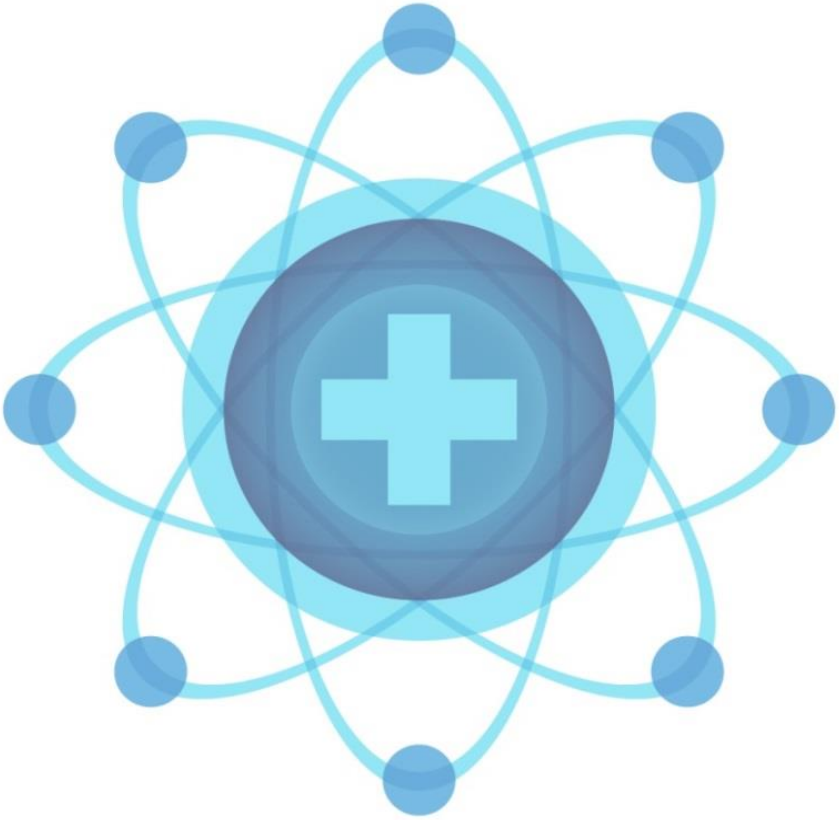

INTERNATIONAL MEDICAL SCIENTIFIC JOURNAL

ART OF MEDICINE

Founder and Publisher **Pascual Izquierdo-Egea / North American Academic Publishing Platforms**

Internet address: http://artofmedicineimsj.us

E-mail: info@artofmedicineimsj.us

11931 Barlow Pl Philadelphia, PA 19116, USA +1 (929) 266-0862

Available at https://www.bookwire.com/

ISBN: 978-0-578-26510-0

10.5281/zenodo.6556277

PHYSICAL ACTIVITY OF THE ELDERLY AS THE MOST IMPORTANT FACTOR OF ACTIVE LONGEVITY

Visogortseva O.N., Sobirova G.N.
Tashkent Medical Academy, Uzbekistan, Tashkent

Abstract. The aim of the study was to develop an improved physical activity program for the elderly in accordance with WHO recommendations and evaluate its effectiveness. Activation of the motor activity mode improves health, expands functionality, slows down the aging process in the elderly, reduces the risk of falls and injuries, and increases the psycho-emotional status.

Keywords: elderly people, physical activity, active longevity, physical activity, adaptive physical culture, age-associated conditions.

Introduction. Population aging today affects all countries of the world. In almost every country, the proportion of people over the age of 60 is growing faster than any other age group, both as a result of rising life expectancy and falling birth rates. According to UN forecasts, by 2025 the total number of people aged 60 and over will reach more than 1.1 billion people. The number of people aged 80 years and over will grow at the fastest pace: from 13 million people in 1950 to 137 million people by 2025. At the same time, the European region has firmly taken the place of the oldest on the planet, since it is in it that 18 out of 20 countries of the world with the largest proportion of elderly and senile people [7].

According to the Global Burden of Disease study, the results of which were published in the Lancet, Uzbekistan is the leader in terms of life expectancy among the countries of Central Asia - 73.8 years.

This population aging can be considered a success of public health policy and socioeconomic development, but it also poses challenges for society to adapt in order to maximize the health and functionality of older people, as well as their social participation and safety. Old age according to WHO classification falls in the range from 60 to 75 years. According to the results of sociological studies, representatives of this age category are young at heart and are not at all going to write themselves down as old people [14].

