

The impact of swimming classes on restoring psychological comfort of University students

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Abstract. This paper presents the results of studying the impact of water activities on students' psychological comfort restoration, as well as the introduction of this technique into physical education classes. The paper discusses the main issues of influence and justification of the program aimed at correcting students' psychological state through swimming classes, which will help to form and provide a positive emotional background and thus will prevent negative emotional consequences, will help to gain the ability to switch to another type of activity without damage and emotional burnout. The purpose of the work is studying of the impact of swimming classes on students' psychological comfort restoration, and the introduction of this technique into physical education classes. Students involved in general physical training groups took part in the experiment. To correct the participants' psychological state, a special program was developed, integrated into physical education classes. The program took into account the individual characteristics of students. Along with the assessment of the students' psychological state, the dynamics of the general physical condition of the students participating in the experiment was analyzed. This made it possible to obtain the necessary information to optimize the educational process. The data obtained as a result of the study allowed us to draw the following conclusions: the proposed method is appropriate for psychological relief and raising the emotional background, as well as improving the physical condition of students in physical education classes in higher education institutions.

1 Introduction

An analysis of domestic publications suggests that modern Russian society is undergoing socio-economic changes.

The problem of first-year students' adaptation to new university conditions is becoming increasingly relevant. Many students face difficulties associated with changes in the learning environment, social environment, and increased academic workload. Research shows that first-year students often have behavioral problems, expressed in increased anxiety, isolation, or, conversely, outbursts of aggression. Changes in emotional state, such as apathy, depression, and decreased motivation, are also noted. These problems can lead to decreased

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academic performance, conflicts with teachers and peers, as well as general discomfort and dissatisfaction with student life. In addition, first-year students often face social difficulties associated with the need to establish new social connections, integrate into an unfamiliar group, and adapt to new rules and expectations. These factors can lead to a feeling of loneliness, isolation, and lack of self-confidence. To solve these problems, it is necessary to implement comprehensive social and pedagogical work in universities [1-7]. Implementation of comprehensive social and pedagogical work aimed at preventing adaptation problems, identifying and supporting students in need, creating a favorable educational environment and using modern technologies will increase the level of psychological and social well-being of students, contributing to their full implementation at the university [8, 9, 10].

Implementation and justification of a program aimed at correcting the psychological state of students through the use of swimming classes will help to form and ensure a positive emotional background and thereby will be a prevention of negative emotional consequences, will allow you to acquire the ability to switch to another type of activity without damage and emotional burnout. Swimming is one of the sports that contributes to the effective hardening of the spirit and body of a person. It helps to form the stamina and endurance of swimmers [11-15].

The average water temperature in the pools is lower than the human body temperature. This means that our body begins to emit more heat – approximately 50-80% more than when in the air. Water has high thermal conductivity and heat capacity, which contributes to this effect. In addition, swimming helps strengthen the immune system and make the body more resistant to temperature fluctuations. The purpose of the study is to study the impact of water activities on the restoration of psychological comfort of students, as well as the introduction of this method into physical education classes [16-20].

2 Materials and methods

The study was conducted at the Don State Technical University with the participation of first-year students, general physical training students who chose physical education, specializing in swimming, for classes. To correct the psychological state of the participants, a special program was developed, integrated into physical education classes. The program took into account the individual characteristics of the students, was easy to learn and included: 1. Warm-up and cool-down with elements of breathing exercises to relieve stress. 2. Exercises aimed at developing coordination, balance and concentration. 3. Game and relay tasks on the water, helping to strengthen team spirit and communication skills. The tasks of teaching swimming were considered from different angles. The first task of the tested program is to teach the student to safely and freely stay in the water. At this stage, the correct breathing technique is studied, as well as various techniques for maintaining buoyancy and controlling the direction of movement. Before starting to swim, the individual characteristics of the body of those involved were taken into account, such as general physical condition, the presence of various medical contraindications. This is very important, since neglecting these points can lead to real health problems. The second objective of the proposed program is to develop the endurance and muscle strength of the student. And the third objective is to strengthen the health of the student in the study group through water activities, and as a result, improve the functioning of the cardiovascular system, increase immunity and reduce stress. Long-term water sports can improve the quality of life and prolong it. In general, the planned swimming training course provides for the achievement of all three goals. Safe swimming is the basis on which you can build further improvement of technique and increase physical fitness.

