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to the Global Challenges of Our Time**

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Materials addressed to all those interested in the actual problems of management, economy and ecology, social sciences, and humanities.

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## CONTENTS / СОДЕРЖАНИЕ

<b>Organizers of the Conference / Организаторы конференции...</b>	<b>9</b>
<b>Contents / Содержание.....</b>	<b>10</b>

### SECTION IV / СЕКЦИЯ IV

#### NATURAL SCIENCES / ЕСТЕСТВЕННЫЕ НАУКИ 13

<b>4.1. М.К. Курманалиев, Ж.Е. Шаихова, С.О. Абилкасова, Ж.Дж. Алимкулова, Л.М. Калимолдина</b> Изучение возможности применения вермикулита в качестве сорбента ионов меди (II).....	13
<b>4.2. А.А. Амангельдина, С.У. Тлеуменова</b> Применение барботирования для повышения всхожести семян <i>Gentiana pneumonanthe</i> L.....	18
<b>4.3. Г.Ш. Маханова, С.А. Ахмадиева, А.С. Кыстаубаева</b> Технология возделывания ремонтантной малины сорта «Зюгана».....	21
<b>4.4. Г.Ш. Маханова, С.А. Ахмадиева, А.С. Кыстаубаева</b> Возделывание перспективного сорта картофеля «Ушконыр» в Восточном Казахстане.....	26
<b>4.5. Е.А. Тоқпанов, К. Ногайбаева, Ж.Х. Ақтаубаева</b> Жетісу облысында өсірілетін қант қызылшасын еліміздің азық-түлік қауіпсіздігін қамтамасыз етудегі маңызы.....	31
<b>4.6. Р.А. Исаева, А.Т. Оразәлі, Р.Х. Халилова, Н.К. Жорабаева, А.Б. Изтлеуова</b> Автотранспорт - как основной источник выбросов в атмосферу промышленного города.....	38
<b>4.7. Д.А. Нарватов</b> Исследование влияния световых лучей разного спектра на биоценоз активного ила в условиях очистной станции города Темиртау.....	42
<b>4.8. A.Sh. Turgenbaeva, A.Sh. Moldakhmetova, G.I. Karkinbayev, F.S. Koishymanov, B. Bakaev</b> The Impact of Physical Activity on Mental Health: The Role of Sports in Reducing Stress and Depression Levels.....	46
<b>4.9. Ж.С. Айкенов, Б.С. Хайдаров, А.Б. Бухарбаева, А.Н. Пулатов</b> Спортшылардың жүрек қан тамырлары жүйесіндегі физиологиялық өзгерістері.....	51
<b>4.10. Б.А. Базарбаев, Р.Г. Саттыбаев, Е.М. Куримбаев</b> Қазақтың ұлттық қимыл-қозғалыс және спорттық ойындарының оқушыларды жан-жақты дамытуға тигізетін әсері.....	55

<b>4.11. К.А. Жакипов, Г.М. Нуркасымова, Т.Ө. Сапарбек</b> Қазақ күресінің дайындық жұмыстары және үйірмені ұйымдастыру.....	60
<b>4.12. Т.А. Өмірзақов, К.Б. Байхожаев, Ж. Қаныбек, Е.М. Курымбаев</b> Мектеп жасына дейінгі балалардың дене тәрбиесі бойынша тәрбиешінің қызметі.....	65

## **SECTION V / СЕКЦИЯ V**

### **HUMANITIES / ГУМАНИТАРНЫЕ НАУКИ 71**

<b>5.1. D.O. Yershimanova, Zh.M. Alova, S.A. Imanbayeva</b> The Development of Communicative Skills in Teaching English Language for Second Language Learners.....	71
<b>5.2. M.A. Shaikym</b> Formative Assessment in EFL Classrooms: Teachers' Perspectives.....	76
<b>5.3. G.S. Karimova, A.M. Amangeldi</b> Implementing the Communicative Approach in English Language Teaching in Kazakhstan.....	80
<b>5.4. S.T. Mametanova</b> Using Linguistic Material in the Process of Teaching English to Increase Students' Motivation.....	87
<b>5.5. M.K. Kamzina</b> Dominant Models of Foreign Language Teaching	92
<b>5.6. Н.А. Шахметова, К.Т. Сарбасова</b> Символическая и мифологическая нагрузка соматизмов в русской и казахской языковых картинах мира.....	99
<b>5.7. Б.Ж. Джумамухамбетова, А.К. Алматова</b> Теоретические основы понятия языковой картины мира.....	106
<b>5.8. А.Е. Шайкенова</b> Формирование функциональной грамотности учащихся средних общеобразовательных учреждений в процессе обучения английскому языку.....	114
<b>5.9. К.К. Омиржанова</b> Использование технологии критического мышления на уроках английского языка.....	118
<b>5.10. Р.С. Умиргалиева</b> Применение интеллект-карты на уроках русского языка в школе.....	125
<b>5.11. А.Қ. Егенисова, Р.К. Айтмухамбетова</b> Педагогтердің психикалық денсаулығы мен эмоционалды күйінің алдын алу жолдары.....	129
<b>5.12. А.Қ. Егенисова, А.А. Кушбаева</b> Тұлға құрылымындағы көшбасшылықтың психологиялық аспектілері.....	137
<b>5.13. А.Қ. Егенисова, А.К. Сәнтәй</b> Оқу үрдісінде оқытудың интербелсенді әдістерін қолдану.....	144

