

An integrated approach to Correcting the Physical and Psychoemotional State of female students working with migrant children

Un enfoque integrado para corregir el estado físico y psicoemocional de estudiantes que trabajan con niños migrantes

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Abstract. The article aims to investigate the effectiveness of the author's program "Correction of the Physical and Psychoemotional state of female students working with migrant children", which combines psycho-training practical classes and training classes in health fitness. *Materials and methods.* The program includes psycho-training practical sessions to develop psychological well-being, stress resistance and psychological harmony, and health fitness training sessions to improve the body's functional state. The program integrates physical and psychological aspects of health. Forty-four female students of the 1st-2nd years of the Yuriy Fedkovych Chernivtsi National University of the Faculty of Physical Culture and Human Health took part in the pedagogical experiment. *Results.* We found that the program for correcting the physical and psycho-emotional state of female students, which included psycho-training practical classes and health fitness training classes, contributed to a decrease in the values of body weight, waist circumference, hip circumference and pelvic circumference ($p < 0.05$; $p < 0.001$). The results showed statistically significant differences ($p < 0.05$; $p < 0.001$) between the initial and final stages of the study. After using the developed program, we observed statistically significant changes ($p < 0.05$) in situational and personal anxiety levels. The percentage of female students with a high level of situational anxiety decreased from 27.3 % to 0.0 %, and the average level decreased from 54.5 % to 15.9 %. Personality anxiety also reduced from a high of 43.2 % to 0.0 %, and the intermediate level decreased from 54.5 % to 20.5 %. *Conclusions.* The results of our study confirm the effectiveness of the author's program "Correction of the physical and psycho-emotional state of female students working with migrant children" in improving the physical development, functional state of the cardiovascular and respiratory systems, and psychological well-being of the participants. The application of the program led to a decrease in anxiety, an improvement in body composition, a reduction in the volume of adipose tissue, and an increase in the adaptation capabilities of the body.

Key words: correction program, physical condition, psycho-emotional well-being, female students, immigrant children.

Resumen. El artículo tiene como objetivo investigar la eficacia del programa del autor "Corrección del estado físico y psicoemocional de estudiantes que trabajan con niños inmigrantes", que combina clases prácticas de psicoentrenamiento y clases de entrenamiento en salud y fitness. *Materiales y métodos.* El programa incluye sesiones prácticas de psicoentrenamiento para desarrollar el bienestar psicológico, la resistencia al estrés y la armonía psicológica, y sesiones de entrenamiento fitness saludable para mejorar el estado funcional del cuerpo. El programa integra aspectos físicos y psicológicos de la salud. En el experimento pedagógico participaron 44 alumnas de 1º y 2º año de la Facultad de Cultura Física y Salud Humana de la Universidad Nacional Yuri Fedkovich de Chernivtsi. *Resultados.* Encontramos que el programa de corrección del estado físico y psicoemocional de las alumnas, que incluía clases prácticas de psicoentrenamiento y clases de entrenamiento físico para la salud, contribuyó a una disminución en los valores de peso corporal, circunferencia de cintura, circunferencia de cadera y circunferencia pélvica ($p < 0,05$; $p < 0,001$). Los resultados mostraron diferencias estadísticamente significativas ($p < 0,05$; $p < 0,001$) entre la etapa inicial y final del estudio. Después de utilizar el programa desarrollado, observamos cambios estadísticamente significativos ($p < 0,05$) en los niveles de ansiedad personal y situacional. El porcentaje de alumnas con un nivel alto de ansiedad situacional disminuyó del 27,3 % al 0,0 %, y el nivel medio disminuyó del 54,5 % al 15,9 %. La ansiedad de la personalidad también se redujo de un máximo del 43,2 % al 0,0 %, y el nivel intermedio disminuyó del 54,5 % al 20,5 %. *Conclusiones.* Los resultados de nuestro estudio confirman la eficacia del programa del autor "Corrección del estado físico y psicoemocional de estudiantes que trabajan con niños migrantes" para mejorar el desarrollo físico, el estado funcional de los sistemas cardiovascular y respiratorio, y bienestar psicológico de los participantes. La aplicación del programa supuso una disminución de la ansiedad, una mejora de la composición corporal, una reducción del volumen de tejido adiposo y un aumento de las capacidades de adaptación del organismo. **Palabras clave:** programa correccional, condición física, bienestar psicoemocional, estudiantes mujeres, niños inmigrantes.