To assess the psycho-emotional state of students before and after the experiment, students were asked to assess their condition on a 10-point scale according to the following criteria:

1. Self-regulation and emotional control skills. 2. Motivation for study and self-development. 3. Striving to achieve goals. 4. Ability to quickly adapt to a new team. 5. Ability to realize oneself in the chosen professional activity. 6. Psychological dependence on public opinion. 7. Self-confidence, level of self-esteem.

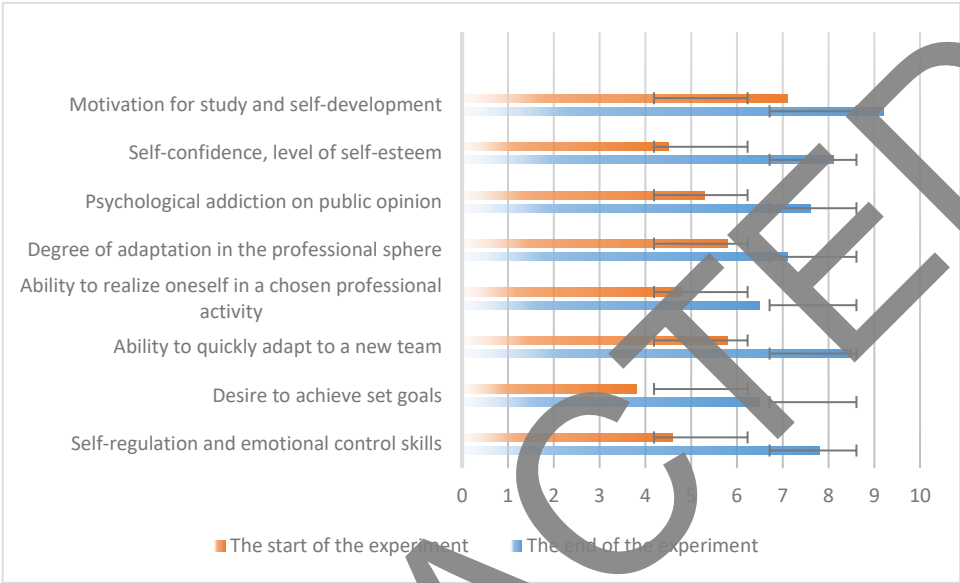


Fig. 1. Comparative analysis of the assessment of the psycho-emotional state of students.

Stages of training: The first stage is basic training. Swimming training is an important factor. The initial stage of training is aimed at the student feeling confident in the water, not being afraid of water. However, to achieve success in training, it is necessary to monitor the rhythm of breathing and the corresponding state of the body. Another important part of basic swimming training is improving swimming technique.

The second stage is transitional. The transitional stage of learning to swim begins after mastering basic skills. At this stage, more in-depth training takes place, students master knowledge and skills in swimming, and also get acquainted with new swimming styles, such as butterfly and medley swimming.

The main methods with the advent of swimming in this program are based on the use of special equipment and technical means, as well as analysis and correction of swimming technique. The student must constantly work on improving the adhesion mechanisms, increasing the speed and accuracy of equipment performance during the training. Particular attention was paid to physical training. Training in various styles aimed at increasing endurance, strength and flexibility. Thus, the stages of training require a lot of emphasis on technique, endurance, strength and psychological development. Each stage requires special care and attention from the students.

The method of teaching separation of movements (MTSM) is adopted as a basis. It assumes that the student must perform the swimming technique separately for each movement: squatting, going up for air, etc. The teacher loves each movement and forces it with the help of metallic and speaking comments. This method of teaching includes the following stages: -Analysis of actions: at this stage, a detailed analysis of the actions is carried out to identify deficiencies in the technique and understand what movements need to be observed.

-Separation of such movements: then individual movements are performed, such as movements of the arms, legs, body, etc.

Method of application: at this stage, the student begins to use new movements in the swimming technique, through the practice of exercises that contribute to the improvement of the technique.

This method of teaching the division of movements in swimming has many advantages. Firstly, it helps to understand which movements need to be improved. Secondly, this method allows you to improve your swimming technique and increase the speed of movements. Finally, it helps to avoid injuries and stress.

This method is convenient because it allows you to expand the swimming movements to a full cycle, more clearly demonstrate each element separately and consider the mistakes made by the student during the execution of each movement.

