

Mortazavi and his researchers group [9], has found Electro-hypersensitivity (EHS) from electromagnetic radiation. Electro-hypersensitivity (EHS) is the disordered physiological processes associated with disease or injury of EHS and it is less significant. Also researchers proved that it is related with significant metallic element. Solid metallic element attached with the proteins within tissues and organs are believed to have fewer danger.

In addition, Mortazavi and associates have observed that steady magnetic field usually generated from mobile phones and other wireless devices may affect mercury vapor release from dental amalgam. The diluted mercury gradient is increasing in saliva within amalgam carriers [9, 10].

Cellular phones are being used close to brain tissue. Hence brain tissue is influenced by electromagnetic wave mostly. Many studies show that human sensory system and behavior are affected closely by the radio frequency electromagnetic waves coming from the base stations (BTS) [10]. A study of Heinrich S [10] shows that increasing use of wireless devices forces mass people to live under RF electromagnetic waves and affecting their health particularly in children.

### Conclusion

RF – the most obvious biological effects of RF energy on living cells are due to heating. While it is not certain that radiofrequency radiation poses any risk to human health at all, there are some reasons for concern about the health effects of cell phones themselves. These problems exist because the antennas of these phones deliver most of their radio frequency energy to small parts of the user's head, resulting in headaches that were found to be very common among high-end users of such radio-emitting phones, as our study proved beyond doubt. The exponential growth in mobile phone use increases huge concerns about radio frequency and its harmful nature to human health. In vivo and in vitro studies are continuing to find out what exactly is happening at the cellular level. Researchers have confirmed that electromagnetic waves affect brain tumors because billions of people use cell phones near brain tissue.

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### EFFECTS ON SYSTEMIC BLOOD PRESSURE DUE TO EXAMINATION STRESS

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Стресс – это часть жизни человека. Стресс – неотъемлемая часть студенческой жизни, особенно в дни экзаменов. Мы провели исследование с участием 86 студентов из нашей группы 5-го курса Кыргызской государственной медицинской академии со средним возрастом 21,53 года, которые участвовали в этом исследовании, 52 (60,04%) были мужчинами и 34 (39,53%) женщинами. Метод, использованный для измерения АД осциллометрическим методом с использованием прибора OMRON 907, показал, что значения систолического артериального давления и частоты сердечных сокращений, проверенные в дни экзаменов, были статистически выше (в среднем 140,60 мм рт.ст. и 90 ударов в минуту соответственно), чем при измерении в обычные учебные дни и во время каникул.

Stress is a part of human life. Stress is inseparable characteristics of student life, especially during exam days. We conducted research on 86 students from our batch of the 5<sup>th</sup> year Kyrgyz State Medical Academy, with a mean age of 21.53 years, who participated in this study 52 (60.04%) were of the male, and 34(39.53%) of the female gender.

The method used for measurement oscillometric method using OMRON 907 oscillometer BP apparatus, their has been found that the systolic arterial pressure and cardiac frequency values checked on exam days were statistically higher (mean of 140.60 mmHg and 90 bpm, respectively) than when measured on class days or during vacations.

Systemic arterial pressure is the lateral pressure exerted by the column of blood on the vessel wall measured in (mmHg), product of force exerted by cardiac output against the walls of blood vessels; and is systolic while the heart pumps blood, and diastolic when it relaxes between beats [6].

Arterial pressure values in healthy adults are 120-129 mmHg in the systole and 80-84 mmHg in the diastole. Cardiac frequency is designated as being the number of times the heart beats per minute, and its normal rate at rest, variable from person to person, is from 60 to 100 [1]. Various factors may change the arterial blood pressure, and one of the most common products of this change is systemic arterial hypertension (SAH). This is characterized by sustained high levels of arterial pressure above 140 mmHg systolic and above 84 mmHg diastolic, and may have an influence on homeostasis [2, 4].

Globally, cardiovascular diseases cause 17.9 million deaths/year, of these, 9.4 million results from SAH complications. In 2016, worldwide, 40% of adults  $\geq 25$  years of age were diagnosed with hypertension, resulting in the number of 1 billion individuals [3]. Among the various risk factors for the development of SAH and circulatory diseases [4], the following are cited: family history, age, gender, ethnicity; and **those that can be controlled:** excess weight, high sodium consumption, alcoholism, smoking, sedentarism, psychosocial stress, socioeconomic factors, sleep apnea and other environmental conditions that tend to contribute to an unhealthy lifestyle.

A risk factor greatly involved in the change in arterial pressure and cardiac frequency, stress consists of a pathological change in response to environmental stimuli. This causative agent has become more common in triggering SAH due to the transformation in the social sphere, in which sedentary habits are associated with long working days, eating habits, violence, and so many other factors that contribute to emotional wear.

