

DOI: 10.58240/1829006X-2025.1-36



RESEARCH ARTICLE

EVALUATION OF ASSOCIATIONS BETWEEN ORAL HEALTH STATUS AND PSYCHO-EMOTIONAL STRESS AMONG YOUNG PEOPLE IN UKRAINE

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Received: Oct 12, 2024; **Accepted:** Nov 15, 2024; **Published:** Jan 10, 2025

Abstract

Purpose: to investigate the relationship between indicators of psycho-emotional state and dental status, to identify risk factors for dental diseases in young people.

Materials and methods: 48 students aged 19-20 years, studying at the 3rd year of the Faculty of Dentistry on specialty 'Dentistry' were examined. Among them: there are 19 males (39.6%) and 29 females (60.4%). Research methods: clinical, psychological, empirical (sociological), statistical analysis.

Results: According to the results of clinical studies of dental status in 48 examined students, the O'Leary hygiene index in the median value was 91.0 (81.0-96.5) %, the hygiene index of contact surfaces of teeth API was 97.0 (86.0-100.0) %, which corresponds to an unsatisfactory level of oral hygiene. The DMF index was 10±0.9. The periodontal tissue inflammation index PMA in the median value was 17% ± 1.6, which corresponds to a mild degree of gingival inflammation. The RBI bleeding index was 0.10 (0.03-0.29) points. Statistical analysis established a correlation of weak strength according to Spearman correlation coefficient (R=0,41, p<0,05) between PMA and stress level according to V.Y. Scherbatykh; and (R=0,49, p<0,05) between PMA and indicators according to V. Zung.

Conclusion: Determination of indicators of the psycho-emotional state of young people and characteristics of stress resistance is of great importance, because it is resistance to stress that protects a person from disorientation and various disorders, lays the foundation for inner harmony and high performance. Therefore, timely identification of risk groups by psychoemotional indicators and appropriate competent correction play an important role in the formation of full mental and dental health.

Keywords: Oral Health Status, Psycho-emotional stress, Periodontal disease, Oral hygiene, Hygiene index.

INTRODUCTION

Due to the realities of today, increased level of psycho-emotional stress in society is becoming more and more common phenomenon, which emphasises the need to study its role and influence on human health, in particular on dental status.

It is believed that the most vulnerable, intolerant to negative external influences, exposed to stress is young people, in particular such a socially and psychologically vulnerable category as students. It is precisely young people who face many challenges and requirements that encourage them to constantly search and develop, struggle for life prospects and positions, formation of personality in society, civil responsibility.^{5,14} All this causes a great strain on the nervous system and mentality of a young person, leads to emotional tension, accumulation of negative emotions, reduction of adaptive abilities capable of resisting stress.¹²

Many scientists have established that psycho-emotional stress influences the human body and dental health by a direct or indirect mechanism.⁷ Stress factors modulate the immune system in the body through the nervous and endocrine systems. One of the important steroid hormones synthesised by the adrenal cortex, the level of which increases in stressful situations of long duration, is cortisol. It helps the body to timely restructure the physiological activity of many organs and systems (cardiovascular, nervous, respiratory, digestive) to adequately counteract the negative effects of stress factors.¹ At the same time, the organism has limited reserves of adaptive capabilities, which are mobilised by restructuring of homeostatic mechanisms of the organism.¹⁵

Stress caused by psychosocial factors can also affect the microbial ecology of the periodontium.^{4,10} Under the influence of changes in the body's defences, which acquired immunosuppressive effect, the propensity to periodontal tissue diseases of bacterial genesis increases.¹⁶

Also, the indirect effect of stress on oral health is realised through lifestyle changes and the introduction of bad habits: smoking, alcohol consumption, unhealthy diet and negligent attitude to oral hygiene and health in general.¹³

The formation of stress resistance in young people is associated with the search for sources and resources needed to overcome the effects of stress.⁵ Modern scientific publications describe the

peculiarities of the state of dental health, the level of health awareness and risk factors for dental diseases among young people.^{2,6}

The aim of the study is to investigate the relationship between indicators of psycho-emotional state and dental status, to identify risk factors for dental diseases in young people.

MATERIALS AND METHODS

At the Department of Therapeutic Dentistry of the Bogomolets National Medical University 48 students aged 19-20 years, studying at the 3rd year of the Faculty of Dentistry on speciality 'Dentistry' were examined. Among them: there are 19 males (39.6%) and 29 females (60.4%).

Research methods: clinical, psychological, empirical (sociological), statistical analysis.

