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Organization and content of aquafitness classes for 30-35 year-old people after a new coronaviral infection 2019 (COVID-19)

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Abstract: The rapid spread of COVID-19 and its subspecies forces specialists of various health care profiles to search for new and effective approaches, methods of rapid diagnosis and treatment, as well as providing high-quality medical care, including rehabilitation measures both during the disease and after a coronavirus infection. This article presents the methodology of aquafitness classes for 30-35 year-old people after coronavirus infection 2019 (COVID-19). **Scientific novelty** of the study is in progressive scientific and pedagogical experience summarizing concerning the impact of coronavirus infection on the health of adults and in substantiation of the author's methodology of aquafitness classes introduction. **Practical significance** is in the author's methodology introduction into health-improving swimming training programs. The research results and conclusions can be used in the system of training and qualification improvement among swimming coaches. **Material.** The research was organized since August 2021 till May 2022 at the Municipal Budgetary establishment "Olympus Sports Club" (Moscow, Russia) and at sports and recreation complex "Burevestnik" (Moscow). The duration of the experiment was ten months. 20 women at the age of 30 - 35 had suffered a new coronavirus infection took part in the research. **Research methods:** information sources concerning the problem of physical rehabilitation and advanced research works on the new coronavirus infection analysis, pedagogical experiment and methods of mathematical statistics. **Results.** We created the methodology of aquafitness classes for 30-35 year-old people after a new coronavirus infection 2019 (COVID-19). As a result of the study, we received the data confirming significant changes in health and physical development indices of people, who trained. **Conclusion.** It was revealed that aquafitness classes for 30-35 year-old people after coronavirus infection 2019 (COVID-19) according to the offered methodology significantly improve health and psycho-emotional state of the people involved, have a positive effect on their functional state.

Keywords: aquafitness, new coronavirus infection 2019, COVID-19, health state, physical development.

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Introduction

Throughout the whole history of humankind existence people face different infections. The threat of the XXI century for the whole humankind is a new coronavirus infection (COVID-19). According to the results of World Health Organization, more than 600 million of children and adults all over the world experienced COVID-19 [3].

The rapid spread of COVID-19 and its subspecies forces specialists of various health care profiles to search for new and effective approaches, methods of rapid diagnosis and treatment, as well as providing high-quality medical care, including rehabilitation measures both during the disease and after a coronavirus infection [1, 7].

In this connection the aim of the research

became the creation and effectiveness experimental substantiation of aquafitness classes methodology for 30-35 year-old people after coronavirus infection 2019 (COVID-19).

Materials and methods

In order to achieve the set aim we used the following research methods:

- information sources concerning the problem of physical rehabilitation and progressive research works, connected with new coronavirus infection, analysis;

- pedagogical testing in order to define the initial level of the functional state of people, who experienced new coronavirus infection 2019 (COVID-19).

- pedagogical observation and pedagogical experiment;

- methods of mathematical statistics (mean values methods, statistical hypotheses check between two mean values).

The research was held on the basis of Municipal budgetary establishment "Olympus Sports Club" (Moscow) and sports health-improving complex "Burevestnik" (Moscow). The duration of the experiment was 10 months (since August, 2021 till May, 2022). 20 women at the age of 30-35 took part in the experimental work and testing. They all experienced new coronavirus infection. The object was health state and level of physical development.

The research was carried out during 4 mutually intersecting stages.

At the first stage we analyzed existing research works of the specialists connected with the influence of new coronavirus infection 2019 (COVID-19) on the functional state of middle age people.

At the second stage we organized the pedagogical testing among people, who experienced COVID-19. The results of the testing helped to reveal disorders in the following systems: cardiovascular system, respiratory system, musculoskeletal system.

At the third stage we created the methodology of aquafitness classes for 30-35 year-old people after new coronaviral infection 2019 (COVID-19). The base of the methodology formed different aquafitness means.

The 4th stage provided the effectiveness of the created aquafitness classes methodology estimation during specially organized pedagogical experiment, the results of analytical and experimental work consideration and description.

