HYGIENIC ASSESSMENT OF WEATHER SENSITIVITY AND METEOTROPIC REACTIONS IN STUDENTS

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The issue of weather sensitivity and meteotropic reactions in various population groups depending on the age, place of residence, professional features, and health status is relevant and inadequately covered in scientific literature. The study was aimed to assess weather sensitivity and meteotropic reactions in medical university students of various age groups. Polling of 243 students aged 17–18 and 23–24 years was performed using a tailored questionnaire consisting of 16 questions allowing one to detect weather sensitivity and meteotropic reactions in the respondents. Analysis of the data acquired showed that 53.7% of female and 16.7% of male first-year students had weather sensitivity ($p < 0.001$). Furthermore, 47.0% of surveyed first-year students and 67.0% of 5–6th-year students complained of various intermittent meteotropic reactions. In first-year students, meteotropic reactions were most often manifested in the decreased performance (76.6%), headache (74.6%), fatigue (70.2%). The weather-sensitive 5–6th-year students more often complained of the bouts of headaches (72.9%), decreased performance (66.7%), sleep disorders (31.2%), and muscle pain (49.6%). Meteotropic reactions occurred in 47.0–67.0% of the surveyed students of various age groups. Thus, when weather sensitivity is detected in students during the medical check-up, further prevention of the meteotropic reaction exacerbations should be tailored based on the medical weather forecasting.

Keywords: students, weather sensitivity, meteotropic reactions, diagnostics

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Compliance with ethical standards: anonymous polling did not violate human rights or endanger the respondents, it was compliant with the principles of biomedical ethics.

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ГИГИЕНИЧЕСКАЯ ОЦЕНКА МЕТЕОЗАВИСИМОСТИ И МЕТЕОТРОПНЫХ РЕАКЦИЙ У СТУДЕНТОВ

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Проблема метеозависимости и метеотропных реакций среди различных слоев населения в зависимости от возраста, места проживания, профессиональных особенностей и состояния здоровья актуальна и недостаточно раскрыта в научной литературе. Целью работы было изучить метеочувствительность и метеотропные реакции у студентов медицинского университета различных возрастных групп. Проведено анкетирование 243 студентов в возрасте 17–18 и 23–24 лет с помощью авторской анкеты из 16 вопросов, позволяющих выявить метеозависимость и метеотропные реакции у респондентов. Анализ полученных данных показал, что метеочувствительность имела место у 53,7% девушек и 16,7% юношей ($p < 0,001$), обучавшихся на первом курсе. При этом 47,0% обследованных студентов-первокурсников и 67,0% студентов 5–6-го курсов жаловались на различные периодически возникающие метеотропные реакции. У студентов первого курса метеотропные реакции чаще проявлялись снижением работоспособности (76,6%), головными болями (74,6%), слабостью (70,2%). Метеозависимые студенты 5–6-го курсов чаще жаловались на приступы головных болей (72,9%), снижение работоспособности (66,7%), нарушения сна (31,2%) и мышечные боли (49,6%). Метеотропные реакции возникали у 47,0–67,0% обследованных студентов различных возрастных групп. Таким образом, во время диспансеризации студентов при выявлении у них метеочувствительности дальнейшую профилактику обострений метеотропных реакций следует строить с учетом медицинских прогнозов погоды.

Ключевые слова: студенты, метеочувствительность, метеотропные реакции, диагностика

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Соблюдение этических стандартов: анонимное анкетирование не ущемляло права человека, не подвергало опасности респондентов и соответствовало требованиям биомедицинской этики.

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The review of scientific literature about the impact of weather conditions on the human body has shown that there is a large group of people poorly tolerating various atmospheric disturbances. According to a number of researchers, weather-sensitive individuals respond differently to the same factors of influence. Like adults, children show weather sensitivity manifesting itself in various meteotropic reactions starting from the neonatal period [1–5]. The prevalence of meteotropic reactions depends on the age, geographic zone of residence, profession, anomalies of the constitution, certain chronic disorders.

Large contribution to investigation of the issues of weather sensitivity and meteotropic reactions in children and adolescents was made by Konstantin I. Grigoriev, Dr. Sci (Med.), Professor at the Department of Pediatrics and Children's Infectious Diseases, Pirogov Russian National Research Medical University. According to K.I. Grigoriev, weather sensitivity is the "ability of the body and autonomic regulation system to generate a physiological, pre-pathological or pathological response to the exposure to weather factors and/or decrease resistance to the changing meteorological or climatic conditions" [6, 7].

