykh, Intrasystem and intersystem rearrangements of physiological parameters during acute experimental hypoxia, **30(2)**, 58-66 (2004)