Results and discussion

Studying information sources concerning the problem of physical rehabilitation and the research works, connected with COVID-19, helped to reveal the following:

- this disease causes the symptoms of mild and

moderate forms of respiratory diseases. In case of mild forms the symptoms are like in case of seasonal flu (high temperature, cough, shortness of breath, respiration problems, weariness, sore throat) in case of severe forms of the disease we see the following symptoms: shortness of breath; constant chest pain; confusional state; inability to estimate adequately own state, cyanosis, revealed owing to cyanotic lip, nasolabial triangle and the whole face color [2, 5, 8];

- the research works showed that hospitalized patients had concomitant heart damage, arrhythmia, cardiac decompensation, ejection fraction decrease, troponin level increase, severe myocarditis with systolic function decrease and etc. [4, 6, 8];

- people, who had experienced the infection, had the following neurological aftereffects: headaches, over-fatigue, syndrome of impaired consciousness, spasms, no sense of smell and taste, skin and other kinds of sensitivity damage, posterior reversible encephalopathy syndrome, viral encephalitis and etc. [5, 6, 8];

- people, who had experienced COVID-19, had the following disorders of skeletomuscular system: severe muscle weakness, pain conditioned by long-term forced lying position, difficulty in vertical orientation, balance and walking disorder, other coordination disorders [5, 6, 8].

- the greatest amount of disorders are described in respiratory system: pulmonary fibrosis as an after-effect of pneumonia; orrhorrea. It demands special physiotherapeutic methods of treatment; Chronic Obstructive Pulmonary Disease and respiratory function disorder of different degree [5, 6, 8].

Taking mentioned above into consideration we come to the conclusion that a person, who had experienced COVID-19, had considerable disorders in his own usual homeostasis. They led to his working capacity and the level of organism systems functioning decrease, including disability. Together with physical fitness and the results of physical activity decrease it complicates usual life and leads to life quality decrease, chronic diseases and health problems and lifetime decrease. In this connection it is reasonable to speak about the ways of state normalization and the forms of activity determination. They would be able to turn coronavirus infection after-effects back.

In order to reveal the initial level of health and the level of different organism systems functioning we organized pedagogical testing among the people. They had experienced COVID-19. It was realized on the basis of the Municipal budgetary establishment "Olympus Sports Club" (Moscow) and at sports and recreation complex "Burevestnik" (Moscow). Testing helped to reveal the following (table 1):

- mean value of body mass index was $25,9 \pm 1,0$ c.u. These values exceed the upper bound of the

norm, it means they correspond with "preobesity" mark. Moreover, the other indices are the following: a) weight $70,6 \pm 2,7$ kg; b) fat component value is $23,7 \pm 3,1\%$, which proves norm excess according to this index; c) muscle component among the most part of the respondents was lower than the norm – $23,4 \pm 5,7\%$ (satisfactory level); d) the volume of waist circumference is in the average $86,2 \pm 9,7$ cm;

- chest excursion was $3,8 \pm 0,9$ cm. It is also doesn't correspond with normal values;
- general physical working capacity indices. They were revealed with the help of PWC₁₇₀ test, in the

average were $413,3 \pm 78,2$ kgm/min. It is also lower then the norm;

- the results of Ruffier ($18,8 \pm 1,4$ c.u.) and orthostatic test ($27,0 \pm 1,9$ beats/min) prove "unsatisfactory" level of cardiovascular system work;

- the values of respiration tests (vital capacity ($2641,1 \pm 186,4$ ml), Stange ($26,6 \pm 5,5$ sec.) and Genci ($14,1 \pm 1,8$ s) tests proved "unsatisfactory" level of a functional state of respiratory system and aerobic abilities of an organism.

Table 1

Health state and physical development indices among middle age people, who had experienced new coronaviral infection, before and after the pedagogical experiment ($\pm \sigma$)

№	Evaluated indices	Before the experiment $(\bar{X} \pm \sigma)$	After the experiment $(\bar{X} \pm \sigma)$	Δ_{abs}	$\Delta \%$	T- критерий, значимость (P)
1	Bodymass index (c. u.)	$25,9 \pm 1,0$	$22,9 \pm 1,5$	3,0 c.u.	11,6	$p < 0,01$
2	Waist circumference (cm)	$86,2 \pm 9,7$	$71,5 \pm 8,6$	14,7 cm	17,1	$p < 0,01$
3	Chest excursion (cm)	$3,8 \pm 0,9$	$5,6 \pm 1,6$	-1,8 cm	47,4	$p < 0,01$
4	Fat component (%)	$23,7 \pm 3,1$	$16,9 \pm 1,4$	6,8 %	28,7	$p < 0,01$
5	Muscle component (%)	$23,4 \pm 5,7$	$34,3 \pm 3,6$	-10,9 %	46,6	$p < 0,01$
6	PWC ₁₇₀ (kgm/min)	$413,3 \pm 78,2$	$713,3 \pm 26,$	-300,0 kgm/min	72,6	$p < 0,01$
7	Ruffier test (c. u.)	$18,8 \pm 1,4$	$8,4 \pm 1,4$	10,4 c.u.	55,3	$p < 0,01$
8	Vital capacity (ml)	$2641,1 \pm 186,4$	$3209,3 \pm 297,5$	-568,2 ml	21,5	$p < 0,01$
9	Orthostatic test (beats/min)	$27,0 \pm 1,9$	$7,2 \pm 1,5$	19,8 beats/min	73,3	$p < 0,01$
10	Stange test (s)	$26,6 \pm 5,5$	$60,7 \pm 12,2$	-34,1 s	56,2	$p < 0,01$
11	Genci test (s)	$14,1 \pm 1,8$	$42,5 \pm 2,2$	-28,4 s	66,8	$p < 0,01$