В то же время использование светодиодных лент с разными спектрами света в течение продолжительных периодов показало негативное влияние на среду активного ила. Протяжённое воздействие этих источников света приводило к снижению активности микробных сообществ, нарушению физиологических процессов и, как следствие, ухудшению эффективности очистки. Это указывает на необходимость тщательного подбора источников света для поддержания оптимальной работы активного ила в системах биологической очистки сточных вод.

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#### **4.8. The Impact of Physical Activity on Mental Health: The Role of Sports in Reducing Stress and Depression Levels**

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#### **Abstract**

*This article examines the impact of physical activity on mental health, focusing on the reduction of stress and depression levels. In the context of the global epidemic of mental health disorders, physical exercise becomes an accessible and highly effective method of improving psycho-emotional well-being. The article analyzes the mechanisms through which physical activity influences mental health, providing data from current*



*studies that confirm its effectiveness. Regular physical activity not only reduces stress and depressive symptoms but also contributes to an improved quality of life.*

**Keywords:** *physical activity, mental health, stress, depression, endorphins, neurotransmitters, prevention, therapy.*

## **Влияние физической активности на психическое здоровье: роль спорта в снижении уровня стресса и депрессии**

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*Данная статья рассматривает влияние физической активности на психическое здоровье с акцентом на снижение уровня стресса и депрессии. В условиях глобальной эпидемии психических расстройств физические упражнения становятся доступным и высокоэффективным методом улучшения психоэмоционального состояния. В статье анализируются механизмы, благодаря которым занятия спортом влияют на психическое здоровье, и приводятся данные актуальных исследований, подтверждающих их эффективность. Регулярная физическая активность не только снижает уровень стресса и депрессивных симптомов, но и способствует улучшению качества жизни.*

**Ключевые слова:** *физическая активность, психическое здоровье, стресс, депрессия, эндорфины, нейротрансмиттеры, профилактика, терапия.*

## **Дене белсенділігінің психикалық денсаулыққа әсері: стресс пен депрессия деңгейін төмендетудегі спорттың рөлі**

*Бұл мақалада стресс пен депрессия деңгейін төмендетуге баса назар аударып, физикалық белсенділіктің психикалық денсаулыққа әсері қарастырылады. Психикалық бұзылулардың жаһандық эпидемиясы жағдайында дене жаттығулары психоэмоционалдық жағдайды жақсартудың қолжетімді және*

*тиімділігі жоғары әдісіне айналады. Мақалада спортпен айналысудың психикалық денсаулыққа әсер ететін тетіктер талданады және олардың тиімділігін растайтын өзекті зерттеулердің деректері келтіріледі. Тұрақты дене белсенділігі күйзеліс пен депрессиялық симптомдардың деңгейін төмендетіп қана қоймай, өмір сүру сапасын жақсартуға да ықпал етеді.*

***Түйінді сөздер:** дене белсенділігі, психикалық денсаулық, стресс, депрессия, эндорфиндер, нейротрансмиттерлер, профилактика, терапия.*

## **Introduction**

Mental health is a crucial component of overall health. It encompasses emotional, psychological, and social well-being. In recent decades, there has been a sharp increase in the prevalence of mental health disorders, such as depression and anxiety disorders, highlighting the need for effective prevention and treatment methods. In this context, physical activity has emerged as one of the most accessible and effective ways to improve psycho-emotional states. This article examines the influence of regular physical activity on reducing stress and depression levels, as well as the mechanisms contributing to this effect.

## **Relevance of the Research**

The relevance of this research is determined by the growing levels of stress and the widespread prevalence of depressive disorders in modern society. According to the World Health Organization (WHO), mental disorders are becoming one of the leading causes of disability. In the face of modern social and economic challenges, it is essential to find accessible and effective methods of treatment and prevention. Physical activity is one such method, offering a range of positive effects on mental health and contributing to an improved quality of life.

## **Research Objectives**

**Objective of the research:** To determine the impact of physical activity on reducing stress and depression levels, and to identify the mechanisms that contribute to this effect.

## **Research tasks:**

- 1) To review existing literature on the impact of physical activity on mental health.
- 2) To study the physiological and psychological mechanisms through which physical activity affects stress and depression levels.
- 3) To analyze the results of clinical trials that confirm the effectiveness of physical exercises as a therapeutic method for individuals with mental disorders.