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Introduction

The United Nations General Assembly resolution calls for the inclusion of sport and physical activity in recovery plans after Covid-19, in national strategies for sustainable development, considering the contribution that sport and physical culture make to health, as well as improving the upbringing of children and young people, including people with disabilities, strengthening physical and mental health,

prevention of diseases, including non-infectious ones, prevention of drug abuse, the realisation of gender equality, maintenance of fitness and activity at school age, formation of tolerance, mutual understanding and respect, as well as promotion social integration, conflict prevention and peacebuilding (Marconnet et al., 2020; Lacoste et al., 2020; Intelangelo et al., 2022; Poblete-Valderrama et al., 2023,).

Today, there is a steady decrease in physical activity (Yarmak et al., 2019; Galan et al., 2020; Marconnot et al., 2021; Médor et al., 2022) among student youth. As a result of military actions on the territory of Ukraine, there is a threatening tendency to decrease their physical and mental health (Andrieieva et al., 2020). The potential of any country is children and student youth, so education, upbringing and development of the younger generation are some of the most critical tasks teachers must face. Education of children and youth and their involvement in humanistic ideals and values is essential at the current stage of society's development (Gagnon et al., 2012; Blagii & Yachnyuk, 2020).

This study focuses on the specific challenges faced by female students who are actively engaged in roles supporting migrant children. As a result of the forced migration of students and the consequences of the Covid-19 pandemic, many social, political, and psychological problems are worsening (Lacoste, et al., 2021; Intelangelo et al., 2022; Bürgin et al., 2022; Galan et al., 2023). Both children and student youth suffer the most in this situation since the stress of being in a military conflict zone, resettlement, and adaptation to new living conditions can negatively affect personality development and mental and physical health. These factors necessitate socio-pedagogical support of children and students from the families of forcefully displaced people in their places of temporary settlement (Ivashchenko et al., 2017; Yarmak et al., 2017; Moya-Mata et al., 2023). This research seeks to integrate an understanding of these challenges and offer a comprehensive approach to address them, emphasising the interplay between migration-related issues and the well-being of these student facilitators.

According to the authors (Galan et al., 2022), psychological difficulties in combination with the need to move to another region makes the problem of social maladjustment of children and student youth critical, which disrupts the interaction of the individual with the environment, the process of social development, socialisation, causes a discrepancy between the social capabilities of a person and the social requirements of life; it creates obstacles on the way to complete personal development (Blynova et al., 2022; Halian et al., 2021; Plokhikh, 2023; Popovych et al., 2022; Carter-Thuillier et al., 2022).

Therefore, considering the above, we focused our research on developing a program to correct physical and psycho-emotional conditions, which is an urgent task for meeting the needs of modern society. Using psycho-training practical and health fitness training classes in one program is an innovative approach to correcting female students' physical and psycho-emotional state.

Material & methods

Participants

The study evaluates the author's program's effectiveness, which aims to correct female students' physical and psycho-emotional state in working with immigrant children.

Forty-four female students of the 1st-2nd years of the Yuriy Fedkovich Chernivtsi National University of the Faculty of Physical Culture and Human Health took part in the pedagogical experiment. "Physical culture and sports", "Secondary education. Physical culture", "Physical therapy, occupational therapy". The specifics of our study determined the choice of female students. All participants of the pedagogical experiment provided informed consent for participation and publication of the obtained results. According to the state of health, the participants were assigned to the main medical group and, at the time of the pedagogical experiment, had no complaints about the state of health.

In addition, the experiment participants were involved in volunteering to work with immigrant children, particularly in organising and conducting sports events for them.

Procedure

The program's content, "Correction of the physical and psycho-emotional state of female students working with immigrant children," consists of a combination of psycho-training practical classes and training classes on health fitness. The goal of the program is to improve the physical and psycho-emotional health of female students. The program includes two blocks. The first block is psycho-training practical classes, where female students participate in various practices to develop psychological well-being, stress resistance and harmony. These classes include relaxation techniques, meditation, positive thinking, and emotion management strategies. The second block provides training sessions on health fitness. Female students engage in physical exercises to strengthen the musculoskeletal system, increase the functional state of the cardio-respiratory system, and increase adaptation potential. These classes include aerobic and anaerobic conditioning, strength training, and flexibility exercises. The categories include sports equipment: fit balls, dumbbells, TRH loops, balls and other sports equipment. The program focuses on integrating physical and psychological aspects of health, which allows it to achieve a comprehensive positive impact on the physical condition of female students. Through active participation in practical classes and training, female students can improve their well-being, reduce stress, increase physical performance, and improve their mood. While the general impact of physical activity on the studied variables is already acknowledged, there is room for studies to optimise this impact. These psycho-training practical classes impart tools and techniques for managing psychological well-being. Through theoretical knowledge and hands-on exercises, students are equipped to navigate the intricacies of their roles with empathy and efficiency. Recognising this, the program incorporates health fitness training classes to bolster female students' physical strength and endurance.