Table. Rates of meteotropic reactions in weather-sensitive students

Symptoms of meteotropic reactions	1st-year students,%	5–6th-year students,%
	n = 47	*n* = 96
Fatigue	70.2	51.1
Irritability	46.8	48.9
Decreased performance	76.6	66.7
Headache	74.6	72.9
Sleep disorder	12.8	31.2
Heart pain	10.6	14.6
Tachycardia	21.3	14.6
Shortness of breath	8.5	7.3
Nausea	14.9	11.4
Abdominal pain	10.6	6.4
Itchy skin	6.4	4.2
Skin rash	6.4	5.2
Muscle pain	28.8	49.6
Joint pain	38.3	37.5
Nosebleed	10.6	7.3
Exacerbation of chronic disorder	25.5	20.8

In our opinion, it is important to study the impact of weather conditions on the student youth in the context of today's socio-hygienic training and living conditions.

The study was aimed to detect weather sensitivity and meteotropic reactions in medical university students of various age groups.

METHODS

We performed polling of medical university (Yaroslavl State Medical University) students using the tailored questionnaire consisting of 16 questions allowing one to detect meteotropic reactions in the respondents. The respondents, who gave the consent to assessment, were divided into two groups. The first group included 100 first-year students aged 17–18 years, the second one included 143 5–6th-year students aged 23–24 years. Polling of first-year students was performed in September and October; polling of senior students was performed in the end of the academic year.

Statistical data processing was performed using the StatTech (StatTech; Russia) software package. The differences were considered significant at $p < 0.05$.

RESULTS

Analysis of the results showed that 53.7% of female and 16.7% of male first-year students had weather sensitivity ($p < 0.001$). Furthermore, 47.0% of surveyed first-year students and 67.0% of 5–6th-year students complained of various intermittent meteotropic reactions.

It is interesting to note that chronic disorders were more common among weather-sensitive students, than among those, who showed no weather sensitivity. Accordingly, chronic disorders were detected in 51.1% of weather-sensitive first-year students and 26.4% of students with no weather sensitivity. Among weather-sensitive senior students, chronic disorders were found in 50%, while among students with no weather sensitivity 28.2% had chronic disorders.

The rates of various meteotropic reactions found in the group of weather-sensitive students are provided in the Table.

The Table shows differences in the meteotropic reactions occurring in the groups of weather-sensitive first-year and 5–6th-year students. In first-year students, meteotropic reactions were most often manifested in the decreased performance (76.6% of cases), headache (74.6% of cases), fatique (70.2% of cases). The weather-sensitive 5–6th-year students more often complained of the bouts of headaches (72.9%), decreased performance (66.7%), sleep disorders (31.2%), and muscle pain (49.6%).

Analysis of the data obtained showed that the rates of exacerbations of chronic disorders in weather-sensitive students were the same in both groups.

DISCUSSION

Our findings are in line with the studies of meteotropic reactions in schoolchildren and students performed by a number of domestic researchers. In the study [8], 58.9% of surveyed individuals were considered to be weather-sensitive. The study of weather sensitivity in the pedagogical university students aged 17–23 years showed that 29.3% of them suffered from weather sensitivity [9].

When assessing weather-sensitive patients, seasonal fluctuations of their hemodynamic parameters were revealed [10].

The study of meteotropic effects on the metabolic factors in the student's body proved that various climatic conditions of students' residence had an impact on the changes in the body's metabolic processes, including in the cardiovascular and respiratory systems [11].

Studies of the impact of meteorological factors on the development and course of disorders were conducted by a number of domestic researchers. Thus, predictors of meteotropic reactions in patients with arterial hypertension under conditions of the Extreme North were identified [12].

In 2020–2022, meteopathic reactions were assessed in children with bronchial asthma living in Moscow: 74.8% of children in this group were weather-sensitive. The authors proposed the normobaric hypoxic therapy that made it possible to reduce the patients' weather sensitivity and meteotropic reactions by 80.0% [13, 14].

The following pattern was identified when assessing the effects of weather sensitivity in patients with arterial hypertension: the authors found that meteopathic reactions occurring in patients were most often associated with sudden weather changes [15].

The literature review has shown that it is necessary to consider health status and ensure prevention of chronic disorders when providing career guidance to weather-sensitive adolescents, including those from the groups at risk of bronchial asthma and arterial hypertension [16–18].

In our opinion, meteotropic reactions and some categories of diathesis are characterized by identical reactions. Therefore, it is necessary to record individuals with certain types of diathesis and to ensure timely preventive measures not allowing diathesis to realize into disease [19].

The analysis of the literature and original data suggests the need to detect weather sensitivity during medical check-ups of schoolchildren and students in order to prevent meteotropic reactions.

CONCLUSIONS

Meteotropic reactions occurred in 47.0–67.0% of the surveyed students of various age groups. Thus, in cases of detecting weather sensitivity in patients, further prevention of the meteoropic reaction exacerbations should be tailored considering medical weather forecasting.

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