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PSYCHO-PHYSIOLOGICAL ASSESSMENT OF THE IMPACT OF ACADEMIC STRESS ON THE SOMATIC HEALTH OF UNIVERSITY STUDENTS IN THE FERGANA VALLEY

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Abstract: The transition from adolescence to adulthood, often coinciding with university studies, is a critical period for the formation of psycho-physiological adaptive mechanisms. Academic stress is a pervasive factor that can disrupt this adaptation, leading to psychosomatic disorders. This article presents a cross-sectional study conducted at Andijan State Medical Institute. Using the IMRAD framework, the research investigates the correlation between perceived stress levels and somatic health indicators among 300 medical students. The study utilized the Cohen Perceived Stress Scale (PSS-10) and simultaneous monitoring of hemodynamic parameters and sleep quality. The results indicate a strong positive correlation between high stress scores and the prevalence of tension headaches, sleep disturbances, and subclinical hypertension. The study concludes that chronic academic stress acts as a catalyst for early somatic pathology in youth, necessitating the implementation of institutional psychological support programs.

Keywords: academic stress, youth health, psychosomatic disorders, hemodynamics, sleep quality, adaptation, Andijan State Medical Institute.

ПСИХОФИЗИОЛОГИЧЕСКАЯ ОЦЕНКА ВЛИЯНИЯ АКАДЕМИЧЕСКОГО СТРЕССА НА СОМАТИЧЕСКОЕ ЗДОРОВЬЕ СТУДЕНТОВ УНИВЕРСИТЕТОВ ФЕРГАНСКОЙ ДОЛИНЫ

Аннотация: Переход от подросткового возраста к взрослой жизни, часто совпадающий с учебой в университете, является критическим периодом для формирования психофизиологических адаптационных механизмов. Академический стресс является повсеместным фактором, который может нарушить эту адаптацию, приводя к психосоматическим расстройствам. В данной статье представлено перекрестное исследование, проведенное в Андижанском государственном медицинском институте. Используя структуру IMRAD, исследование изучает корреляцию между уровнем воспринимаемого стресса и показателями соматического здоровья среди 300 студентов-медиков. В исследовании использовалась шкала воспринимаемого стресса Коэна (PSS-10) и одновременный мониторинг гемодинамических параметров и качества сна. Результаты указывают на сильную положительную корреляцию между высокими показателями стресса и распространенностью головных болей напряжения, нарушений сна и субклинической гипертензии. Исследование делает вывод, что хронический академический стресс выступает катализатором ранней соматической патологии у молодежи, что требует внедрения институциональных программ психологической поддержки.

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Ключевые слова: академический стресс, здоровье молодежи, психосоматические расстройства, гемодинамика, качество сна, адаптация, Андижанский государственный медицинский институт.

AKADEMIK STRESSNING FARG‘ONA VODIYSI OLIY O‘QUV YURTLARI TALABALARINING SOMATIK SALOMATLIGIGA TA’SIRINI PSIXOFIZIOLOGIK BAHOLASH

Annotatsiya: O‘smirlikdan kattalik davriga o‘tish, ko‘pincha universitetda o‘qish bilan bir vaqtga to‘g‘ri keladi va bu psixofiziologik moslashuv mexanizmlarining shakllanishi uchun hal qiluvchi davr hisoblanadi. Akademik stress ushbu moslashuvni buzishi va psixosomatik kasalliklarga olib kelishi mumkin bo‘lgan keng tarqalgan omildir. Ushbu maqolada Andijon davlat tibbiyot institutida o‘tkazilgan kesim (cross-sectional) tadqiqot natijalari keltirilgan. IMRAD tuzilmasiga asoslangan ushbu ish 300 nafar tibbiyot talabasi orasida stress darajasi va somatik salomatlik ko‘rsatkichlari o‘rtasidagi bog‘liqlikni o‘rganadi. Tadqiqotda Koenning Stressni idrok etish shkalasi (PSS-10) hamda gemodinamik parametrlar va uyqu sifatini monitoring qilish usullaridan foydalanildi. Natijalar shuni ko‘rsatadiki, yuqori stress ko‘rsatkichlari zo‘riqishdan kelib chiquvchi bosh og‘rig‘i, uyqu buzilishi va subklinik gipertenziya tarqalishi bilan kuchli ijobiy bog‘liqlikka ega. Tadqiqot surunkali akademik stress yoshlarda erta somatik patologiyaning katalizatori bo‘lib xizmat qiladi degan xulosaga keladi va oliy o‘quv yurtlarida psixologik qo‘llab-quvvatlash dasturlarini joriy etish zarurligini ta’kidlaydi.