Classes were held in groups - a group work method, when several people are trained at the same time. This method is used in most schools and sports clubs that work on a common program. But the teacher considers the swimming technique separately for each student, taking into account his physical fitness and individual characteristics. The group work method in swimming is one of the most effective ways to develop physical and athletic capabilities. For decades, this method has been used both in open water and in indoor club pools. Group work helps develop the skills of interaction with other students, form a team spirit, and also increases motivation for physical education. The essence of the group work method in swimming is to conduct training in a group. This helps students become more self-confident, learn to work in a team, and most importantly – increase their speed and endurance. One of the key features of the group work method is the distribution of water area between students. Depending on the level of training of each group member, the teacher can provide them with a more or less voluminous swimming area. This allows each student to control their training load and reach a new level of physical fitness. In addition, the group work method includes joint exercises. This allows not only to increase endurance and speed, but also to improve the technical skills of students. The group work method in swimming is one of the most effective ways to develop physical capabilities in swimmers. It allows you to control the training load, improve technical skills and develop teamwork, which is important not only for amateur swimmers, but also for professional swimmers. Another method used in this training program is the method of learning through play. This method is used to help them easily and quickly master the technique of swimming. Games are held in the pool, such as overcoming obstacles, throwing a ball and swimming with objects that float on the surface. It helps to improve coordination of movements, establish the correct breathing rhythm and creates a good mood.

3 Results

Swimming is one of the most valuable sports, which has a general strengthening and health-improving effect on the human body. It helps not only to strengthen the muscles of the body, but also to develop endurance, strengthen the immune system and improve mood.

Along with the assessment of the psychological state of the students, the authors' group analyzed the dynamics of the physical condition of the students participating in the experiment, thereby emphasizing the relevance of introducing outdoor games in physical education classes (Table No. 1, Table No. 2).

In addition, physical tests were conducted to determine: speed-strength qualities (30 m run, standing long jump); coordination abilities of the students in the group (shuttle run 3x10 m). The results of the physical tests were compared with the age standards of the all-Russian physical culture and sports complex «Ready for Labor and Defense» (RLD). To assess their readiness to perform the tests, the students also did a cardio test, which included a 3-minute

walk on a step platform at a pace of one step per second with heart rate measurement for one minute (Diagram No. 2). The data analysis showed that regular swimming lessons according to the developed program had a positive influence on the psychological state of the students. The following indicators significantly improved: 1. Stress resistance. 2. Self-confidence. 3. Motivation for learning and self-development. 3. Self-regulation and emotional control skills. In addition, swimming lessons contributed to the improvement of the students' physical fitness. An increase in speed, strength, coordination and endurance was noted.

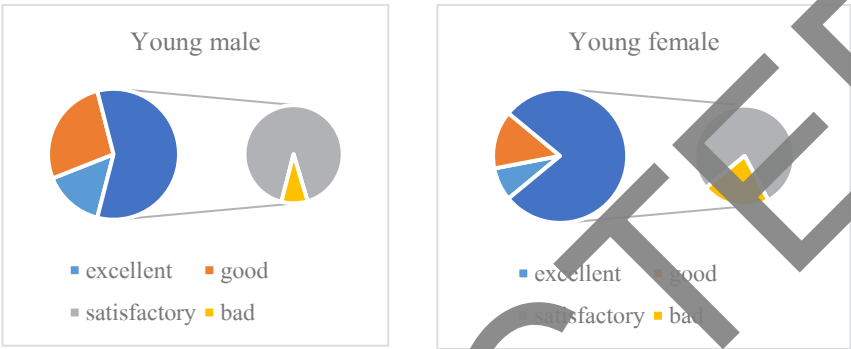


Fig. 2. Cardio test indicators of students.

Table 1. Dynamics of change in results from September 2022 to December 2023 for young male participating in the program.

	September 2022			December 2023		
	The best result	The worst result	The average result	The best result	The worst result	The average result
30m run	4.4 sec.	5.2 sec.	4.8 sec.	4.2 sec.	4.8 sec.	4.5 sec.
Standing jump	236 cm	191 cm	213 cm	244 cm	205 cm	224.5 cm
Shuttle run 3x10m	6.8 sec.	7.8 sec.	7.3 sec.	6.6 sec.	7.1 sec.	7.85 sec.

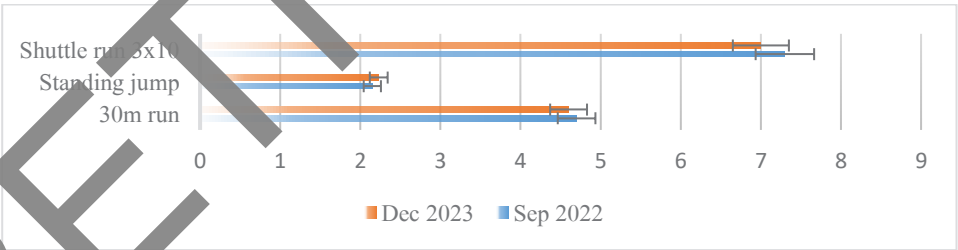


Fig. 3. Dynamics of changes in the results of young male from September 2022 to December 2023.