Bearing in mind the pathological effects of stress and their consequences relative to arterial pressure and pulse rate, the high level of stress experienced by medical students must be taken into consideration. The fact that this group is submitted to long days of classes, long hours of study and pressure both in the academic medium and family circle, factors that converge and lead to a high incidence of anguish/distress. This distress could have a profound impact on the professional and personal life of students, and leave them more vulnerable to developing depressive conditions [7, 2].

By virtue of this stressful situation, this class may present reduction in academic performance, social isolation, exhaustion, and even greater predisposition to developing various pathologies, since the immune system is highly influenced by the emotional and psychological state.

## Methods

Initially, the project of the presented to our professor of research in our academy, the sample was composed of 86 students enrolled in the undergraduate course of Medicine in Kyrgyz State Medical Academy, comprised of the academic periods in the spring & summer semester. The sample number was obtained after including students who showed they were in favor of participating in the study and device used in the research was OMRON 907 BP apparatus. Afterwards, arterial pressure was recorded in 3 time intervals:

- 1) during school holidays;
- 2) an academic period without exams;
- 3) an academic period during exams.

We put emphasize that at this institution, exams on all the disciplines generally take place during the period of 1 week. Authorization was obtained from the Coordinator of the Course in our Medicine academy, to conduct the research in the premises of the faculty. A questionnaire was applied, covering the students' identification data, follow-up chart of measurement, and questions related to factors that affected the level of arterial pressure and that could have an influence on the research, such as hereditary cardiovascular disease, age, gender, alcohol consumption, smoking, use of medications during the exam periods.

**The measurements were taken by the two of us,** we were trained and calibrated with regard to the pressure monitor manufacturer's specifications, so that this procedure would not interfere in the students' academic obligations. Measurement was taken after a 30-minute rest, with 2 measurements being taken with an interval of 2 minutes between them, in accordance with the cardiology guidelines of the (European society of hypertension 2018), (American Heart Association). Afterwards the arithmetical mean values of systolic and diastolic arterial pressure were established.

## Results

Of the 86 students, with a mean age of 21.53 years, who participated in this study 52 (60.04%) were of the male, and 34 (39.53%) of the female gender. The frequency of relevant medical data was tabulated (Table 1). No data relative to Diabetes, AIDS and cardiac and renal insufficiency were put into the table, since the frequency of students with these conditions was zero.

When we checked that the systolic arterial pressure and cardiac frequency values checked on exam days were statistically higher (mean of 140.60 mmHg and 90 bpm, respectively) than when measured on class days or during vacations.

Whereas the systolic arterial pressure and cardiac frequency values measured on class days were significantly lower than those on the other days (mean of 121.50 mmHg and 80 bpm, respectively).

**Table 1**

Characteristics of the sample	Number of Individuals (n)
Males sex	52
Female sex	39
Average age	21.53
Hypertension	1
Anti-Hypertensive Medication	3
History of Hypertension	34
Dyslipidemia	11
Smoking	16
Use of medications in exam periods	19
Sedentarism	34

Only diastolic pressure was there no statistical difference between measurements on class days and vacation days. However, there was statistical difference between values of measurement days and exam days. For this purpose we took (Table 2) comparison of means and standard deviations of systolic arterial blood pressure, diastolic arterial blood pressure and cardiac frequency measurement values.

**Table 2**

	Class day	Exam day	Vacation day
Systolic Blood Pressure Mean	121.50	140.60	120.22
Diastolic Blood Pressure Mean	80	90	81
Cardiac Frequency Mean	74.89	88	76.17

### Discussion

The study explored the variations in arterial pressure (AP) of medical students in periods of classes, exams and vacations; with a view to the different influence of stress on students in these time intervals. This analysis was shown to be statistically true relative to the hypothesis, in which our results led us to clarity about the problem in palpable values of AP and its relationship with stress. As a result, we discussed the data obtained and their implications with studies of relevance.

The percentage of students who alleged sedentarism (39.53%) aroused concern due to its association with an unhealthy life style that leads to the onset of homeostatic imbalance, susceptibility to cardiovascular diseases, and excessive suffering from the load of stress experienced. As a similar fact, 22.09% of the individuals used medications in exams periods due to the necessity of diminishing anxiety and psychological anguish, therefore this was an important marker of the psychic state of this group of individuals.

Systolic arterial pressure and cardiac frequency values were statistically higher in exam

periods than in the other periods. Diastolic AP was higher in tests than in classes; all of this was palpable proof of the degree to which stress affects the health of medical students (Figure). Physiologically a correlation has been verified between cardiovascular reactivity and vagal suppression as a consequence of prolonged activation of the sympathetic system by stress. Exacerbation of the sympathetic function related to renal and vascular abnormalities acts directly as a risk factor not only for SAH, but also for other cardiovascular diseases. Correlation has also been found between exacerbated vasoconstriction stimuli with imbalance of the immune response, proving greater susceptibility of persons affected by stress.