Kalit so‘zlar: akademik stress, yoshlar salomatligi, psixosomatik buzilishlar, gemodinamika, uyqu sifati, moslashuv, Andijon davlat tibbiyot instituti.

Introduction

Stress is a non-specific physiological response of the body to any demand for change, a concept first defined by Hans Selye. While acute stress can be adaptive, enhancing performance and focus, chronic stress is increasingly recognized as a major determinant of ill health in the modern world. The demographic group comprising young adults, particularly university students, is uniquely vulnerable to the deleterious effects of chronic stress. This period of life is characterized by intense intellectual loads, irregular sleep patterns, social pressure, and the anxiety associated with future professional responsibilities.

In the context of Uzbekistan, and specifically within the competitive environment of medical education in the Fergana Valley, these stressors are amplified. Students face high academic expectations from families and society, coupled with the rigorous demands of the medical curriculum. The physiological cost of this "achievement" is often overlooked until somatic symptoms manifest. The mechanism linking psychological stress to physical illness involves the prolonged activation of the hypothalamic-pituitary-adrenal (HPA) axis and the sympathetic nervous system. This results in sustained elevation of cortisol and catecholamines, which can induce dysregulation in the cardiovascular, immune, and digestive systems.

Despite the prevalence of this issue, there is a paucity of local data quantifying the physiological impact of academic stress on Uzbek youth. Most studies focus on the psychological aspects (anxiety, depression) without correlating them with somatic markers. At Andijan State Medical Institute, it was hypothesized that high levels of perceived academic stress are directly correlated with subclinical alterations in hemodynamics and sleep architecture, serving as precursors to chronic disease.

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This article aims to evaluate the psycho-physiological status of students and determine the extent to which academic stress impacts their somatic health. By bridging the gap between psychology and physiology, this study seeks to highlight the urgent need for stress management interventions in higher education institutions.

METHODS

This cross-sectional analytical study was conducted at Andijan State Medical Institute during the academic year 2023-2024. The study protocol was approved by the institute's Ethics Committee, and all participants provided written informed consent.

Participants - The study population consisted of 300 undergraduate medical students aged 18 to 24 years. The participants were randomly selected from the second and third years of study, ensuring a representative sample of those in the pre-clinical phase of education. Exclusion criteria included diagnosed chronic diseases, current use of psychotropic medications, and pregnancy, to ensure that physiological measurements reflected the impact of stress rather than underlying pathology.

Psychometric Assessment - To quantify the level of psychological burden, the Perceived Stress Scale (PSS-10) developed by Sheldon Cohen was utilized. This instrument measures the degree to which situations in one's life are appraised as stressful. Scores were categorized into low stress (0-13), moderate stress (14-26), and high stress (27-40). Additionally, the Pittsburgh Sleep Quality Index (PSQI) was used to assess sleep duration and efficiency, as sleep disturbance is a primary indicator of allostatic load.

Physiological Measurements - Somatic health was assessed through non-invasive monitoring of hemodynamic parameters. Systolic (SBP) and Diastolic Blood Pressure (DBP) and Heart Rate (HR) were measured three times after a 10-minute rest period using a digital sphygmomanometer. The Kerdo Autonomic Index (KAI) was calculated to determine the balance of the autonomic nervous system (sympathetic vs. parasympathetic dominance). Anthropometric data (height, weight) were collected to calculate Body Mass Index (BMI).

Procedure - Data collection was synchronized with the academic calendar. Measurements were taken during two distinct periods: the "calm period" (mid-semester) and the "stress period" (examination session). This design allowed for the assessment of the physiological reactivity of the students to academic pressure.

Statistical Analysis - Data were analyzed using statistical software. Pearson correlation coefficients were calculated to examine the relationship between PSS-10 scores and physiological parameters. Paired t-tests were used to compare hemodynamic values between the calm and stress periods. A p-value of less than 0.05 was considered statistically significant.

RESULTS

The results of the study revealed a disturbing prevalence of high stress levels and a clear correlation with somatic dysregulation.