To assess the dental status of students we used: DMF index, O'Leary hygiene index, API hygiene index, PMA inflammation index, PBI bleeding index.

To determine the psycho-emotional indicators of the personality we used psychological tests to determine the level of stress according to V.Y. Scherbatykh and V. Zung's.

Sociological (empirical) research is represented by questionnaire survey of young people on lifestyle, oral hygiene, medical (dental) awareness.

STATISTICAL ANALYSIS

The statistical analysis of the obtained data was carried out on a PC using Microsoft Excel 2021, StatSoft Statistica 12. For the samples, the conformity of the empirical distributions to the normal law (Gaussian distribution) was assessed according to the Kolmogorov-Smirnov and Shapiro-Wilk criteria, being the basis for selection of the statistical criteria. Criteria for methods: the mean value of the variant M , the standard error of the mean value m ($M \pm m$), Spearman's correlation coefficient, the median value of the median Me and the interquartile range $QI-QIII$ ($Me(QI-QIII)$).

RESULTS

According to the results of clinical studies of

dental status in 48 examined students, the O'Leary hygiene index in the median value was 91.0 (81.0-96.5) %, the hygiene index of contact surfaces of teeth API was 97.0 (86.0-100.0) %, which corresponds to an unsatisfactory level of oral hygiene. The DMF index was 10 ± 0.9 . The periodontal tissue inflammation index PMA in the median value was $17\% \pm 1.6$, which corresponds to a mild degree of gingival inflammation. The RBI bleeding index was 0.10 (0.03-0.29) points.

The test for determining the level of stress and stress resistance of students by V. Shcherbatykh includes an analysis of 4 components of stress - intellectual, behavioural, emotional and physiological. Its purpose is to determine the level of stress of a person. The test consists of several sections that are responsible for a particular stress symptom. Each symptom is accompanied by states that a person may experience.

Therefore, according to the results of this test, the values of stress level in students were very variable: the minimum score is 4, and the maximum score is 38. The average value is 15.8 ± 1.1 points. The results and their interpretation according to the evaluation and characterisation scale (Fig.1) were:

- 1) 0 to 5 points, which corresponds to the concept of 'no stress', was scored by 1 student (2% of respondents);
- 2) 6 to 12 points, which means 'moderate stress', was scored by 15 students (32%);
- 3) 13 - 24 points, which means 'high stress' was scored by 23 students (47%);
- 4) 25-40 points, which means 'very stressful' - 9 students (19%);
- 5) 40 and above points, which is interpreted as the most dangerous stage of stress 'depletion of adaptation energy reserves' was not scored by any student (0%).

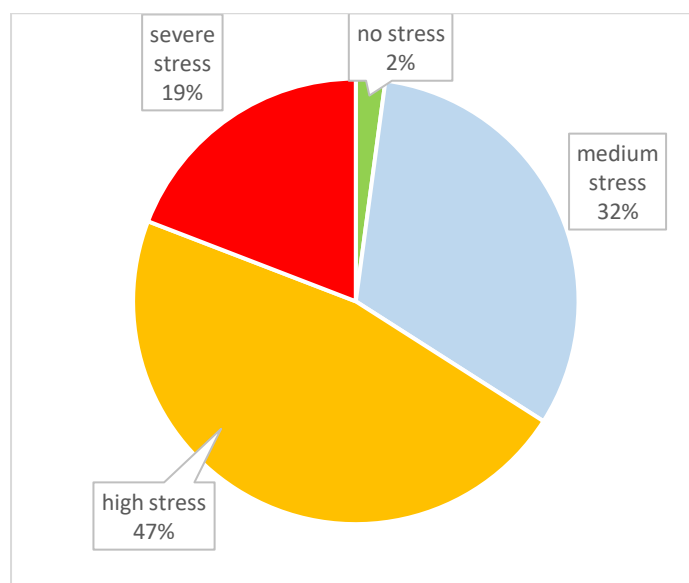


Figure 1. Stress level in students according to the test of V.Y. Scherbatykh

This means that 34% of students at this moment of life either have no significant stress or experience moderate stress, which can be compensated with the help of rational use of time, regular holidays and finding an optimal way out of the situation. Unfortunately, the majority of students (66%) are in a state of strong and very strong stress, have quite pronounced tension of emotional and physiological systems of the body, which arose in response to a strong stressor that could not be compensated. To

overcome this state, it is advisable for students to consult a psychologist or psychotherapist, as their organism is already very close to the limit of its ability to resist stress.