Population aging gives rise to a number of economic, environmental, medical and social problems: the demographic burden on the able-bodied population is increasing, which complicates the solution of the problems of material support for the elderly; there are difficulties and additional economic burden associated with social security, organization of living, work and recreation, medical and household services for the elderly. In the elderly and senile age, age-associated diseases are more common, there are changes in the functioning of many organs and systems against the background of polymorbidity. An elderly person is more often exposed to stressful situations that cause changes in his state of health in addition to existing ones [3, 19].

Old age is characterized by the fact that people experience a decrease in vital activity. Older people become inactive, acquire a lot of chronic diseases, their attentiveness decreases, their memory deteriorates. Often there are age-related

10.5281/zenodo.6556277
conditions: frailty syndrome (FS), sarcopenia, impaired mobility and increased risk of falls, polymorbidity, depression, pain syndrome, hearing and vision impairment, eating disorders [6, 8, 9, 10].

The aging process is a genetically programmed process, accompanied by certain age-related changes in the body. With age, the intensity of metabolic processes decreases. At the same time, the risk of developing atherosclerosis, hypertension, myocardial infarction, stroke, diabetes, tumor and other diseases increases. In old age, there is a natural and obligatory decrease in strength, a limitation of physical capabilities. These involutionary processes also concern mental activity, which is expressed in a decrease in the strength and mobility of mental processes. Older people are not as strong and not able, as in their younger years, to withstand prolonged physical or nervous stress; their total energy supply is getting smaller and smaller; dehydration of the body increases, which leads to many disorders, primarily from the musculoskeletal system. Due to the weakening of the sensitivity of the nervous system, the elderly and old people react slowly to changes in external temperature and are therefore more susceptible to the adverse effects of heat and cold. External manifestations are expressed in a weakening of the sense of balance, uncertainty in gait, loss of appetite, in the need for brighter illumination of the space, etc. [16, 18, 19].

The aging process is not unambiguous, it is associated not only with the processes of extinction, but also with the emergence of adaptive mechanisms for their suppression and compensation. Various kinds of changes in a person as an individual that occur in the elderly and senile age are aimed at actualizing the potential, reserve capabilities accumulated in the body during the period of growth, maturity and formed during the period of late ontogenesis. In old age, the activity of some genes not only fades, but others are stimulated, providing a high level of vitality of an elderly person [5, 11].

In gerontology, there are many different concepts related to active aging. in search of the most appropriate term, WHO settled on the term “active aging”, suggesting that it provides the least basis for discrimination against those older people who already suffer from acute or chronic diseases, are physically disabled or dependent. WHO defines active aging as follows: “...the process of optimizing opportunities for health, community participation and safety in order to ensure quality of life as people age. The concept of "active aging" is applicable to both individuals and groups of the population. It enables people to realize their potential for physical, social and mental well-being throughout life and to participate in society in accordance with their needs, desires and opportunities, providing them with adequate protection, security and care when the need arises” [3, 21-23].

According to the World Health Organization (WHO), physical inactivity (PA) is the fourth most important risk factor that increases the mortality of the population. Physical inactivity significantly increases the risk of hypertension, myocardial infarction, stroke, heart failure, coronary heart disease, metabolic syndrome, obesity, diabetes. Among the causes of premature aging, hypodynamia and adynamia occupy one of the first places. WHO considers the increase in physical activity to be the

10.5281/zenodo.6556277
factors that make up the essence of highly effective gerontotechnologies, which can be implemented even with limited resources [4, 20].

Physical activity is one of the main components of health saving in old age. The most common reasons for limited physical activity at this age are:

1. Muscle weakness. If "the legs do not hold", and there is no strength in the hands to rise or prevent a fall.
2. Violation of gait and balance.
3. Osteoporosis.
4. Feeling of "tingling in the legs", numbness, changes in sensitivity, unpleasant and painful sensations in the legs, leading to a limitation of daily activities.
5. Some drugs, daily intake of 5 or more drugs per day.
6. Reduced vision.
7. Pain syndrome, pain in joints and muscles.
8. Depression, decreased mood, lack of desire, loss of interest in life, communication.