Additionally, guidance on nutrition ensures that students maintain a balanced diet, supporting their active roles and consistent energy levels. Together, these elements prepare students to meet the demands of their roles

with vigour and vitality. The program “Correction of the Physical and psycho-emotional state of female students working with immigrant children” is designed for nine months. The recommended frequency of classes is three times a week with 2 hours of class duration.

Methods

The methodological basis of the study is the main provisions of the theory of cognition, the theory behind personality’s intellectual development in the learning process. Concepts of systemic and activity approaches formed the psychological and pedagogical basis of the study. Doing the research required the following research methods: theoretical - study, analysis and generalisation of psychological-pedagogical, scientific-methodical literature, professional publications, educational programs, textbooks and training manuals; comparison, modelling, classification and systematisation of theoretical and experimental data; empirical - questionnaires, surveys, observation methods to analyse the role of the developed program in working with migrant children; statistical methods of processing research results and establishing quantitative and qualitative relationships between the studied phenomena and processes, substantiating and verifying the legality of conclusions made based on a pedagogical experiment.

Following the set goal, during the research, we used anthropometric methods that provided quantitative measurements of physical development indicators in compliance with international standards. We measured body length (BL) in centimetres with an accuracy of 1 cm, body mass (BM) in kilograms with 100 grams, and girth measurements of the shoulder, chest, waist and hips in centimetres with an accuracy of 1 mm. We used the obtained indicators of physical development to calculate the body mass index (BMI). We calculated the index using the formula: $BMI = \text{body weight (kg)} / \text{body length (m)}^2$.

We studied the body’s composition using a Japanese company Tanita BC-545 N poly segment analyser (Kelly, John & Metcalfe, John, 2012). The body composition of female students included fat, muscle and bone components.

We measured the functional state of the cardiovascular system by heart rate indicators (HR) in a state of relative rest, e.i. by palpation by the number of beats per 1 minute; blood pressure (BP) was determined in a state of relative rest using an electronic meter UA 767 (manufactured by AND, Japan) in a sitting position in a state of relative rest, as well as in a horizontal and vertical body’s position, and we recorded the result in mmHg. We measured the functional state of the respiratory system using traditional research methods. We measured the vital capacity of the lungs (VCL) using a portable spirometer in compliance with all sanitary standards, with an accuracy of 100 ml.

Using an orthostatic test allowed us to obtain objective information about the tone of the sympathetic part of the autonomic nervous system when moving from a horizontal position to a vertical position of the body based on the difference in heart rate (Borysenko, I., Marian, C., &

Kozina, Z., 2020). A typical reaction to the test is an increased heart rate of 10-16 beats in 1 minute immediately after lifting. We considered the body’s level of adaptation capabilities high when the heart rate increased by 1-6 beats per 1 minute immediately after lifting, the average level with an increase in heart rate by 7-13 beats in 1 minute immediately after lifting, a satisfactory level when the heart rate increases by 14-25 beats in 1 minute immediately after lifting and an unsatisfactory level when the heart rate decreases from -1 and when the heart rate increases by 30 beats in 1 minute immediately after lifting.

We used the Spielberger-Hanin questionnaire to measure the level of anxiety among the study participants (Mishchuk, V. G., Miziuk, T. M., & Mishchuk, V. V., 2022). The questionnaire consists of two parts: 20 statements describing anxiety as a state and 20 statements aimed at defining personal anxiety. Each statement in the questionnaire was rated by the participant on a scale where ‘1’ means “not true at all” and ‘4’ means “extremely true”. These statements reflect different aspects of anxiety, such as anxious thoughts, physical symptoms of anxiety, and emotional discomfort. We defined personal anxiety through 20 statements also rated on a five-point scale. These statements describe the general tendency of the individual to feel anxious in various life situations. The total score of the anxiety measure consists of the sum of the scores received by the participants on statements and statements. If the test result does not exceed 30, the respondent does not have significant anxiety, indicating a low level of anxiety. A score in the range of 31-45 indicates a moderate level of anxiety. A score of 46 or more indicates a high level of anxiety. A very high level of anxiety (>46) is directly related to neurotic conflicts, emotional and neurotic disorders, and psychosomatic diseases. A low level of anxiety (<12) characterises a state that can be depressed, reactive, and low in motivation. However, sometimes a deficient level of anxiety in test scores can result from actively hiding high anxiety to present oneself in a better light.