Notes: * – statistically valid difference between the results before and after the pedagogical experiment (in case $p < 0,01$)

The results of testing helped to prove the results of special information sources analysis. They state that after Covid-19 most part of respondents had disorders in the following systems: cardiovascular system, respiratory system, musculoskeletal system.

Taking into account mentioned above results we consider health-improving swimming one of the most effective means of life quality and physical fitness rehabilitation. It is a well-known fact that water characteristics have a positive influence on the work of the mentioned above systems. Moreover, physical activity stimulates substances intensification, stimulates rehabilitation processes. As a result of it we expect physical condition improvement owing to reserve capacities of the body.

However, it is important to understand that speaking about health-improving swimming and aquafitness. We mean its health-improving

(rehabilitation) orientation. Training should be organized taking into account complications of each definite person. As the infection complications are different and influence all systems of an organism. In each definite case in an individual combination and degree of damage, we can characterize only general features of such work.

The results of special information sources analysis, pedagogical observations, practical experience of physical rehabilitation coaches summarizing helped us to create the methodology of health-improving aquafitness classes for 30-35 year-old people. They had experienced new coronavirus infection 2019 (COVID-19).

The aim of the presented methodology is in a quicker, more effective and safe rehabilitation of the functional state among people. They had experienced COVID-19.

The expected results of the offered methodology

of aquafitness classes for 30-35 year-old people, who had experienced new coronavirus infection 2019 (COVID-19) would be the following:

- Functional state improvement and/or the functional state initial indices achievement;
- health state, self-assessment and psychic rehabilitation parameters improvement, their psycho-emotional state improvement;
- quicker return to usual life style.

The created by us methodology is based on the following principles:

- Principles of physical rehabilitation: early beginning of rehabilitation measures; complex character of all available and necessary rehabilitation measures use; rehabilitation program individualization; stage character of the rehabilitation; continuity and succession during all stages of rehabilitation; social orientation of rehabilitation measures; control methods use of the loads adequacy and rehabilitation effectiveness;

- physiologically substantiated medical principles: an individual approach to a patient; conscientiousness; graduality principle; systematic character principle; cyclicality principle; systematic character of the influence; novelty and diversity; moderate character of the influence;

- general didactic principles of physical upbringing: conscientiousness and activity; availability; individualization; visualization; systematic character;

- specific principles of physical upbringing: continuity; system alternation of the loads and rest. This principle provides systematic alternation of the loads and rest during the whole process of rehabilitation; gradual increase of developing-training effects; adapted-balanced dynamics of the

loads; cyclic organization of the classes; age-related adequacy.

The presented methodology provides the following:

1) rehabilitation would be organized as an integral cycle of events. It includes a rational selection of the stages, means and methods. They take into account age, gender, motor experience of the people, who train, the character and degree of pathological process and the functional abilities of a patient;

2) rehabilitation process can be divided into two interconnected and mutually complementary stages (table 2);

3) rehabilitation of the people, who train has a complex character and should begin within maximally short periods, after a doctor gives permission;

4) rehabilitation measures start only when the doctor permits and is controlled by the doctor. In the end of each stage respondents went through medical checkup;

5) the main means of physical rehabilitation would become aquafitness means. They include the following: health-improving and remedial swimming, exercises from aquaerobics, hydroshaping, exercises using special simulators for swimming and aquaerobics; respiratory gymnastics using water characteristics, hydromassage, watsu, floating, thermal springs and work in "sea" water;