Physical activity is not only sports, but also any daily activity (walking, housework, dancing, gardening, etc.). Recommended levels of physical activity for the age category of 65 years and older (WHO, 2010) [17, 20]:

1. Adults 65 years of age and older must engage in at least 150 minutes per week of moderate-intensity aerobic activity, or at least 75 minutes per week of high-intensity aerobic activity, or similar moderate-to-high-intensity physical activity.

2. Each aerobics session should last at least 10 minutes.

3. For additional health benefits, adults in this age group should increase their moderate-intensity aerobic activity to 300 minutes per week, or 150 minutes per week for high-intensity aerobics or a similar combination of moderate and high intensity.

4. Adults in this age group with joint problems should do balance exercises to prevent the risk of falls 3 or more days per week.

5. Strength exercises that involve the main muscle groups should be devoted to 2 or more days a week.

6. If the elderly cannot perform the recommended amount of physical activity due to their health, then they should engage in physical exercises, taking into account their physical capabilities and health status.

Physically active older people have a higher level of functional adaptation of the cardiovascular and respiratory systems, better memory, mental performance, coordination, lower risk of falls, greater independence, and lower mortality rates [1]. In addition, regular exercise helps to get rid of depression, and group activities help to get rid of the feeling of social isolation and loneliness [12, 13, 15]. It is important to note that the presence of chronic diseases is not a contraindication to moderate physical activity. The development of physical activity programs for the elderly remains an urgent problem.

The aim of the study was to develop an improved physical activity program for the elderly in accordance with WHO recommendations and evaluate its effectiveness.

Materials and research methods. The study involved 48 people aged 60 to 75 years, men - 21 (43.7%), women - 27 (56.3%). The mean age was 65.9±0.6 years.

10.5281/zenodo.6556277

Health-improving physical culture (OPC) classes were held at the sports complex of the Tashkent Medical Academy for 6 months. Together with specialists in physical culture, a physical activity program was developed, the main objectives of which were to increase the psycho-emotional status of participants, their motivation to exercise, improve the state of the cardiorespiratory system, strengthen the musculoskeletal system (MLA), improve coordination and balance, and increase tolerance to physical stress. Training was carried out 3 times a week with a gradual increase in the duration of the session and load. In accordance with the tasks listed, the classes were divided into three types: one lesson was aimed at increasing physical performance and was carried out in the form of Nordic walking, the other was to strengthen the musculoskeletal system in the form of training on simulators with elements of strength exercises, the third was to stimulate the central nervous system (CNS) in the form of exercises for coordination and balance with elements of dance, including the national one.

In accordance with the provisions of the theory of the process of adaptation of the body to muscle load, V.K. Balsevich [2] every four weeks, the training load increased, and the exercises gradually became more difficult: after walking at an average pace, several running steps were performed, followed by a transition to accelerated walking, then to a step at an average pace; half-squats were gradually replaced by squats with an increase in the amplitude of the squat every week; flexion and extension of the arms with support on the seat of a chair, starting with a small dosage, adding every week for several movements; an increase in the number of circular movements of the arms bent at the elbow joint, with fingers touching the shoulder, etc.

In the next four weeks, not only did the number of running steps increase, but a new task was added: jumping from one foot to the other (from left to right and from right to left), starting one jump, gradually adding several jumps every week. Heart rate indicators were constantly measured during the training session. Blood pressure was measured before and after the session.

To improve coordination and balance, as well as the state of the psycho-emotional status of the participants, elements of yoga and qigong gymnastics were used in the complex of exercises.

Prior to the start of OFC classes, all participants were examined to identify contraindications to physical activity and determine their health status: complete blood count, complete urinalysis, ECG, VEM, blood biochemistry (fasting glucose, lipid spectrum). Also, all participants signed an informed consent to participate in the proposed program, and also filled out questionnaires to determine the initial level of physical activity (short international questionnaire on physical activity International Questionnaire on Physical Activity IPAQ, motor activity questionnaire ODA23+). Efficiency criteria were the dynamics of heart rate (HR), blood pressure (BP), walking distance according to the 6-minute walk test (6MWT), Romberg's coordinating test, the test for the psycho-emotional state "Health, activity, mood" (HAM).

10.5281/zenodo.6556277

Results and discussion. During the examination before the start of the program, the participants had the following health problems: 13 (27%) - coronary artery disease, exertional angina II-III, 19 (39.6%) - hypertension stage II AH I-II, 11 (22.9%) - COPD, 27 (56.2%) - osteoarthrosis of the joints, osteochondrosis of the spine, 9 (18.7%) - impaired glucose tolerance, obesity I-II degree - in 21 people (43.7 %).