Data analysis

We carried out processing of the statistical information obtained during the research using the “Statistica 13.0” and “Excel 2019” computer packages (Microsoft, USA). We chose the statistical criteria depending on the scale of measurements and the number of samples. Since the group was heterogeneous according to most of the investigated indicators, we used the median (Me). We used the interquartile range to demonstrate the data distribution, indicating the first quartile (25 % percentile) and the third quartile (75 % percentile). In the comparative analysis of physical condition indicators, we used the non-parametric Wilcoxon test for dependent samples. We tested statistical hypotheses with a critical significance level of $p < 0.05$.

Results

Many scientific studies indicate that physical development reflects the formation of structural and functional features of the organism during ontogenesis (Bartsch et al., 2003; Ozmert et al., 2011; Kuchma et al., 2013; Shklyar, 2014; Yarmak et al., 2018; Kozhokar, et al., 2018; Prontenko et al., 2019; Petrachkov & Yarmak, 2021). We defined the construction of phenotypic signs of the organism by genetic heredity, constitutional characteristics of the organism, congenital or hereditary pathology of growth and development, environmental situation, quality of nutrition and intensity of motor activity. Among the main exogenous factors that influence the formation of phenotypic signs of the body, we singled out the following: the mode of day and rest, the way of eating, the amount of motor activity, and emotional stress. In a broad sense, development is the process of qualitative and quantitative changes that occur in the human body and lead to an increase in the level of complexity of the organisation and the interaction of all its systems. The development includes three main factors: growth, differentiation of organs and tissues, and formation. They are

closely related and interact (Vaskan et al., 2018;). Physical development characterises the proportionality of the body structure, that is, its geometric dimensions, which in turn affect the functioning of all organs and systems of the body without exception. The intensity of metabolic processes, the activity of physiological functions, in particular, the heart rate and breathing rate, depending on the size of the body.

According to the scientific and methodical literature, in girls aged 17-20, the processes of body formation are completed. In this period, all body systems' structural and functional maturity occurs (Yarmak et al., 2018).

Therefore, we analysed the dynamics of the results of anthropometric data without comparison with age norms because the common idea of the norm in the past as an average type, an average value for our sample, is irrelevant. Table 1 presents the obtained results of indicators of the physical development of female students during the pedagogical experiment.

Table 1.
Results of physical development of female students, (n = 44)

The investigated indicators	Before the pedagogical experiment	After the pedagogical experiment	P
	Me (25%;75 %)	Me (25%;75 %)	
Body Length (BL), cm	165.0 (160.0;167.0)	165.0 (160.0;167.0)	93
Body Mass (BM), kg	67.9 (56.5; 71.0)	64.9 (55.8; 65.0) **	001
Shoulder girth, cm	29.0 (28.0; 32.0)	29.0 (27.0; 32.0)	75
Circumference of the rib cage (CRC), cm	94.0 (90.0;99.0)	92.0 (90.0;96.0) *	002
Waist circumference, cm	69.0 (66.0;75.0)	65.0 (61.0;71.0) **	001
Pelvic circumference, cm	95.0 (93.0;97.0)	93.0 (92.0;96.0) *	03
Hip circumference, cm	57.0 (54.0; 58.0)	54.0 (52.0;56.0) **	001
Dynamometry of the right hand, kg	30.0 (22.0; 38.0)	30.0 (22.0; 38.0)	84
Dynamometry of the left hand, kg	26.0 (12.0;32.0)	26.0 (13.0;32.0)	46

Note. Significant differences according to the non-parametric Wilcoxon test for dependent samples between the results of the first and second stages of the study. * $p < 0.05$; ** $p < 0.001$

We analysed indicators that characterise mass growth processes and indicators that reflect total body size. During the analysis of the results, we found that the program for correcting the physical and psycho-emotional state of female students, which included practical psycho-training sessions and training sessions on health-improving fitness, positively affected the dynamics of the studied indicators of physical development. In particular, we found a statistically significant ($p < 0.05$; $p < 0.001$) decrease in the values of MT indicators, waist circumference, hip circumference and pelvic circumference after using the program. These changes may indicate an improvement in body composition and a decrease in body fat. The obtained results confirm that correctional programs that combine physical activity with psy-

chological methods can significantly impact physical development and the general psycho-emotional state of individuals.

The next stage of our research was the bioimpedance analysis of the body composition of female students. Bioimpedance analysis provides more information about the human body's structure than anthropometric data. Analysing the body's structure makes it possible to obtain a reliable assessment of lipid, protein and water metabolism and several metabolic correlates. If, during the study, the size of one of the body components has a deficiency or, on the contrary, exceeds the age norm, then this method allows you to react quickly to this violation. Table 2 presents the obtained results of the study of girls.