The choice of medicine associated with an unbalanced life style could trigger severe pathological questions, and data obtained in this study corroborate this affirmation. Psychological stress associates predisposing factors such as modern life events, problems related to work and family, social isolation, financial problems and violence. These conditions converge directly on psychological anguish in medical students, because they develop poor academic performance, increase rate of drop-out from medical schools, break-down of personal relationships, abuse of toxic substances and suicide. Other causes identified such as lack of learning strategy, nights of sleeping badly before exams, and ingestion of unhealthy foods during the period [5].

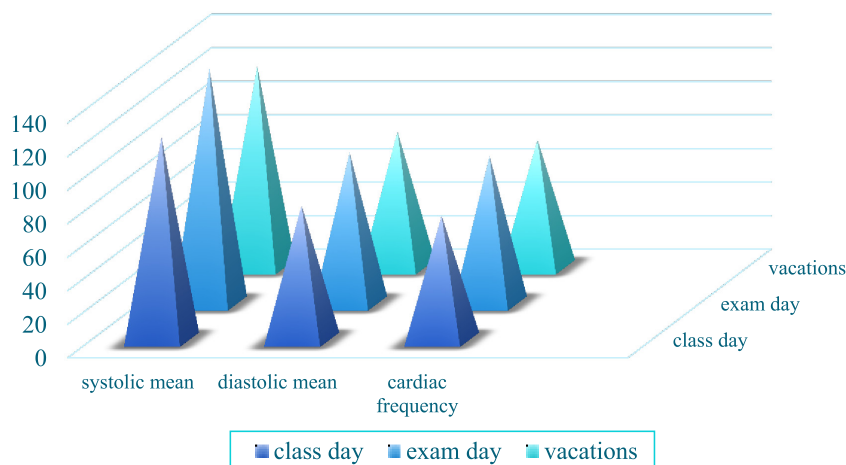
In addition, the lack of psycho-pedagogical support and flexibility of exam periods may act as risk factors for stress of students, and become a pathological process inherent to medical education.

As more detailed explanations about the subject, the figures analyzed in this study demonstrated the influence of stress on arterial pressure, and this has a relationship with conditions of depression and psychological anguish [2]. When compared with students of the same age, students of medicine have higher rates of symptomatology of depression: a quarter of them presented substantial symptoms.

### Conclusion

The statistical increase in AP and cardiac frequency proved by this study demonstrated the degree of direct interference of stress in the cardiovascular condition of the students, not only for SAH, but for any and all their cardiac, immunological, renal and psychosocial conditions that work in harmony.

Therefore, the students' health is stated as a right to be considered by the medical curriculum; and this must be protected and supported so that all the wear suffered by students will not be so severe that it would be capable of harming learning, and the students' responsibility towards society, the family environment and their interpersonal relationships, particularly their own personal and spiritual well-being.



*Systolic AP, diastolic AP and cardiac frequency*

In view of the foregoing considerations, it is necessary to promote an efficient education, with social responsibility towards the medical class, composed of individuals subjected to a greater dimension of accountability because of their zeal for care of life.

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### Педагогические науки

#### АКТУАЛЬНОСТЬ ИСПОЛЬЗОВАНИЯ ФИЗИЧЕСКИХ УПРАЖНЕНИЙ ДЛЯ ПРОФИЛАКТИКИ СТРЕССА И ДЕПРЕССИИ У СТУДЕНТОВ

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Статья посвящена физическим нагрузкам против борьбы со стрессовыми ситуациями. Тема является актуальной, поскольку каждый второй студент страдает от депрессии. В данной работе описаны причины возникновения стресса и депрессии в жизни студента, а также их влияние на здоровье. Рассмотрены положительные аспекты воздействия физических нагрузок на психологическое состояние (в том числе в зависимости от направленности занятий и спортивной специализации). Автор приводит к выводу, что спорт и его альтернатива хорошо помогают при борьбе со стрессом.

*Депрессия* – это психическое состояние, характеризующееся депрессивным настроением, пессимизмом, отсутствием удовольствия от жизни и от любимых занятий, трудностями в запоминании и концентрации внимания. Од-

ной из основных причин расстройства является *стресс*: негативные жизненные события (разлука, потеря работы или ценного имущества, смерть близкого человека), давние конфликты с родственниками, коллегами и знакомыми [1]. Согласно исследованиям о разнице в эмоциональных сферах физически неподготовленных и подготовленных студентов, повышенный уровень агрессивности, ригидности и фрустрации напрямую связан с физической подготовкой [2]. Регулярное выполнение физических упражнений – средство профилактики и борьбы со стрессом и депрессией.

Цель: обосновать эффективность использования физических нагрузок для профилактики и борьбы со стрессом и депрессией.

Задачи:

1) охарактеризовать понятия стресс, депрессия, выявить причины их возникновения и формы проявления;

2) проанализировать влияние физических нагрузок, выбранной спортивной специализации на психологическое состояние.

Понятие «стресс» впервые было использовано канадским физиологом Хансом Селье в 1936 году. Под стрессом врачи понимают состояние психического напряжения, возникаю-