According to the IPAQ and ODA23+ questionnaires, the PAin the majority was assessed as "below average" (86.7%), in 46.7% there were violations of coordination and balance, the TSH distance was 396.87±12.56 m. the SAN test conducted among the participants indicated a decrease in subjective indicators of well-being, activity and mood in 74.3% of the participants (Table 1).

Table 1

Characteristics of the initial functional state of the cardiovascular system and the main subjective indicators of the study participants

Indicators	Data before the PAprogram M±m
Возраст, лет	65,9±0,6
BMI, kg/m^2	29,97±1,76
Resting heart rate, beats in min.	77,98±1,38
SBP, mm Hg	130,1±3,1
DBP, mm Hg	81,4±1,5
EF%	54,1±1,2
VEM load time, min	7,96±0,39
Threshold load power, W	75,2±3,78
The volume of work performed, kJ	23,3±1,87
Heart rate at the height of the load, bpm in min.	129,53±1,22
SBP at the height of the load, mm Hg	160,33±3,36
DBP at the height of the load, mm Hg	94,75±1,33
DP load, arb. unit	207,56±4,58
ΔDP/A	5,54±0,5
Distance TSH, m	280,6±4,68
PAIPAQ questionnaire, points	12,68±0,87
Questionnaire PA ODA23+, points	43,68±2,93
Well-being, points	1,46±0,05
Activity, points	2,02±0,06
Mood, points	2,01±0,09

As a result of regular training during the study, after 6 months, positive dynamics of hemodynamic parameters was revealed: all participants showed stabilization of blood pressure and a decrease in resting heart rate and heart rate at the height of the load (Table 2).

Table 2

Comparative characteristics of the functional state of the cardiovascular system and the main subjective indicators of the study participants during the implementation of the physical activity program

Indicators	Data before the PAprogram M±m	Data by the end of 6 months of the PAprogram, M±m	p
BMI, kg/m^2	29,97±1,76	25,68±1,34	<0,05
Resting heart rate, beats in min.	77,98±1,38	73,73±1,12	<0,001
SBP, mm Hg	130,1±3,1	123,66±2,36	<0,001
DBP, mm Hg	81,4±1,5	78±0,89	<0,05
Heart rate at the height of the load, bpm in min.	129,53±1,22	138,03±1,32	<0,001
SBP at the height of the load, mm Hg	160,33±3,36	166,16±3,06	>0,05
DBP at the height of the load, mm Hg	94,75±1,33	95,33±1,35	>0,05
DP load, arb. unit	207,56±4,58	229,13±4,34	<0,001
Distance TSHH, m	280,6±4,68	416,4±5,37	<0,001
PA IPAQ questionnaire, points	12,68±0,87	18,43±0,72	<0,05
Questionnaire PA ODA23+, points	43,68±2,93	59,43±3,16	<0,05
Well-being, points	1,46±0,05	3,29±0,09	<0,001
Activity, points	2,02±0,06	4,41±0,11	<0,001
Mood, points	2,01±0,09	4,50±0,15	<0,001

Note: * - reliability of differences

According to the TSH data, the distance covered by the participants after the program significantly increased compared to the initial one by 48% (Fig. 1).

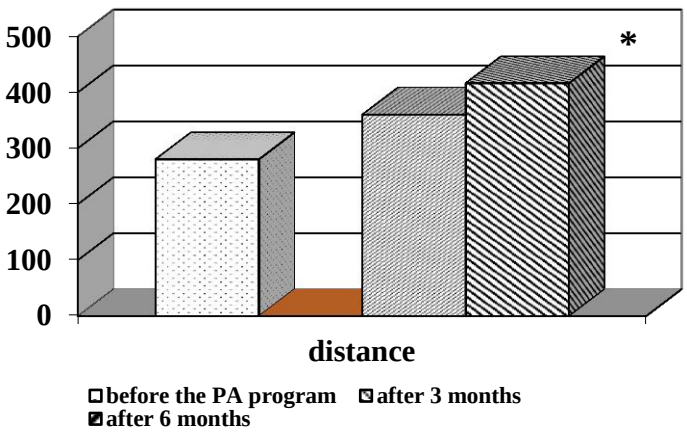

Fig.1. The dynamics of the distance indicators of the TSH among the participants during the implementation of the program (* - significance of differences p<0.05).