It is also important to analyse students' answers to some test questions. For example, a lot of 'Yes' answers were given by 'Concentration difficulties' - 79% of students, 'Deterioration of memory' - 54%, 'Chronic lack of time' - 75%, 'Increased anxiety' - 63% (Table 1).

Table 1: Analysis of stress components according to the test of V.Y. Scherbatykh

Signs of stress components according to the test of V. Shcherbatykh:					
1. Intellectual signs of stress					
Contents of the question	Difficulties with concentration	Deterioration of memory performance	Increased distractibility	Difficulties in making decisions	Impulsivity of thought
% of students who answered 'Yes'	79,2%	54,2%	62,5%	58,3%	45,8%
2. Behavioural signs of stress					
Content of the question	Decreased or increased appetite	Increase in conflict situations	Chronic lack of time	Lack of time to socialise with loved ones	Decrease in labour productivity
% of students who answered 'Yes'	54,2%	25,0%	75,0%	66,7%	50,0%
3. Emotional symptoms of stress					
Content of the question	Increased anxiety	Frequent bad moods	The feeling of constant longing	Anger attacks	Reduced self-esteem
% of students who answered 'Yes'	62,5%	54,2%	37,5%	37,5%	50,0%
4. Physiological symptoms of stress					
Content of the question	Body pain of unclear genesis	Increased fatigue	Disorders of digestive processes	Trembling hands, cramps.	Increased sweating
% of students who answered 'Yes'	37,5%	70,8%	50,0%	29,2%	29,2%

The second method of differential diagnostics of stress and depressive states according to V. Zung showed that the average value of the index is 46.3 ± 1.1 points. The results show that the majority of students (71%) have no signs of depression or subdepression.

According to the interpretation of the test, the whole volume of scale scores is divided into 4 ranges:

- 1) up to 50 points - range 1, meaning no lowered mood at the time of the study - scored by 34 respondents (71%);
- 2) 51 - 59 points - range 2, which means insignificant but clearly expressed low mood - 12 respondents (25%) scored;
- 3) 60 - 69 points - range 3, which means a significant decrease in mood and emotional instability - scored by 2 respondents (4%);

- 4) 70 points and above - range 4, which means a deep decrease in mood (depression) - no respondent (0%).

Further sociological empirical research was conducted - questionnaire survey of respondents on lifestyle, oral hygiene, medical awareness to identify risk factors of dental diseases. To your attention are some of them.

To the question about 'Frequency of individual daily oral hygiene' - 88% of students answered correctly, but 12% do not observe the rules of rational hygiene.

To the question 'How many minutes do you devote to brushing your teeth?' - 56% devote enough time and 44% do not devote enough time (Figure 2).

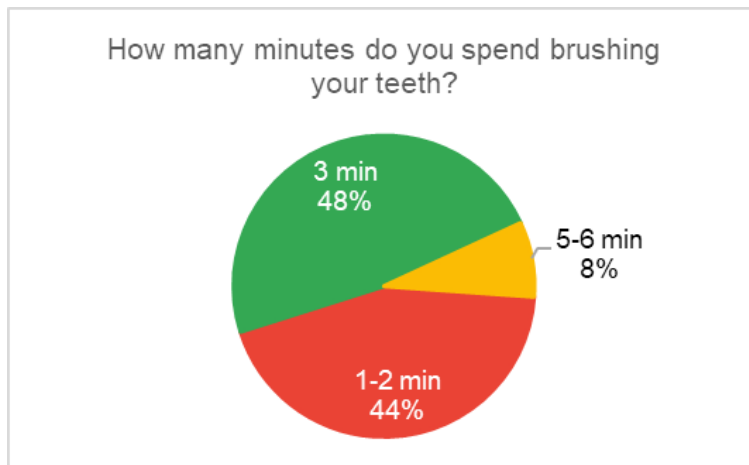


Figure 2. The amount of time spent on individual oral hygiene

According to the results of the question about ‘Frequency of professional hygiene at the dentist’ - 16% have never had professional hygiene at all in their life.

To the question ‘Do you smoke?’ - 68% answered ‘No’ and 32% unfortunately answered ‘Yes’.

Statistical analysis established a correlation of weak strength according to Spearman correlation coefficient ($R=0,41, p<0,05$) between PMA and stress level according to V.Y. Scherbatykh (Fig.3); and ($R=0,49, p<0,05$) between PMA and indicators according to V. Zung (Figure 4).