Table 2.
Results of the dynamics of indicators of physical development of female students under the influence of the author's program (n = 44)

The investigated indicators	Before the pedagogical experiment	After the pedagogical experiment	p
	Me (25%;75 %)	Me (25%;75 %)	
BMI $\text{kg}\cdot\text{m}^{-2}$	24.6 (23.3; 26.9)	24.1 (22.8; 25.2) **	001
Total fat content, %	28.7 (24.2; 34.2)	27.7 (22.2;28.2) **	001
The fat content of the right hand, %	29.2 (24.2; 32.6)	27.2 (21.2; 29.6) *	03
The fat content of the left hand, %	31.6 (25.6; 33.8)	28.6 (20.6; 30.8) *	04
Body fat content, %	23.5 (18.6; 26.4)	21.5 (16.6; 24.4) *	03
The fat content of the right leg, %	34.7 (32.9; 35.7)	32.7 (30.9; 33.9) *	04
The fat content of the left leg, %	35.4 (33.8; 36.9)	33.4 (30.8; 33.9) *	04
Total water content, %	52.9 (52.4; 55.8)	53.9 (55.4; 56.4)	19
Total muscle mass, kg	43.1 (42.2; 45.1)	44.6 (43.6; 48.3) *	02
Muscle mass of the right hand, kg	2.3 (2.2; 2.5)	2.3 (2.3; 2.5)	27

Muscle mass of the left arm, kg	2.3 (2.1; 2.4)	2.3 (2.2; 2.4)	16
Body muscle mass, kg	24.7 (24.3; 26.1)	25.8 (25.3; 27.4) *	04
Muscle mass of the right leg, kg	7.1 (6.9; 7.8)	7.3 (7.1; 8.2) *	04
Muscle mass of the left leg, kg	6.8 (7.1; 8.0)	7.1 (7.1; 8.0) *	03
Physiological evaluation, score	5.0 (5.0;5.0)	5.0 (5.0;5.0)	45
Bone mass content, kg	2.4 (2.3; 2.6)	2.4 (2.3; 2.6)	87
Basic exchange, KJ	1568.0 (1530.0; 1670.0)	1475.0 (1430.0;1590.0) *	04
Visceral fat content, %	1.8 (1.5;2.5)	1.5 (1.0;1.5) **	001

Note. Significant differences according to the non-parametric Wilcoxon test for dependent samples between the results of the first and second stages of the study, * $p < 0.05$; ** $p < 0.001$

Body composition indicators, including BMI (body mass index), fat content in various body parts, total water content, muscle mass and other parameters, were measured at the beginning and after the application of our author's program to correct the physical and psycho-emotional state. A comparison of the results showed statistically significant differences ($p < 0.05$; $p < 0.001$) between the first and second stages of the study. Note that at the beginning of the study, the BMI of female students at the 75 % percentile corresponded to $26.9 \text{ kg} \cdot \text{m}^{-2}$ and, according to the gradation scale, indicated the presence of excess body weight, and after applying for the program, it decreased to $25.2 \text{ kg} \cdot \text{m}^{-2}$ ($p < 0.001$). Following the developed program, classes helped reduce the values of the total fat content in the body and in its parts (right arm, left arm, torso, right leg, left leg). We also observed an increase in muscle mass and a decrease in visceral fat. As for muscle mass, the figure for the trunk increased by 4.4 % ($p < 0.05$), for the right leg by 2.8 % ($p < 0.05$), and for the left leg by 4.4 % ($p < 0.05$).

The results of our research also indicate minor changes in body water content and primary metabolism. The water content increased by 1.0 % ($p > 0.05$), which means preserving the hydro electrolyte balance in the body. The primary metabolism decreased by 6.0 % ($p < 0.001$), possibly related to changes in the subjects' physical activity and energy metabolism.

The next stage of our research focused on determining the functional status of female students, which involved the study of indicators of the cardio-respiratory system. Table 3 presents the obtained results.

Studying the mechanisms of regulation of the work of the cardiovascular system plays a vital role in examining persons engaged in physical training, especially for students studying at the Faculty of Physical Culture and Human Health. They perform significant physical exertion, characterised by increased autonomic nervous system lability with a sympathetic component predominance.

Table 3.