The level of FA of participants according to the IPAQ questionnaire increased by 45% from the initial 12.68±0.87

points to 18.43±0.72 by the end of 6 months from the start of classes. The dynamics of physical activity indicators according to the ODA23+ questionnaire, shown in Fig. 2, demonstrates a gradual increase in the level of FA, which reaches reliability only by 6 months of regular exercise.

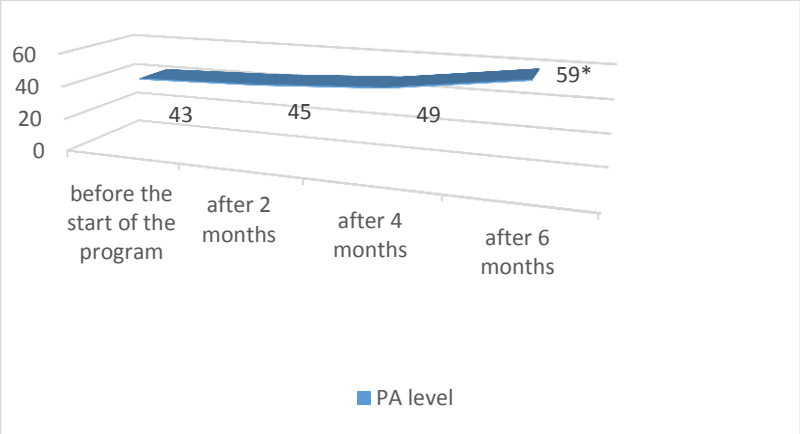

Fig.2. Dynamics of indicators of the level of physical activity among participants during the implementation of the FA program (* - significance of differences $p<0.05$).

Body weight control is an important issue. Women pay particular attention to this issue. As a result of the developed FA program, all overweight participants managed to achieve some success, for 6 months of regular training, body weight decreased by an average of 6.93 ± 1.24 kg.

The inclusion of elements of national dances, as well as traditional yoga and qigong gymnastics in the training program, contributed to the increase in the participants' interest in the classes and a significant improvement in their psycho-emotional state.

According to the CAH test, there was an improvement in the psycho-emotional status: the indicators of "well-being", "activity" and "mood" significantly increased by 78%, 84% and 96%, respectively, compared with the baseline. The quality of performance of coordinating tests has also improved, which in the future will lead to a reduction in the risk of falls for older people and their various injuries.

A variety of means of physical culture and the inclusion of dance exercises in the program under the guidance of a professional specialist in adaptive physical culture helped to increase the motivation of the participants for classes, 100% of them expressed a desire to continue training and brought others (neighbors, relatives, friends) with them.

Conclusion

1. The development of physical activity programs for the elderly has its own characteristics and should take into account age-associated diseases and functional changes in organs and systems.

2. An individually designed physical activity program for the elderly, taking into account deviations in the state of health and polymorbidity, leads to an improvement in hemodynamic parameters, an increase in physical performance, an increase in psycho-emotional status and motivation for exercise, which in the future

10.5281/zenodo.6556277
will contribute to active longevity and maintaining independence in this group of people.

References

1. Akopyan E.S. Adaptation capabilities of women of mature and elderly age involved in health-improving physical culture / E.S. Akopyan, M.V. Chshmarityan// Science and sport: current trends. - 2019. - V. 7, No. 2. – pp. 106-113 [in Russian]

2. Balsevich V.K. Ontokinesiology / V.K. Balsevich. - M .: Publishing house: "Theory and practice of physical culture", 2000. [in Russian]

3. Bashkireva A.S., Bogdanova D.Yu., Bilyk A.Ya., Shishko A.V., Kachan E.Yu., Kulapina M.E. Possibilities of managing the quality of life in old age based on the concepts of active longevity. Clinical gerontology. 2019; 25(3-4): 70-79. [in Russian]

4. Bashkireva A.S., Bogdanova D.Yu., Kachan E.Yu., Shishko A.V., Kulapina M.E. The level of physical activity and quality of life in the elderly and senile. Clinical Gerontology, 2018, No. 11-12, pp. 26-35. [in Russian]

5. Kandelya M.V., Koisman L.A., Nazarova V.P. Physiological and psychological changes in old age. Bulletin of the Amur State University. Sholem Aleichem, 2019, No. 2(35), pp.106-116. [in Russian]