Table 2. Dynamics of change in results from September 2022 to December 2023 of young female participating in the program.

	September 2022			December 2023		
	The best result	The worst result	The average result	The best result	The worst result	The average result
30m run	5.3 sec.	6.5 sec.	5.9 sec.	5.0 sec.	5.8 sec.	5.4 sec.
Standing jump	184 cm	162 cm	173 cm	189 cm	172 cm	180.5 cm
Shuttle run 3x10m	8.5 sec.	9.7 sec.	9.1 sec.	8.2 sec.	8.9 sec.	8.55 sec.

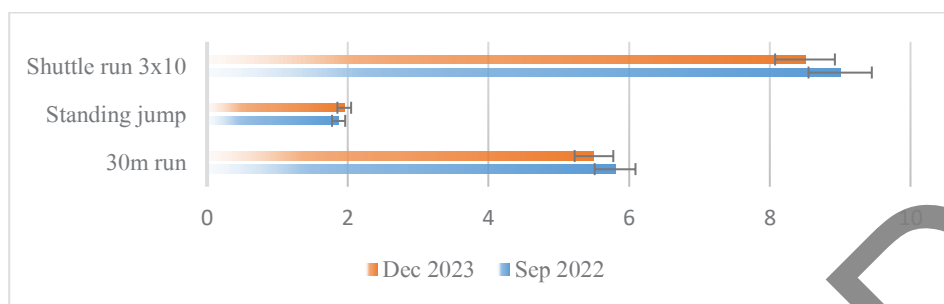


Fig. 4. Dynamics of change in results for young female from September 2022 to December 2023

The authors' group also proposed water games of various types, which make it possible to restore the psychological comfort of those involved and at the same time improve their physical fitness to assess the feasibility of introducing and using water activities in the educational process during physical education classes and their impact on the psycho-emotional state of those involved.

Firstly, swimming is a type of physical activity that allows you to comprehensively strengthen your muscle corset, as well as a unique type of physical activity that offers a number of benefits, making it an indispensable tool for developing overall health. Strengthening muscles and improving physical performance, unlike most workouts in gyms, when swimming, water resistance constantly increases as you move. This makes your muscles work harder, leading to their strengthening and development. In addition, swimming involves many muscle groups simultaneously, including the muscles of the back, shoulders, chest, abdomen and legs. This low-impact environment reduces the risk of injury, allowing muscles to effectively recover and grow.

Secondly, during swimming, your heart rate naturally increases, strengthening your heart and reducing the risk of cardiovascular disease. Increasing the amount of blood pumped by the heart per minute also improves the functioning of the circulatory system, reducing blood pressure and the risk of blood clots. Swimming involves various muscle groups, including the respiratory muscles. This increases oxygen intake and makes the lungs work harder. Regular swimming exercises increase lung capacity and inhalation/exhalation force, improving respiratory function.

The rhythmic, smooth movements of swimming help reduce stress and anxiety. Swimming is superior to many other forms of physical activity in this regard. In addition to the primary benefits, swimming also offers a number of additional benefits, such as: improved sleep quality; increased immunity; improved coordination; increased bone density. Swimming is suitable for people of all ages and fitness levels. It is a great activity for children, as it promotes swimming skills, water safety, and physical development. Swimming improves the ability of the lungs to absorb oxygen and remove carbon dioxide, which reduces pressure on the heart and reduces the likelihood of disease.

Thirdly, swimming helps develop endurance and improve metabolic processes in the body. Swimming helps increase the number of red blood cells in the blood. Red blood cells are responsible for transporting oxygen to the organs and tissues of the body. Increasing their number in the blood helps to transport oxygen more efficiently, which leads to increased endurance. Swimming also helps to increase metabolism. This happens due to the acceleration of blood circulation and increased movement of blood through the vessels. Increased blood flow stimulates metabolism and improves the functioning of all organs of the body.

Another benefit of swimming is that it helps to relax and reduce stress on the body. An increase in the level of endorphins - hormones responsible for feelings of happiness and pleasure - leads to an improvement in mood and a decrease in stress. Swimming not only

increases the level of physical activity, but also accelerates the breakdown of fat cells and improves metabolic processes in the body.