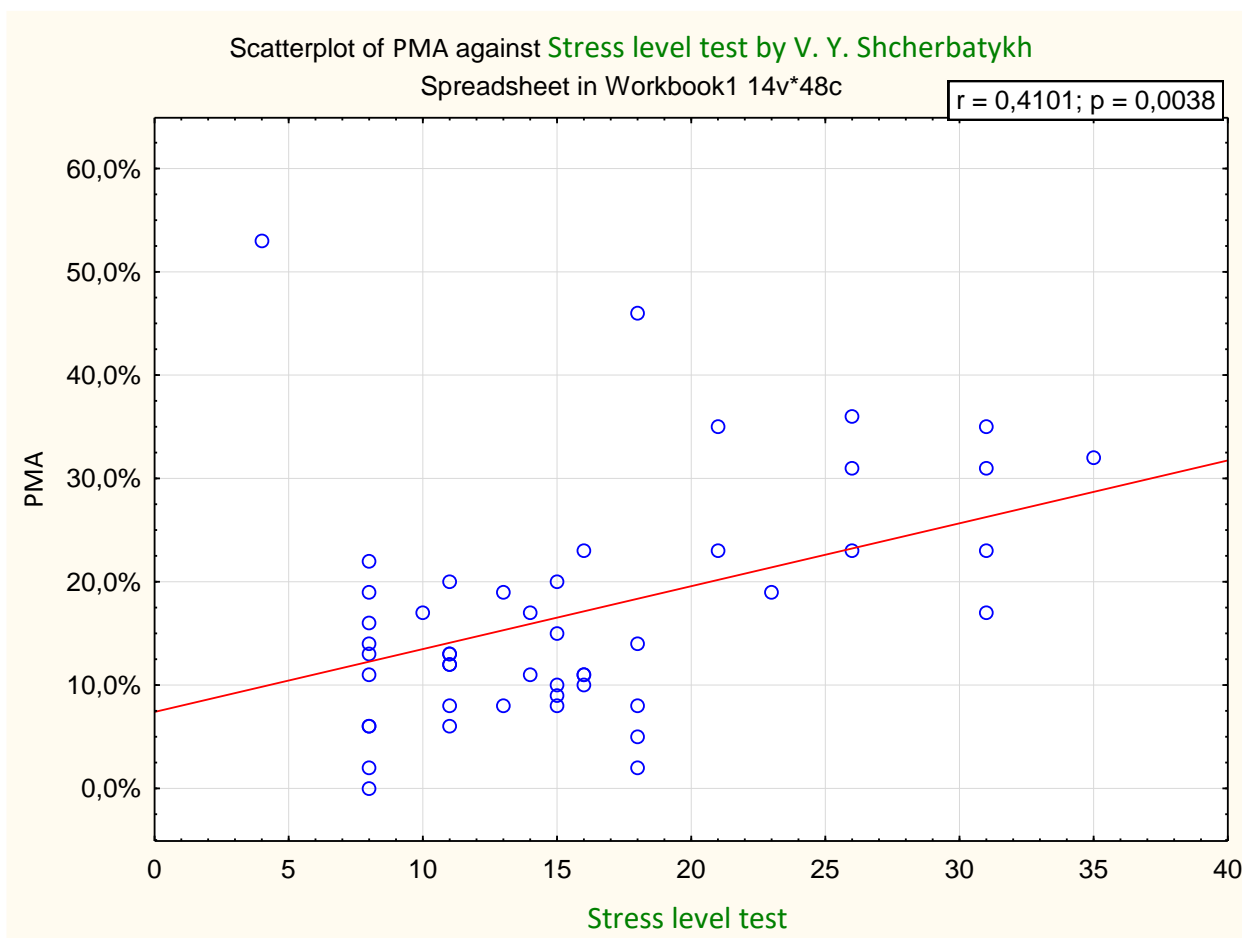


Figure 3. Scatterplot of PMA against stress level test by V.Y. Shcherbatykh

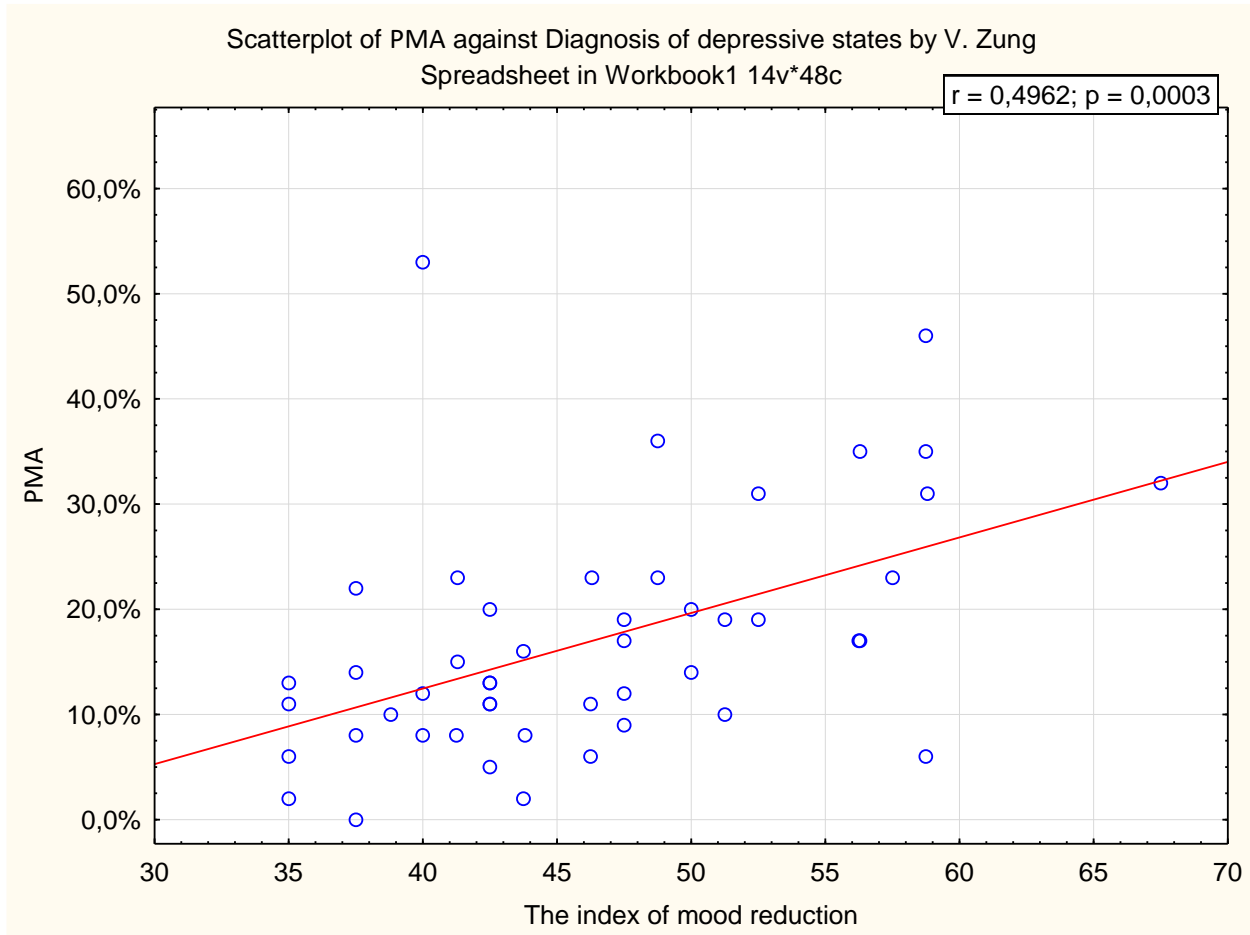


Figure 4. Scatterplot of PMA against Diagnosis of depressive states by V. Zung

DISCUSSION

The concept of stress has long been of interest to scientists. Dictionaries and encyclopaedias often cite the definition formulated by the eminent scientist Hans Selye: ‘Stress is a nonspecific response of an organism to any demand made on it, aimed at creating adaptation or adjustment of the organism to difficulties’.^{12,15} Stress is defined as a defensive reaction of our brain and body to various demands, influences, events or environmental factors. It is a part of our lives. A person is born in a stressful situation and lives with stress. Every event that requires a change in the usual way of life or additional energy expenditure is potentially stressful.

