ARTÍCULO DE INVESTIGACIÓN

Relación entre los recursos personales y los indicadores de la edad biopsicológica en la región del Cáucaso de Rusia*
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Resumen

El artículo informa sobre un estudio experimental de la relación entre la edad biopsicológica y los recursos personales. El estudio utiliza las variables de edad biológica, cronológica y psicológica, junto con el índice de envejecimiento biológico relativo (BA-EBA), el índice de envejecimiento psicológico relativo (PA-CA), la evaluación de la edad psicológica subjetiva, un cuestionario de trayectoria de vida y un cuestionario de recursos. Los resultados de la investigación demuestran que, en mujeres jóvenes de 25 a 35 años, el recurso de la comunicación reduce el índice PA-CA. Se encuentra un impacto positivo del deporte en la salud fisiológica entre las mujeres de 36 a 55 años, a pesar de que lo practican menos a medida que envejecen. Las mujeres entre 56 y 71 años se vuelven menos propensas a conductas de riesgo con la edad, lo que explica su mayor edad psicológica. En la muestra de hombres de 36 a 60 años, se destaca que los recursos de organización de la vida, amabilidad, cuidado, determinación, vigor y necesidad de logro reducen los indicadores de edad biológica. Al mismo tiempo, el ejercicio deportivo ayuda a disminuir los indicadores de envejecimiento biológico y psicológico y contribuye al antienvejecimiento en los hombres de esta franja de edad. Así, el estudio muestra que en cada período de edad, mujeres y hombres difieren en el uso de los recursos vitales, lo que incide en la disminución o aumento de la edad biopsicológica.

Palabras clave: edad biológica, edad psicológica, procesos de envejecimiento, antienvejecimiento, áreas de recursos, recursos personales, organización de la trayectoria vital.

Abstract

Relationship between personal resources and indicators of biopsychological age in the Caucasus region of Russia

The paper reports on an experimental study of the relationship between biopsychological age and personal resources. The study uses the variables of biological, chronological, and psychological age, along with the relative biological aging index (BA-EBA), the relative psychological aging index (PA-CA), assessment of subjective psychological age, a life path questionnaire, and a resource questionnaire. Research results demonstrate

that in young women aged 25-35, the resource of communication lowers the PA-CA index. A positive impact of sports on physiological health is found among women aged 36-55 despite the fact that they engage in it less as they get older. Women aged between 56 and 71 become less prone to risky behavior with age, which explains their higher psychological age. In the sample of 36-60-year-old men, it is notable that the resources of life organization, kindness, care, determination, vigor, and the need for achievement reduce the indicators of biological age. At the same time, sports exercise helps to lower the indicators of biological and psychological aging and contributes to anti-aging in men of this age group. Thus, the study shows that in each age period, women and men differ in their use of life resources, which affects the decrease or increase in biopsychological age.

Keywords: biological age, psychological age, aging processes, anti-aging, resource areas, personal resources, life path organization.

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1.- Introduction

In recent years, the problem of preserving and improving health, as well as increasing life expectancy, has become more acute. The relevance of this issue stems from the need to preserve the ability to work and health indicators in people of middle and mature age.

The outlined problem is actively investigated. New measures are being taken to improve the quality of life. Special research is being conducted to improve people's health and life expectancy. Yet the fast pace of life, constant pressure, high levels of stress, deterioration of the socio-environmental sphere, and constant changes (e.g., pandemics, self-isolation, etc.) adversely affect human health (Rybtsova et al., 2020; Zinatullina et al., 2021).

For these reasons, of great importance for preserving and improving people's health and life expectancy are their individual resources and personal strategies.

Factors influencing and contributing to health outcomes are now investigated by many scientists, who report positive dynamics in the form of a lower aging index and improving health indicators with the proper use of personal resources. The current study addresses the issues of biopsychological age and the effect of personal resources on it.

Considering the concept of biopsychological age, we should note that it is comprised of the indicators of biological and psychological age and indexes successively calculated on their basis. Researchers of biological age define it in different ways and use characteristic health indicators that differ between men and women (Furukawa et al., 1975). Specifically, biological age in women is estimated based on pulse blood pressure, body weight, static balancing on the left leg with eyes closed, and subjective health assessment. Men's biological age is calculated based on blood pressure, breath hold, static balancing on the left leg with eyes closed, and subjective health assessment. Health is assessed based on objective (physical) and subjective (self-assessment of health) indicators, which influence biological age.

Psychological age is a subjective parameter of the individual-personal characteristic that is assessed by the individual proceeding from their life experience, satisfaction, and self-realization.