Fourthly, swimming helps to strengthen the immune system and reduce the risk of developing various diseases. Coronavirus infection has proven that immunity plays a key role in fighting infectious diseases, so it is important to strengthen your immunity to prevent possible diseases. One way to boost your immunity is to go swimming.

Swimming not only helps to strengthen muscles and improve blood circulation, but also increases the number of lymphocytes in the blood, which play a key role in the fight against infections. In addition, swimming helps to increase melatonin levels and reduce cortisol levels. Melatonin is a sleep hormone that helps the body rest and recover.

Thus, swimming is an excellent way not only to maintain physical fitness, but also to strengthen the immune system and reduce the risk of developing various diseases.

Fifthly, swimming has a positive effect on the mental state of the student. Swimming helps to improve mood, reduce stress and increase overall performance.

In general, swimming is one of the most effective sports and has many positive physiological and psychological effects on the human body.

Swimming is an excellent way to reduce stress and improve mood. While swimming, a person is in an environment where the load of gravity is significantly reduced, which creates a feeling of lightness and peace. Reducing fatigue, improving mood and, as a result, reducing stress. Swimming helps to improve self-esteem and well-being. With each training session, the student gains new experience, strengthens his physical health and improves his appearance. Usually, participants in group swimming lessons have more opportunities for social and cultural life and communication with their friends, which also has a positive effect on their mental state.

4 Discussions

The study resulted in adjustments that will be implemented. The results of the study allow us to draw the following conclusions:

1. Impact on physical development: Swimming lessons are an integral part of comprehensive physical development. Classes have a beneficial effect on various body systems and contribute to the harmonious development of the individual.
 - Musculoskeletal system: swimming strengthens muscles, joints and ligaments, forming a muscular corset.
 - Muscular system: swimming involves almost all muscle groups, especially the shoulder girdle, arms, chest, abdomen, back and legs. Regular classes contribute to their uniform development, strengthen them and improve muscle tone.
 - Physical qualities: this program allows you to develop endurance, strength, speed and coordination of movements. Exercises in water reduce the load on the spine and joints.
 - Cardiovascular system: it improves blood circulation, stabilizes blood pressure and increases overall endurance of the body as a result of regular classes according to this program.
 - Respiratory system: swimming increases lung capacity, improves respiratory function and increases overall aerobic endurance.
 - Nervous system: swimming has a relaxing and calming effect. Water treatments reduce excitability and irritability, relieve stress and improve mood.
2. Development of hygiene skills and hardening. Swimming plays an important role in the formation of stable hygiene skills. Regular visits to the pool help maintain body cleanliness and prevent skin diseases. In addition, swimming hardens the body and increases its resistance to various infections. Inhaling moist air in the pool and

swimming in relatively cool water have a beneficial effect on the mucous membranes and respiratory tract.

3. Organization of classes. Effective swimming training involves proper organization of classes. It is advisable to include in the training process:
 - General developmental exercises for warming up and preparing the body for swimming.
 - Special physical exercises for mastering and improving the technique of various swimming styles.
 - Games and entertainment on the water, which make classes more exciting and increase student motivation.
4. Correctional and health-improving value. Swimming is a means of correcting and preventing various diseases of the musculoskeletal system and internal organs. It is effectively used to eliminate posture disorders, flat feet, scoliosis and other pathologies.

5 Conclusion

The proposed methodology for the incorporation and application of in-depth study of swimming in physical education classes at a university is appropriate for psychological relief and an increase in emotional background, as well as for improving the physical condition of students. It allows us to diversify the educational process and make it more exciting and motivating. The data obtained during the study allow us to expand the range of tools and methods for conducting swimming classes. This makes it possible to individualize the approach to each student, taking into account their level of training, physical capabilities and preferences. The presented brief summary of data on the introduction and application of in-depth study of swimming in physical education classes at a university shows that the proposed program contributes to strengthening health, developing physical qualities in students, as well as relieving stress and increasing emotional background.

The results obtained indicate that swimming classes can be an effective tool for improving the psychological and physical health of students, which contributes to their successful adaptation to study and future professional activities. Prospects for further research include studying the long-term effects of swimming classes and developing differentiated programs for students with different individual characteristics and needs.