Dynamics of results in indicators of the cardio-respiratory system of female students during the study ($n = 44$)

The investigated indicators	Before the pedagogical experiment	After the pedagogical experiment	p
	Me (25 %;75 %)	Me (25 %;75 %)	
HR in the state of relative calm, breathing in and out $^{-1}$	75.0 (68.0; 80.0)	65.0 (62.0;70.0) **	001
HR in the horizontal position, beats per min $^{-1}$	66.0 (62.0; 71.0)	56.0 (52.0;61.0) **	001
HR in the vertical position, beats per min $^{-1}$	79.0 (78.0; 85.0)	72.0 (68.0;76.0) *	03
BP syst in the state of relative calm down, mmHg	125.0 (118.0; 139.0)	120.0 (118.0; 132.0)	17
BP diast in the state of relative calm down, mmHg	70.0 (65.0;77.0)	70.0 (65.0;75.0)	94
BP syst in the horizontal position, mmHg	123.0 (120.0;125.0)	121.0 (118.0; 124.0)	28
BP diast to the horizontal position, mmHg	70.0 (66.0;71.0)	69.0 (66.0; 70.0)	41
BP syst in the vertical position, mmHg	137.0 (133.0; 148.0)	130.0 (129.0; 141.0) *	02
BP diast in the vertical position, mmHg	84.0 (69.0; 85.0)	83.0 (69.0; 84.0)	37
Orthostatic test, c.u.	28.0 (7.0; 26.0)	13.0 (2.0;24.0) **	001
VC, l.	3.1 (2.9; 3.4)	3.7 (3.3;3.9) *	01

Note. Significant differences according to the non-parametric Wilcoxon test for dependent samples between the results of the first and second stages of the study, * $p < 0.05$; ** $p < 0.001$

The results of the activity of the cardiovascular and respiratory system in girls after the implementation of the author's program according to the indicators of heart rate (HR) from different initial positions, blood pressure (BP), and vital capacity (VC) indicate a high functional level of the cardiorespiratory system. Regarding blood pressure, at the beginning of the study, we found diastolic BP values to be normal in girls. Still, systolic BP values in some participants exceeded the normal range. In particular, 38.6 % ($n = 17$) of girls had systolic blood pressure ranging from 135 mmHg to 140 mmHg, indicating the presence of arterial hypertension. However, after the program's implementation, we observed some minor improvements in these indicators, but the changes did not reach statistical significance ($p = 17$). Figure 1 shows the dynamics of the HR and VC result in a

state of relative rest in a graphical interpretation

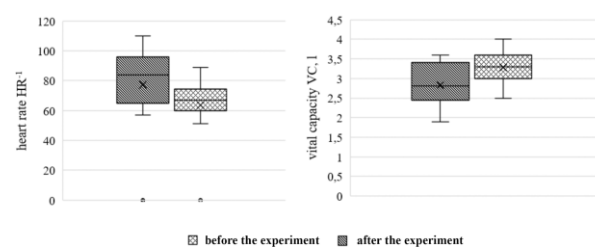


Figure. 1. Changes in the results of the HR index in and VC a state of relative rest during the pedagogical experiment

According to the results obtained by us, the girls observed a decrease in the heart rate value in a state of relative rest, which decreased after Me (25 %;75 %) = 75.0

(68.0;80.0) in the first stage before Me (25 %;75 %) = 65.0 (62.0; 70.0) in the second stage ($p < 0.001$), which indicates high training of the body, which ensures the work of the cardiovascular system in an optimal mode.

We explain the positive dynamics of heart rate, blood pressure, and VL indicators among female students we explain by the program's comprehensive approach, which includes physical exercises and aerobic and anaerobic training aimed at improving the functional state of the cardio-respiratory system. Regular physical activity, particularly aerobic exercise, helps to strengthen respiratory muscles and improve respiratory function. Also, relaxation, meditation, and emotion management strategies included in the program can help reduce tension and improve breathing.

The index of the orthostatic test in girls, according to the median at the beginning of the pedagogical experiment, corresponded to a satisfactory level. The distribution of the indicators of the orthostatic test in girls ranged from a minimum of -1 bpm^{-1} to a maximum of 26 bpm^{-1} . Figure 2 graphically interprets the orthostatic test indicators' dynamics by development levels during the pedagogical experiment.

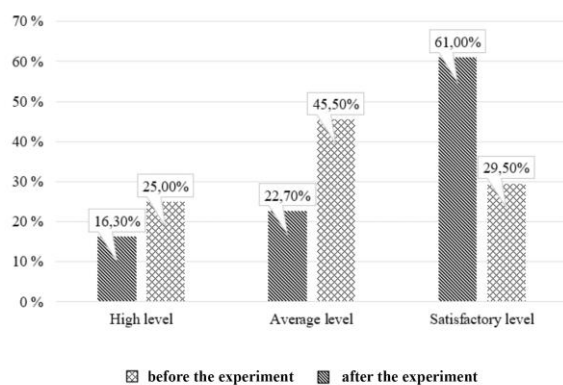


Figure 2. Comparative results of the orthostatic test of female students during the pedagogical experiment.