Psychological and biological age may not align with one another and the real (chronological) age of the person. This inconsistency may come as a result of various factors. The presence of a mismatch between the psychological and calendar age is considered by many scientists as psychosomatic maladaptation.

In addition to biological and psychological age, the concepts of chronological (or calendar) age and social age exist, which are also significant parameters in studying individuals' health status. However, the most appropriate indicator for such research is biological age (Finkelstein, 2006).

Another important characteristic in research on human health and life expectancy is the relative aging index calculated using the formula BA-EBA (the difference between biological age and expected biological age) (Berezina, 2020a).

Above we listed the indicators of human health, the key among which is biological age defined by a number of physiological factors (Voitenko, 1982). Next in order of importance come the parameters of expected biological age used to calculate the relative aging index (BA-EBA) and psychological age (Berezina, 2020b).

At present, there is a wide array of research proving the impact of a plethora of different factors on people's health status and life expectancy. Most often studied are intellectual and creative characteristics, temperament and character traits, behavioral indicators, and the motivational sphere (Snowdon, 2008; Koteneva, 2020).

The factors affecting human health and life expectancy also include individuals' physical, genetic, and individual-personal characteristics and strategies (Robert et al., 2005; Morozova et al., 2015; Kim et al., 2017; Berezina et al., 2019; Berezina et al., 2020; Grande et al., 2020), the features of the personal organization of time and life path (Cutler & Lleras-Muney, 2010; Hampshire et al., 2021), psychological and emotional components, the presence of relationships, the environment, peculiarities of relationships with other people (Long et al., 2020), and more.

Factors affecting life expectancy and health status may act as both favorable and unfavorable depending on the individual and personal characteristics of the person.

There are studies demonstrating the positive health effects of work persistence (Shannahan et al., 2012), which can be an adverse factor in workaholism (Berezina et al., 2022). Similar results are reported for openness in communication (Cornwell et al., 2008) with constant active interaction with other people, an overabundance of which can lead to withdrawal, lack of stress tolerance, nervousness, etc. (Friedman & Rosenman, 1974; Friedman & Martin, 2012; Hampshire et al., 2021).

A recent study suggests three groups of factors affecting human life expectancy: heredity, the environment, and personal characteristics. "Heredity factors are the response rate programmed in the genes for individual life expectancy. Environmental factors are the level of medical care in the country, the economic and environmental well-being of society, the absence of wars, etc." (Berezina et al., 2022: 36).

In our study, of greatest interest is the personality factor, which emerges in the interaction of heredity and the environment. This process consists in the fact that certain genes inherent in a person help in the search for a certain environment for maximum success. In the context of the organization of healthy aging by the person, the person acts as an active individual capable of influencing the length of their life by prolonging it (Berezina & Mansurov, 2015; Berezina & Rybtsov, 2021).

The research objective of the conducted study is to explore the relationship between personal resources and biopsychological age indicators.

2. Materials and methods

The conducted analysis of modern literature indicates the existence of studies on the influence of various psychological and behavioral factors on health and life expectancy. For our research, we chose effective factors that are amenable to personal regulation (conscious training), the so-called resource areas that allow increasing the duration of a person's productive life.

Thus, we selected 13 resource areas that contribute to better health and higher life expectancy. They include the resource of sports, the resource of control, the creative resource, the intellectual resource, the resource of applied activities, the altruistic resource (kindness, caring), humor, the spiritual resource, the resource of risk, the resource of communication, the resource of "living nature", the resource of victory (determination, vigor, achievement), and the resource of optimism.

Relying on the theoretical investigation, we collected data demonstrating the impact of the large set of factors on biopsychological age. Peculiar effects on biopsychological age and life expectancy are produced by individual-personal characteristics, the so-called personal resources. Data on their impact on human health are quite contradictory. Controversial research findings may result from studying the influence of only one parameter on biopsychological age, while individual-personal factors act on health indicators comprehensively. These factors form a single individual-personal strategy that

facilitates positive or negative effects on life expectancy and health. In this light, the present work is devoted to the study of the relationship between personal resources and indicators of biopsychological age.

The methods employed in the research process include:

a. The method "Determination of Biological Age by V.P. Voitenko", including the questionnaire "Determination of Self-Assessment of Health" (DSAH) and formulas for calculating biological age (Voitenko, 1982).

b. The life path questionnaire showing the individual-typological characteristics: sex, age, profession, body type, emotionality, functional asymmetry, style of relationship with the world, and place of residence (Voitenko, 1982).

c. K.A. Abulkhanova and T.N. Berezina's method of self-assessment of psychological age (Abulkhanova & Berezina, 2001).

d. The "Resource Areas" questionnaire (Berezina, 2021).

e. Descriptive statistics methods.

f. Mathematical statistics methods (IBM SPSS Statistics 26).