6) process aids of physical rehabilitation would become: massage and self-massage; physiotherapy; remedial gymnastics. It should be noted that the recommended means of physical rehabilitation are fulfilled according to the recommendations of a doctor;

Table 2

Methodology of aquafitness classes among middle age people, who had experienced new coronaviral infection 2019

Stage of training	The characteristics of the training stage
Rehabilitation	<p><i>Objectives of teaching:</i></p> <ul style="list-style-type: none"> - an athlete's organism adaptation to gradually increasing physical load; - general level of physical readiness rehabilitation; - muscles strengthening and physical qualities development; <p><i>Target zone: 50-65% from max.</i></p> <p>3-4 lessons a week.</p> <p><i>Duration of the lessons: from 30 to 60 min.</i></p> <p><i>temperature of water: from 29 to 31 °C.</i></p>
Functional	<p><i>Objectives of teaching:</i></p> <ul style="list-style-type: none"> - the level of general physical readiness increase; - physical qualities development: power, endurance, speed, flexibility, dexterity; - physical working capacity and functional abilities increase. <p><i>Target zone: 60-75% from max.</i></p> <p>4-5 lessons a week.</p> <p><i>Duration of the lessons: 45.60 min.</i></p> <p><i>temperature of water: from 27 to 29 °C</i></p>

7) in terms of the offered methodology the leading role belongs to the method of strictly-regulated exercise. Moreover, the methodology provides the following methods of training use: even-continual, even-alternate, repeated, interval, repeated-interval and alternate-distant methods;

8) at different stages of rehabilitation after coronaviral infection different combinations of means and methods are used:

- "rehabilitation" stage provides the following aquafitness means use: remedial and health-improving swimming, exercises from aquafitness, hydroshaping, exercises using specialized simulators for swimming and aquaerobics; exercises of respiratory gymnastics using water characteristics, hydro massage, watsu, thermal springs and work in "sea" water, rehabilitation procedures and the procedures based on water characteristics use. At this stage all exercises are fulfilled in a sparing mode (50-65 % from maximal values) using an even and/or repeated methods;

- at a "functional" stage the following would be used: conditional-health-improving and recreational swimming, exercises from aquafitness, hydroshaping, exercises using specialized simulators for swimming and aquafitness; respiratory gymnastics using water characteristics, hydro massage, watsu, floating. At this stage all exercises are fulfilled in a moderate mode (60-75 % from maximal values) using all methods;

9) recommendations concerning aquafitness exercises fulfillment:

- physical exercises, which can be fulfilled at different depth: a) shallow water – from 120 to 140 cm (water level till breastbone); b) transitive – from 140 to 150 cm (when legs stand on dock apron and water level is till the neck); c) deep water – from 150 cm and deeper (when there is no contact with the swimming pool floor);

- physical exercises, fulfilled from different positions in terms of the support: a) standing near swimming-pool nosing with arm support or spine support; b) standing on the swimming pool floor with one or two legs, with the support on the whole foot or toes; c) without any support, body is in a floating position, there is no support;

- physical exercises fulfilled from different positions of the body in water: a) vertical; b) horizontal (back posture, on chest, side position); c) transient; d) in a sitting position;

- physical exercises fulfilled using different equipment: a) supporting; b) increasing water environment resistance; c) special training simulators (for example: rubber expander);

- physical exercises fulfilled in different directions: a) with the turn (to the right, to the left, around); b) moving (forward, back, to the right, to

the left); c) like pendulum (all possible swings from side to side, forward-back and etc.); d) diagonally; e) with pushing out from the water upward and down;

- swimming the parts of distance with the help of the exercises for mastering the technique of swimming types (including the applied once), mistakes correction in the technique of sports styles, swimming exercises;

- conditional-health-improving and recreational swimming in target volumes;

- water procedures, which use water characteristics, directed toward relaxation, lymphatic drainage intensification, psycho-emotional state normalization, physical and psychological tonus release, life quality improvement;

10) the state of health monitoring during the lesson should be limited by an adequate to the necessary level (individually determined indices) of cardiovascular and respiratory systems state. For pulse values calculation we used Karvonen method;

11) the presented methodology provides an active kind of rest, when a person fulfills the chosen motor action. It doesn't demand great physical efforts and provides quicker and more effective rehabilitation after the training load;

12) rehabilitation measures start only after the doctor's permission.