Stress is really present in every person's life, but as Hans Sellier said: ‘Stress is not something that kills us, it is the very reaction to stress that kills us, which is individual and depends on perception’. Analysing modern scientific publications on the peculiarities of stress manifestation in young people, it is determined that stress resistance is manifested in the ability to

adequately react and resist difficult situations, to retain a sense of self-control, tolerance, tactfulness, tolerance, ability to abstract from unnecessary information and make adequate decisions.⁵ That is why psychoemotional indicators of personality and the level of stress resistance are so important and especially relevant in modern conditions.¹⁴

The role of stressors in the context of dental health indicators has been investigated, as well as universal mechanisms of periodontal tissue damage.^{8,17} Stress factors cause induced modulation of the immune system by increasing the level of adrenocorticoid hormones and a number of biologically active substances, which leads to excitation of chemotaxis and phagocytosis of polymorphonuclear leukocytes, changes in the level of cytokines, activation of free-radical lipid peroxidation of cell membranes, changes in blood circulation, increase in total proteolytic and collagenolytic activity in blood serum and periodontal tissues, etc.^{3,4,18}

The primary task of a doctor is the timely diagnosis and identification of risk factors for dental

pathology and the need for its treatment.^{2,8} This means that it is necessary to develop a comprehensive understanding of the main common and local risk factors for dental diseases in adolescence and young adulthood.

Modern living conditions of young people in Ukraine, modernisation of the higher education system due to dynamic changes in our country and the world, realities of socio-economic and political state of today, extreme conditions of existence due to martial law in Ukraine, have quite a powerful impact on the psycho-emotional sphere and quality of life. The nature of stress experience depends on the interaction of the main factors: the strength and duration of the impact of stressors on the psyche, as well as on individual characteristics of perception and response to them.

The analysis of literature emphasises the manifesting role of psycho-emotional indicators of personality in the perception and response to the constantly changing conditions of the surrounding world, in fact, a number of authors emphasise the close relationship between stress and the level of oral hygiene, periodontal health status.^{1,3,6,9,12}

Ponomarenko M. and Kaifie A.¹³ identified oral health characteristics of stress among war-affected Ukrainian refugees.

Kolenko Y. and Volovyk I.⁸ noted that not only stress is one of the leading factors in the development of dental pathology, but also vice versa - the presence of dental diseases worsens the quality of life of a person, his psycho-emotional state and self-confidence. And this is a very important aspect, especially for young people, to realise themselves in society, to create a family, to become a career and society.

CONCLUSION

Stress in young people manifests itself mainly at the psychological level in the form of reduced efficiency, poor concentration, depressed mood, and depression. A significant number of students are exposed to stressful situations. They do not always know how to find a way out of unpredictable situation, experience anxiety, so they need to increase the level of stress resistance.

The results of the conducted research indicate:

- about the unsatisfactory level of hygiene of

students and the presence of diseases of hard tissues of teeth and inflammatory processes in periodontal tissues;

- the majority of students (66%) are in a state of strong and very strong stress according to the test of V. Y. Scherbatykh and 4% have a significant decrease in mood and emotional instability according to the test of V. Zung. Zung;
- statistical analysis established a correlation relationship by Spearman's coefficient between clinical indicators and stress level;
- psycho-emotional stress should be taken into account when assessing dental health as a risk factor;
- up to 44% of students have an insufficient level of sanitary-educational knowledge, which act as risk factors for dental diseases.

The main task of psychological tests is to determine the indicators of psychological state, to predict the stress resistance of the organism taking into account individual psychological and physiological features of the researched and timely identification of risk groups.

The results showed that uncontrolled constant psycho-emotional stress can be a factor contributing to the development of periodontal diseases and hard tissues of teeth. Stress indirectly affects periodontal health through behavioural and lifestyle changes, increasing negligent oral hygiene. It also affects periodontal health through direct biological effects mediated by changes in saliva status, changes in gingival blood flow and effects on the body's immune response.

Also, the findings emphasise the importance of paying attention to the psychological state of young people when assessing dental health. This study can be taken into consideration when planning dental interventions. Thus, patients with increased stress indicators should be given special treatment and prevention schemes with greater attention to motivation to maintain oral health and more frequent hygiene procedures, as well as counselling by a psychologist or psychotherapist to increase the body's stress resistance.

Determination of indicators of the psycho-emotional state of young people and characteristics of stress resistance is of great importance, because it is resistance to stress that protects a person from

disorientation and various disorders, lays the foundation for inner harmony and high performance. Therefore, timely identification of risk groups by psychoemotional indicators and appropriate competent correction play an important role in the formation of full mental and dental health.

DECLARATIONS

Conflicts of interest and financial disclosures

The author declares that he has no conflict percent and there was no external source of funding for the

research in question.

Ethical approval

The study was approved by the Institutional Ethics Committee and was conducted in accordance with the Declaration of the World Medical Association.

Informed consent

Informed consent was obtained from all individual participants included in the study.

Source of funding

The work was not funded.

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