6. Lopukhova V.A., Svetyi L.I., Tarasenko I.V., Konnova E.E., and Malashina M.I., J. Appl. Assessing the level of asthenia and disability in elderly patients with chronic obstructive pulmonary disease. Modern problems of healthcare and medical statistics, 2021, No. 1, pp. 254-263. [in Russian]

7. Mamchits L.P. The state of health and quality of life of the elderly and senile. Problems of health and ecology, 2014, pp.116-120. [in Russian]

8. Noskov S.M., Zavodchikov A.A., Krasivina I.G., Evgen'eva A.V., Lutskova L.N. Sarcopenia as a gerontological problem. Clinical Gerontology, 2011, No. 3-4, pp. 48-52. [in Russian]

9. Pavlova T.V., Proshchaev K.I., Satardinova E.E., Pilkevich N.B., Pavlova L.A. Assessment of changes in muscle strength in elderly patients with signs of premature aging. Medical Bulletin of the South of Russia, 2019, No. 10 (1), pp. 59-64. [in Russian]

10. Paikova A.S., Ushakova S.E. The prevalence of senile asthenia and mobility disorders in older age groups. Bulletin of the Ivanovo Medical Academy, 2019, Vol. 24, No. 3, pp. 37-40. [in Russian]

11. Savchenkov M.F., Sosedova L.M. Healthy lifestyle as a factor of active longevity and safe life // XXI century. Technosphere safety, 2016. Vol. 1. No. 2. P. 95–105. [in Russian]

12. Chupryaev I.K., Ponomareva S.D., Yasakova A.V., Frolova E.V. Physical activity as a factor influencing cognitive impairments// Russian family doctor. – 2020. – T. 24. – № 1. – S. 45–51. [in Russian]

13. Shilko V.G., Guseva N.L., Kolpashnikova V.S. Physical activity as a means of increasing the duration and quality of life of older people. Theory and practice of physical culture, 2020, No. 11, pp. 71-73. [in Russian]

14. Akhmedova D.M.; Usmankhodjaeva A.A., Sharipov U.A. Assessment of the level of compliance of women of uzbekistan with a heal thy lifestyle // Central Asian Journal of Medicine: Vol. 2021: Iss. 4, Article 5.

15. Alkadhi KA. Exercise as a positive modulator of brain function. Mol Neurobiol. 2018;55(4):3112-3130.

16. Ekelund U, Tarp J, Steene-Johannessen J, et al. Dose-response associations between accelerometry measured physical activity and sedentary time and all cause mortality: systematic review and harmonised meta-analysis. BMJ. 2019; 366:l4570. https://doi.org/10.1136/bmj.l4570

17. Füzéki E, Vogt L, Banzer W. German National Physical Activity Recommendations for Adults and Older Adults: Methods, Database and Rationale. Gesundheitswesen. March 2017; 79(S01): S20-28

18. Mendonca GV, Pezarat-Correia P, Vaz JR, Silva L, Almeida ID, Heffernan KS. Impact of Exercise Training on Physiological Measures of Physical Fitness in the Elderly. Curr Aging Sci. 2016;9(4): S. 240-259

19. Tarumi'T, Zhang RJ. Cerebral blood flow in normal aging adults: cardiovascular determinants, clinical implications, and aerobic fitness. J Neurochem. 2018; 144(5): 595-608.

20. World Health Organization. Global recommendations on physical activity for health. Guidelines approved by the guidelines review committee. Geneva: WHO; 2010.

21. Abdullaeva U.K., Sobirova G.N., Karimov M.M., Aslonova I.J. The prevalence and possibilities of prevention of noncardial gastric cancer in the Bukhara region // American journal of medicine and medical sciences, 2020, 10(9), P. 679-681.

22. Sobirova G.N., Abdullaeva U.K., Nosirova M.S., Aslonova I.J. Evaluation of the gastrointestinal mucosa by the OLGA system in chronic atrophic gastritis // Journal of critical reviews, Kuala Lumpur, Malaysia, Vol. 7, Iss. 2, 2020, P. 409-413.

23. Karimov M.M., Sobirova G.N., Abdullaeva U.K., Aslonova I.Zh., Tulyaganova F.M. Possibilities of serological diagnosis of atrophic processes of the gastric mucosa // European Journal of Molecular & Clinical Medicine Vol. 7, Iss. 11, 2020, P. 2955-2960.