Sample: 270 people between the ages of 25 and 71 living in the Caucasus region of Russia. The sample was subdivided into the groups of women (188 persons between the ages of 25 and 71) and men (82 persons between the ages of 25 and 71).

3. Results

The first stage of the study involved collecting data on the respondents' individual-typological characteristics, indicators of biological and psychological age and resource areas, the relative aging index, and the relative psychological aging index.

The next step of the study was correlation analysis to determine the relationship between various personal resources and health indicators.

Table 1
Correlation analysis of resource areas and biopsychological age in a sample of 25-35-year-old women

Women 25-35 years old	CA	BA	BA-EBA index	PA	PA-CA index
Creative activities (in the sphere of art)				.427*	.434*
Applied activities (handicrafts)	-.457*				

Risky behavior	-.458*	-.471*	-.405*	-.515**	
Communication				-.485*	-.763**

Note.
** – correlation significant at the confidence level p≤0.01.
* – correlation significant at the confidence level p≤0.05.
CA – chronological age.
BA – biological age.
BA-EBA index (biological age – expected biological age) – individual aging index.
PA – psychological age.
PA-CA index (psychological age – chronological age).

The results show that in 25-35-year-old women, chronological age has an inverse correlation with applied activities and risky behavior (p⩽0.05). Thus, women in this age group tend to engage in applied activities and risky behavior less often as they get older. A similar relationship is found between biological age and the aging index and risky behavior, both correlations being inverse (p⩽0.05). In this case, the women prone to risky actions are younger biologically and have lower values of the aging index. Psychological age also shows negative correlations with risky behavior (p⩽0.01) in addition to communication (p⩽0.05). In other words, the more often women between 25 and 35 years old take risks, the younger they are psychologically. Similar results are observed for the resource of communication: the more these women communicate, the lower their psychological age. Furthermore, psychological age demonstrates a direct correlation with creative activities in the sphere of art (p⩽0.05). These results suggest that as their psychological age increases, women in this age group tend to devote more time to creative activities. The relative psychological aging index is linked with creative activities in the arts (p⩽0.05) and has a strong negative correlation with the resource of communication (p⩽0.01). This implies that 25-35-year-old women who often engage in artistic activities feel older psychologically, while active communication, on the contrary, lowers the relative psychological aging index.

Table 2
Correlation analysis of resource areas and biopsychological age in a sample of 36-55-year-old women

Women 36-55 years old	CA	BA	BA-EBA index	PA	PA-CA index
Sports	-.337**	-.347**	-.211*		
Creative activities (in the sphere of art)		-.221*	-.310**		
Intellectual activities (in science and technology)		-.238*	-.211*		
Kindness, care					.238*
Spiritual practices and self-improvement	.194*			.229*	

Determination, vigor, achievement	-.207*			-.232*	

Note.
** – correlation significant at the confidence level p≤0.01.
* – correlation significant at the confidence level p≤0.05.
CA – chronological age.
BA – biological age.
BA-EBA index (biological age – expected biological age) – individual aging index.
PA – psychological age.
PA-CA index (psychological age – chronological age).

In the sample of women aged between 36 and 55, chronological age has a negative correlation with sports (p⩽0.01) and the resource of determination, vigor, and achievement (p⩽0.05). In addition, chronological age shows a direct association with spiritual practices and self-improvement activities (p⩽0.05). Thus, with age, women in this group do sports less often and become less goal-oriented and active, devoting more time to spiritual practices and self-improvement.

Biological age and the aging index are found to have inverse relationships with the resources of sports (p⩽0.01; p⩽0.05), creative activities (in the sphere of art) (p⩽0.05; p⩽0.01), and intellectual activities (in science and technology) (p⩽0.01; p⩽0.01). A significant negative correlation is noted between biological age and the resource of sports (p⩽0.01), as well as between the aging index and creative activities (p⩽0.01). Thus, engagement in sports in this group is associated with lower biological age, while the aging index is lower in women who devote their time to artistic and intellectual pursuits (science and technology).

Psychological age displays a direct correlation with spiritual practices and self-improvement activities (p⩽0.05) and a negative correlation with determination, vigor, and achievement (p⩽0.05). This suggests that more determined women have a lower psychological age, while spirituality and self-improvement are associated with greater psychological age.

The relative psychological aging index is found to be associated with kindness and care (p⩽0.05), meaning that kindness and care entail higher values of relative psychological aging.