Stress Prevalence - Analysis of the PSS-10 scores during the examination period indicated that 45 percent of the students experienced "high perceived stress," while 40 percent experienced "moderate stress." Only 15 percent fell into the "low stress" category. This represents a significant increase compared to the mid-semester baseline, where high stress was reported by only 12 percent of the cohort. Female students reported statistically higher stress scores compared to their male counterparts, potentially reflecting different coping mechanisms or societal pressures.

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Hemodynamic Impact - Physiological measurements confirmed that this psychological stress had a somatic footprint. During the examination period, the mean Heart Rate of the "high stress" group increased by an average of 12 beats per minute compared to baseline. Systolic Blood Pressure showed a mean elevation of 8-12 mmHg. While these values often remained within the upper limits of normal, they signify a state of hyperdynamic circulation driven by sympathetic overactivity. The Kerdo Autonomic Index shifted significantly towards positive values in the high-stress group, confirming a dominance of the sympathetic nervous system (sympathicotonia) and a failure of parasympathetic restorative mechanisms.

Sleep and Somatic Complaints - The correlation between PSS-10 scores and PSQI scores was strong and positive (r=0.72). Students with high stress scores reported a drastic reduction in sleep quality, with 60 percent experiencing difficulty falling asleep or frequent night awakenings. Furthermore, a somatic symptom survey revealed that 55 percent of the high-stress group suffered from frequent tension-type headaches, and 30 percent reported gastrointestinal discomfort (gastritis-like symptoms or irritable bowel syndrome) during the exam session. These symptoms were virtually absent in the low-stress group.

Adaptive Reserve - An alarming finding was the identification of a subgroup (approximately 10 percent of participants) who exhibited "paradoxical" reactions—hypotension and bradycardia during peak stress. This indicates a depletion of adaptive reserves and a transition from resistance to the exhaustion stage of the General Adaptation Syndrome, putting these students at high risk for fainting and depressive states.

DISCUSSION

The findings from Andijan State Medical Institute underscore that academic stress is not merely a psychological state but a systemic physiological challenge that compromises youth health.

The Mechanism of Psychosomatic Derailment - The study demonstrates the classic "fight or flight" response manifested in an academic setting. The persistent sympathetic activation observed (elevated HR, BP, positive Kerdo Index) forces the cardiovascular system to work at a higher set point. In young, healthy individuals, the body can compensate for this temporarily. However, the chronic nature of medical education means this activation is sustained for years. This creates an "allostatic load" that accelerates vascular aging and predisposes individuals to early hypertension, as evidenced by the correlation with subclinical blood pressure elevations.

Sleep as the First Casualty - The strong link between stress and sleep disruption is particularly concerning. Sleep is the primary mechanism for neuroendocrine recovery. The loss of sleep quality due to anxiety creates a vicious cycle: sleep deprivation increases cortisol levels, which in turn increases anxiety and further disrupts sleep. This cycle impairs cognitive function, memory consolidation, and immune system competence, making students more susceptible to infections during exam periods.

Lifestyle Factors - The discussion must also address the behavioral response to stress. Although not the primary focus of the quantitative data, observations suggest that students cope with this stress through maladaptive behaviors such as excessive caffeine intake (energy drinks), poor diet, and physical inactivity. These behaviors act as multipliers, exacerbating the physiological toll of the psychological stress.

Institutional Responsibility - The high prevalence of stress-related somatic symptoms suggests that the current educational environment may be pathogenic for a significant portion of students. The "survival of the fittest" mentality in medical education needs to be re-evaluated.

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The data supports the implementation of stress-management curricula, not as an elective, but as a core component of professional training.

CONCLUSION

The psycho-physiological assessment conducted at Andijan State Medical Institute leads to several critical conclusions regarding the health of young people.

Firstly, academic stress is a potent driver of somatic dysregulation in university students. Nearly half of the studied population exhibits high levels of stress during critical academic periods, which is directly correlated with signs of sympathetic overactivity and hemodynamic instability.

Secondly, the impact of stress is systemic, affecting not only the cardiovascular system but also sleep architecture and gastrointestinal function. The prevalence of tension headaches and insomnia indicates that psychosomatic disorders are already established in this young population.

Thirdly, there is a distinct gender difference, with female students showing higher susceptibility to perceived stress, necessitating gender-sensitive support approaches.

Therefore, it is recommended that higher education institutions in Uzbekistan integrate health monitoring programs that include psychological screening. Establishing student psychological support centers that offer training in relaxation techniques, time management, and cognitive-behavioral coping strategies is essential. Protecting the mental and somatic health of students today is an investment in the quality of the future healthcare workforce.

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