## **Research Methods**

This article presents a review of existing methods used to study the impact of physical activity on mental health. These include:

**1. Randomized Controlled Trials (RCTs):** These are considered the gold standard in medical research, allowing the evaluation of the effectiveness of physical exercises. Participants are randomly assigned to

groups, one of which undergoes a physical activity program, while the other receives control conditions.

**2. Meta-analysis Methods:** These methods are used to combine data from multiple studies to identify general patterns and the impact of physical activity on mental health. This helps reveal more consistent results.

**3. Clinical Trials:** Research evaluating the impact of different types of physical activity (e.g., aerobic exercises, strength training, yoga) on stress and depression levels.

**4. Self-assessment Questionnaires and Scales:** Used to measure stress and depressive symptoms. Examples include the Beck Depression Inventory (BDI) and the Perceived Stress Scale (PSS).

**5. Neuropsychological Tests:** These tests assess cognitive functions and the overall psycho-emotional state of participants, providing deeper insights into the impact of physical activity on mental health.

**6. Long-term Cohort Studies:** These studies evaluate the impact of physical activity on mental health over extended periods, allowing for the identification of long-term effects.

### **Mechanisms of Physical Activity's Impact on Mental Health**

Physical activity has a complex impact on mental health through several key mechanisms, which are supported by scientific research.

#### **1. Endorphin Production**

Physical activity stimulates the release of endorphins — neurochemicals with analgesic and antidepressant properties. According to *Schwarz et al. (2014)*, regular exercise increases endorphin concentrations in the brain, leading to improved mood and reduced stress levels.

#### **2. Normalization of Neurotransmitters**

Physical activity also affects the levels of neurotransmitters such as serotonin, dopamine, and norepinephrine, which regulate mood and emotional state. Research by *Blumenthal et al. (2007)* showed that both aerobic exercises and strength training contribute to the restoration of these chemicals in the brain, reducing symptoms of depression.

#### **3. Reduction of Cortisol Levels**

Cortisol, the stress hormone, is produced in response to stressful situations, and prolonged high levels can contribute to depression. *Youngstedt et al. (2004)* demonstrated that regular aerobic exercise reduces cortisol levels in the body, helping to alleviate chronic stress and prevent its negative effects on mental health.

#### **4. Psychological Mechanisms**

Physical activity improves self-esteem and self-perception, which are crucial for psycho-emotional well-being. *Salmon (2001)* noted that exercise can increase life satisfaction, which helps combat depressive symptoms. Additionally, physical activity aids in overcoming social isolation, a common aspect of depression.



## **Effectiveness of Different Types of Physical Activity**

Research confirms that different types of physical activity can have varying effects on mental health.

### **1. Aerobic Exercise**

Numerous studies, including *Craft and Perna (2004)*, have shown that aerobic exercises, such as running, swimming, and cycling, have the most pronounced antidepressant effect and significantly reduce stress levels.

### **2. Strength Training**

Strength training also has a positive impact on mental health, especially in the long term. *Ströhle et al. (2007)* demonstrated that regular strength training can effectively reduce depression symptoms, even without other interventions.

### **3. Yoga and Meditation**

Yoga and meditation significantly reduce anxiety and depression. *Cramer et al. (2013)* showed that yoga helps lower stress and improve psycho-emotional health through improved flexibility, breathing exercises, and relaxation techniques.

## **Clinical Research and Evidence**

Many clinical studies support the idea that physical activity can be an effective method for preventing and treating mental disorders. For example, a meta-analysis by *Cuijpers et al. (2013)*, which examined over 30 randomized controlled trials, showed that physical activity can be as effective as medication in treating depression.

## **Practical Recommendations**

**1. Integrating Physical Activity into Daily Life:** To achieve sustainable results, it is important to make physical activity a regular part of daily life. This can include activities such as morning runs, cycling, going to the gym, or practicing yoga.

**2. Variety in Training:** To minimize the risk of psycho-emotional fatigue, it is important to alternate between different types of physical activity, combining aerobic and strength training with relaxing practices like yoga or meditation.

**3. Social Support:** Exercising together with friends or in groups can enhance the effects of physical activity through social support and the strengthening of interpersonal connections.

## **Conclusion**

Physical activity has a significant positive impact on mental health by reducing stress and depression levels. Regular exercise contributes to improved mood, increased self-esteem, and the stimulation of neurochemicals that help manage psycho-emotional disorders. In modern life, physical activity is an essential tool for the prevention and treatment of mental illnesses, improving the quality of life and overall well-being.

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## 4.9. Спортшылардың жүрек қан тамырлары жүйесіндегі физиологиялық өзгерістері

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### **Резюме**

*Физиологические изменения в сердечно-сосудистой системе спортсменов.*

### **Summary**

*Physiological changes in the cardiovascular system of athletes.*

Спорттық жаттығулар кезіндегі физиологиялық өзгерістердің көбісі дене еңбегі сияқты бағытта болады. Алайда, олар ауқымды, қарқынды және тез қажытатын толқынды келеді.