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References

1. Jantsch J, Tassinari ID, Giovenardi M, Bambini-Junior V, Guedes RP, de Fraga LS, Front Cell Dev Biol. 2022 **10**:795384. <https://doi.org/10.3389/fcell.2022.795384>. eCollection 2022.
2. Bull FC, Al-Ansari SS, Biddle S, Borodulin K, Buman MP, Cardon G, et al.. Br J Sports Med. (2020) **54**:1451–62. <https://doi.org/10.1136/bjsports-2020-102955>

3. La Arias-de Torre J, Vilagut G, Ronaldson A, Serrano-Blanco A, Mart'n V, Peters M, et al. *Lancet Public Health*. (2021) **6**: 729–38. [https://doi.org/10.1016/S2468-2667\(21\)00047-5](https://doi.org/10.1016/S2468-2667(21)00047-5)
4. Luke, P., Riana, R., Lesley, W., Elizabeth, L., *J. Sci. Med. Sport* **22(1)**, 117–122 (2019). <https://doi.org/10.1016/j.jsams.2018.06.009>
5. Barnett, S., Anthony, C., Claudio, L., Troy, B., *J. Sci. Med. Sport* **22(1)**, 29–34 (2019). <https://doi.org/10.1016/j.jsams.2018.05.017>
6. Anna Ivanova, Anna Korban, Nikolay Ryzhkin, and Yulia Savchenko, In: *E3S Web of Conferences* **273**, 10035 (2021). <https://doi.org/10.1051/e3sconf/202127310035>
7. Pooja Tandon, Melanie Klein, Brian Saelens, Dimitri, A., *Mental Health and Physical Activity* **15**, 17–21 (2018). <https://doi.org/10.1016/j.mhpa.2018.06.004>
8. Anna Ivanova, Nikolay Ryzhkin, and Yulia Savchenko, *Lecture Notes in Networks and Systems* **22**, 575 (2023). https://doi.org/10.1007/978-3-031-21219-2_157
9. Janet Simon, Carrie Docherty, *J. Sci. Med. Sport* **21(12)**, 1206–1209 (2018). <https://doi.org/10.1016/j.jsams.2018.05.008>
10. Luzak A, Heier M, Thorand B, Laxy M, Nowak D, Peters A, et al. Physical activity levels, duration pattern and adherence to WHO recommendations in German adults. *PLoS ONE*. (2017) **12**: e0172503. <https://doi.org/10.1371/journal.pone.0172503>
11. Samira Rahimi, Maghsoud Peeri, Mohammad Ali Azarbayjani, Leila Anoosheh, *Physiol. Behav* **226**, 113130 (2020). <https://doi.org/10.1016/j.physbeh.2020.113130>
<https://www.sci-hub.ru/10.1016/j.physbeh.2020.113130>
12. Tina J Kauh, *Preventive Medicine* **130**, 105894 (2020). <https://doi.org/10.1016/j.ypmed.2019.105894>
13. Paluska SA, Schwenk TL. Physical activity and mental health: current concepts. *Sports Med*. (2000) **29**: 167–80. <https://doi.org/10.2165/00007256-200029030-00003>
14. Nikolay Ryzhkin, Anna Ivanova, *IOP Conference Series: Earth and Environmental Science* **937(2)**, 022011 (2021). <https://doi.org/10.1088/1755-1315/937/2/022011>
15. M. F. Singh, *Journal of Science and Medicine in Sport* **22(1)**, 1 (2019). <https://doi.org/10.1016/j.jsams.2019.08.023>
16. McLaughlin M, Aldin AJ, Starr L, Hall A, Wolfenden L, Sutherland R, et al. *Int J Behav Nutr Phys Act* (2020) **17**: 1–12. <https://doi.org/10.1186/s12966-020-01008-4>
17. Samantha G Farris, Emily K Burr, Mindy M. Kibbey, Ana M Abrantes, *Mental Health and Physical Activity* **19**, 100346 (2020). <https://doi.org/10.1016/j.mhpa.2020.100346>
18. Park JH, Moon JH, Kim HJ, Kong MH, Oh YH. *Korean J Fam Med*. (2020) **41**: 365–73. <https://doi.org/10.4082/kjfm.20.0165>
19. Kandola A, Lewis G, Osborn DPJ, Stubbs B, Hayes JF. *Lancet Psychiatry* (2020) **7**: 262–71. [https://doi.org/10.1016/S2215-0366\(20\)30034-1](https://doi.org/10.1016/S2215-0366(20)30034-1)
20. Miko HC, Zillmann N, Ring-Dimitriou S, Dorner TE, Titze S, Bauer R. (2020). Effects of physical activity on health. *Gesundheitswesen (Bundesverband der Ärzte des Öffentlichen Gesundheitsdienstes)*. (2020) **82**: S184–95. <https://doi.org/10.1055/a-1217-0549>