Analysing the orthostatic test results during the pedagogical experiment, we observe changes in the level of adaptation capabilities of the girls' bodies. At the beginning of the study, before the pedagogical experiment, there was a predominance of a low level of adaptation capabilities, which the consequences of the Covid-19 pandemic and military events in the country can explain. A low level of adaptation capabilities indicates increased reactivity of the sympathetic part of the autonomic nervous system, which is a characteristic reaction of people under stress. However, after conducting the pedagogical experiment, we observed a positive adaptation capacity dynamic. The percentage of female students with a high level of adaptability increased from 16.3 % to 25.0 %, which indicates an improvement in their functional state. The number of people with an average level of adaptability also increased from 22.7 % to 45.5 %. At the same time, the percentage of female students with a satisfactory level of adaptability decreased from 61.0 % to 29.0 %. These changes are statistically significant

($p < 0.05$) and indicate the effectiveness of the program "Correction of the physical and psycho-emotional state of female students working with immigrant children" in improving the functional state of the body. The author's program, the content of which includes practical psycho-training sessions and training sessions on health fitness, contributed to reducing the reactivity of the sympathetic part of the autonomic nervous system and increasing the adaptation potential of female students.

As part of our scientific research, we focused on studying the psychological stability of female students. One of the critical aspects of our work was the problem of studying girls' mental states, which includes considering such states as socio-psychological, psychological, psychophysiological and physiological. Socio-psychological state reflects the behaviour of the individual, including his social interactions, adaptation to social roles and communication with others. Psychological state refers to changes in an individual's mental functions and moods, including emotional state, cognitive processes, and mental activity. The psychophysiological state characterises autonomic reactions observed at the intersection of mental and physiological levels, such as changes in heart rate, breathing, blood circulation, and other autonomic functions. The physiological state indicates neurophysiological characteristics, morphological and biochemical changes, and changes in the functioning of organs and body systems. Considering the consequences of the country's Covid-19 pandemic and military events, we paid special attention to studying the expression level of anxiety symptoms. For this, we used the Spielberger-Hanin questionnaire, which consists of 20 statements describing anxiety as a state and 20 statements aimed at determining personal anxiety. This unique scale allows you to distinguish between anxiety as a personality trait and anxiety as a condition in female students. Table 4 presents the obtained results.

Table 4.

Comparative results of the level of situational and personal anxiety of female students during the pedagogical experiment, (n=44)

Anxiety level	To the pedagogical experiment	After the pedagogical experiment	P
Situational anxiety, %			
High	27.3 % (n=12)	0.0 %	0.02
Average	54.5 % (n=24)	15.9 % (n=7)	0.03
Low	18.2 % (n=8)	84.1 % (n=37)	0.04
Personal anxiety, %			
High	43.2 % (n=19)	0.0 %	0.02
Average	54.5 % (n=24)	20.5 % (n=9)	0.03
Low	2.3 % (n=1)	79.5 % (n=35)	0.02

Note. Significant differences according to the non-parametric Wilcoxon test for dependent samples between the results of the first and second stages of the study, $p < 0.05$

Analysing the results of the level of situational and personal anxiety of female students during the pedagogical experiment, statistically significant changes in anxiety we found after using the author's program "Correction of the physical and psycho-emotional state of female students in working with migrant children". We observed a significant decrease in the level of situational anxiety in the studied

group of girls ($p < 0.05$). Before the experiment, a high level of situational anxiety was characteristic of 27.3 % of female students. However, after the experiment, this indicator decreased to 0.0 %. The average level of situational anxiety decreased from 54.5 % to 15.9 %, and the low level increased from 18.2 % to 84.1 %. However, it is important to note that the program also significantly affected personal anxiety ($p < 0.05$). Before the experiment, a high level of personal anxiety was present in 43.2 % of female students, but after the pedagogical experiment, this indicator decreased to 0.0 %. The average level of personal anxiety decreased from 54.5 % to 20.5 %, while the low level increased from 2.3 % to 79.5 %.

The specifics of the author's program, which combines psycho-training practical classes and health fitness training classes, have shown their effectiveness in improving the psychological state of female students. During the practical sessions on psycho-training, the students learned the skills of relaxation, meditation, positive thinking and emotion management strategies, which helped reduce situational and personal anxiety.

Thus, our results confirm the author's program's effectiveness in reducing situational and personal anxiety. These changes are statistically significant ($p < 0.05$), indicating the feasibility of using the proposed means and methods used to improve female students' psychological well-being. The program, combining psycho-training practical sessions and training sessions, provides a comprehensive approach to maintaining and improving the psycho-emotional state of female students, which is an important aspect of their academic and personal development.