In order to estimate the effectiveness of the created methodology of aquafitness lessons for 30-35 year-old people, who had experienced COVID-19, we organized the pedagogical experiment. It was held on the basis of the Municipal Budgetary establishment "Olympus Sports Club" (Moscow) and at sports and recreation complex "Burevestnik" (Moscow). 30-35 year-old female respondents took part in the experiment. All they experienced COVID-19 and trained at swimming schools «SwimRocket» and «Tochka Rosta». After the end of 10-months pedagogical experiment the respondents had the increase in all control tests. The greatest increase in health state and physical development indices among middle age people. They had experienced COVID-19, was registered in the following tests (table 2): orthostatic test ($\Delta_{abs}= 19,8$ beats/min; $\Delta_{rel}= 73,3\%$); PWC170 ($\Delta_{abs}= -300,0$ kgm/min; $\Delta_{rel}= 72,6\%$); Genci test ($\Delta_{abs}= -28,4$ s; $\Delta_{rel}= 66,8\%$); Stange test ($\Delta_{abs}= -34,1$ s; $\Delta_{rel}= 56,2\%$); Ruffier test ($\Delta_{abs}= 10,4$ c.u.; $\Delta_{rel}= 55,3\%$); chest excursion ($\Delta_{abs}= -1,8$ cm; $\Delta_{rel}= 47,4\%$); muscle component ($\Delta_{abs}= -10,9\%$; $\Delta_{rel}= 46,6\%$); fat component ($\Delta_{abs}= 6,8\%$; $\Delta_{rel}= 28,7\%$); vital capacity ($\Delta_{abs}= -568,2$ ml; $\Delta_{rel}= 21,5\%$); waist circumference ($\Delta_{abs}= 14,7$ cm; $\Delta_{rel}= 17,1\%$); bodymass index ($\Delta_{abs}= 3,0$ c.u.; $\Delta_{rel}= 11,6\%$).

It should be noted that during the individual conversations we revealed general health state improvement and the indices of the increased

tiredness absence.

Thus, we revealed that the author's methodology of aquafitness classes use for 30-35 year-old people after coronaviral infection 2019 (COVID-19) helps to realize the following:

a) normalize and return the initial level of physical development indices, functional state of the main, vital systems (respiratory, cardiovascular, musculoskeletal system) of an organism;

b) improve health state and psycho-emotional state of people, who train.

Conclusion

All mentioned above proves that the offered methodology of aquafitness classes for 30-35 year-old people after coronavirus infection 2019 (COVID-19) is effective. It gives the ground for the methodology recommendation in the system of health-improving physical culture and sport lessons.

References

1. Baklanov M.V., Repin A.I., Mongush A.O. The influence of physical culture on the students during rehabilitation after coronavirus infection. *Nauchnyj gorizont*. 2022; 1(53): 17-28 [In Russ.].

2. Golukhova E.Z., Sokolova N.Yu., Bulaeva N.I. The opinion concerning the problem of new coronavirus infection COVID-19 pandemic (literature review). *Creativnaya kardiologiya*. 2020; 14. 1: 5-15 [In Russ.].

3. Информационная панель ВОЗ по коронавирусу (COVID-19). URL: HYPERLINK "https://covid19.who.int/"https://www.who.int/.

4. Kasaeva G.R., Maksimova P.E., Gorbunov A.A., Goryanskaya I.Ya., Ivanchenko V.S. The influence of new coronavirus infection on cardiovascular system. *Modern science*. 2021; 6-1: 338-346.

5. Malinnikova E.Yu. New coronavirus infection. Nowadays opinion of XXI century pandemic. *Infekcionnye bolezni: Novosti, vytybz, obuchenie*. 2020; 9. 2(33): 18-32 [In Russ.].

6. Bukhtiyarova I.B. *Novaya koronavirusnaya infekciya KOVID-19: professional'nye aspekty sohraneniya zdorovya i bezopasnosti medicinskih rabotnikov: metodicheskie rekomendacii* [New coronavirusinfection COVID-19: professional aspects of health care professionals' health preservation and safety: methodical recommendations. Moscow: Federal State Budgetary Scientific Establishment "Scientific Research Institute of Medicine Labor". 2021: 132 [In Russ.].

7. Ostrovskiy D.I., Ivanova T.I. The influence of new coronavirus infection COVID-19 on psychic health of a person (literature review). *Omskij psixiatricheskij zhurnal*. 2020; 2-S1(24): 4-10 [In Russ.].

8. Romanov B.K. Coronavirus infection COVID-19. *Bezopasnost' i risk farmakoterapii*. 2020; 8. 1: 3-8 [In Russ.].

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