Discussion

Regular physical activity has a positive effect on the treatment and prevention of chronic diseases and some infectious diseases that arose due to Covid-19. Due to the social restrictions applied to fight the spread of the virus, the problem of a sedentary lifestyle among schoolchildren has appeared (Plisko et al., 2018; Marconnot et al., 2019). Instead, regular physical activity reduces the risks of the consequences caused by the pandemic. To help people stay active during the pandemic, the World Health Organization (WHO) has recommended that everyone increase physical activity and physical activity to maintain and preserve their health (Caputo et al., 2022).

Nowadays, innovative technologies have been developing and spreading rapidly and on a large scale. It is obvious that the implementation of such technologies in physical education and sports are very important and appropriate because they increase the popularity and accessibility of sports training to everyone age and social categories population, namely in work with immigrant children (Lacoste et al., 2020; Marconnot et al., 2021).

The study's relevance lies in the fact that due to the forced immigration of students and the consequences of the Covid-19 pandemic, social, political and psychological

problems are becoming more acute, which applies to children and student youth, who are experiencing stress from military conflicts, resettlement and adaptation to new conditions (Lacoste et al., 2021). Given this, it is important to provide socio-pedagogical support to students and ensure their personal development, mental and physical health. Since students are the country's potential, ensuring their education and upbringing is an important task for the pedagogical community. Considering this, developing a program to correct the physical and psychoemotional state is an urgent task aimed at solving the problems of modern society. The innovative approach, which combines psycho-training practical classes and health fitness training classes in the program, contributes to the improvement of the physical and psycho-emotional condition of female students and contributes to their full-fledged personal development in working with migrant children (Marconnot et al., 2021).

Our research does not contradict the results obtained by other scientists (Yarmak et al., 2017; Mondéjar-Jiménez et al., 2022; Lacoste et al., 2020; Carter-Thuillier et al., 2022). Many previous studies have confirmed the importance of physical activity and psychological well-being for overall health and well-being (Poblete-Valderrama et al., 2023; Galan et al., 2023). Our program for correcting the physical and psychoemotional state of female students supports and expands these results, providing an innovative approach to integrating physical and psychological aspects of health.

We have confirmed that combining psycho-training practical classes and health fitness training classes helps to achieve positive changes in female students' physical and psycho-emotional state, which is consistent with previous research that indicates a relationship between physical activity, psychological well-being and health status (Mondéjar-Jiménez et al., 2022).

Our results emphasise the need to develop comprehensive programs that combine physical activity and psychological methods to achieve optimal physical and psychoemotional health. These results support and expand scientific knowledge in the health field and contribute to the further development of effective programs aimed at improving the physical and mental well-being of female students (Yarmak et al., 2018; Vaskan et al., 2018; Montalt García, García-Massó, & Monfort, 2023).

Strength and Limitations

The study "An Integrated Approach to Correcting the Physical and Psychoemotional State of Female Students Working with migrant children" boasts a comprehensive methodology holistically addresses female students' physical and psychoemotional aspects. This dual focus captures a broad spectrum of experiences and challenges these individuals face. Its relevance in today's context, characterised by global migrations and refugee challenges, cannot be understated. However, limitations exist. The study may have benefitted from a more diverse demographic sample, en-

compassing students of various backgrounds and experiences. While the integrated approach is robust, it may only encapsulate some potential challenges the students face.

Furthermore, the reliance on self-reported measures could introduce bias. Additionally, cultural nuances related to the migrant children's backgrounds might not have been deeply explored. Nevertheless, this study provides foundational insights to inform future research and interventions.

Conclusions

An important aspect of our results is that during the implementation of the correction program, we obtained significant changes in indicators of physical development, body structure and the cardio-respiratory system, which may indicate an improvement in the functional state of the body of female students. In addition, there was an improvement in the indicators of adaptation potential and psycho-emotional state, which indicates the program's beneficial effect on the general well-being and psychological harmony of the participants. Our research makes an important contribution to the scientific development and practical implementation of programs to correct the physical and psycho-emotional state of female students, particularly in working with immigrant children.

The research results emphasise the need for further study and development of integrated programs that will contribute to the preservation and improvement of the health of children and youth, especially those who are in difficult social and psychological conditions, as well as due to forced migration. In general, our results confirm the effectiveness of the author's program for correcting the physical and psychoemotional state of female students and emphasise the importance of an integrated approach to training classes that considers physical and psychological aspects of health. Our research contributes to the development of scientific knowledge and opens perspectives for further research in the training of female students in working with migrant children.

Conflict of interest

Authors state no conflict of interest.

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