Table 3
Correlation analysis of resource areas and biopsychological age in a sample of 56-71-year-old women

Women 56-71 years old	CA	BA	BA-EBA index	PA	PA-CA index
Risky behavior	-.389**			-.360**	
Communication		.282*	.320*		-.293*
Living nature	.269**				

Determination, vigor, achievement		.265*			

Note.
** – correlation significant at the confidence level p≤0.01.
* – correlation significant at the confidence level p≤0.05.
CA – chronological age.
BA – biological age.
BA-EBA index (biological age – expected biological age) – individual aging index.
PA – psychological age.
PA-CA index (psychological age – chronological age).

In the sample of women aged between 56 and 71, chronological age has a significant negative correlation with risky behavior (p≤0.01) and a direct correlation with the resource of "living nature" (p≤0.05). Thus, women in this age group are less inclined to risky behavior and spend more time in nature.

A direct relationship is observed between biological age and the biological aging index and the resource of communication (p≤0.05). Furthermore, biological age is associated with greater determination, vigor, and achievement (p≤0.05). This demonstrates that more determined and sociable women in this age group have higher biological age and that communication is associated with a higher aging index.

A negative correlation is found between psychological age and risky behavior (p≤0.01). The index of relative psychological aging, in turn, shows a negative correlation with the resource of communication (p≤0.05). Thus, women aged 56-71 less often choose to take risks at a higher psychological age. The psychological aging index is lower with active communication. Although communication is found to contribute to physical aging, from a psychological standpoint, it proves to be an anti-aging resource.

Table 4
Correlation analysis of resource areas and biopsychological age in a sample of 36-60-year-old men

Men 36-60 years old	CA	BA	BA-EBA index	PA	PA-CA index
Sports		-.697**	-.597**	-.445**	-.367*
Precision, order, and organization	-.488**	-.399**			
Intellectual activities (in science and technology)	-.317*	-.315*			
Applied activities (handicrafts)	-.431**				
Kindness, care	-.509**	-.415**		-.359*	
Spiritual practices and self-improvement	-.449**			-.354*	

Living nature	-.347*		.321*	-.312*	
Determination, vigor, achievement	-.666**	-.469**		-.337*	
Optimism		-.353*			

Note.
** – correlation significant at the confidence level p≤0.01.
* – correlation significant at the confidence level p≤0.05.
CA – chronological age.
BA – biological age.
BA-EBA index (biological age - expected biological age) – individual aging index.
PA – psychological age.
PA-CA index (psychological age – chronological age).

In the sample of men aged 36-60, inverse correlations are found between chronological age and precision, order, and organization, applied activities (handicrafts), kindness and care, spiritual practices and self-improvement, and determination, vigor, and achievement (p⩽0.01), as well as intellectual activities (in science and technology) and the resource of living nature (p⩽0.05). Thus, the findings suggest that 36-60-year-old men spend more time performing intellectual tasks and observing nature when they are younger. Furthermore, the lower their calendar age, the more they focus on precision, order, and organization, engage in applied activities, show kindness and care, get involved in self-improvement and spiritual practices, and demonstrate vigor and the desire to set and achieve goals.

Similar results are observed for biological age, which has significant negative correlations with sports, precision, order, and organization, kindness and care, determination, vigor, and achievement (p⩽0.01) and negative correlations with intellectual activities (in science and technology) and optimism (p⩽0.05). Thus, men who are more optimistic about life and spend more time on intellectual tasks are biologically younger. Sports are linked to lower biological age, same as the function of precision, order, and organization. Similar relationships are shown for the resources of kindness and care and determination, vigor, and achievement.

The index of biological aging is found to have a significant positive correlation with the resources of sports (p⩽0.01) and a positive correlation with "living nature" (p⩽0.05). Thus, in this age group of men, time spent in nature is linked with aging. This could be associated with professional work or directly with recreation in nature, which is individual for each person. Doing sports, in turn, is found to be an anti-aging factor for men.

Psychological age has a negative correlation with the resource of sports (p⩽0.01) and is inversely associated with kindness, care, spirituality, self-improvement, living nature, determination, vigor, and achievement (p⩽0.05). This implies that active, goal-oriented, kind, and caring men who engage in self-improvement and spiritual practices and spend more time in nature are psychologically younger, same as the men who do sports.

The relative psychological aging index shows a negative correlation with sports ($p \leqslant 0.05$), i.e. sport helps to lower the index of relative psychological aging and serves as an anti-aging resource.

Table 5

Correlation analysis of resource areas and biopsychological age in a sample of 61-71-year-old men

Men 61-71 years old	CA	BA	BA-EBA index	PA	PA-CA index
Sports	-.356*				
Humor		-.399*	-.368*	-.410*	-.346*

Note.
* – correlation significant at the confidence level $p \leq 0.05$.
CA – chronological age.
BA – biological age.
BA-EBA index (biological age – expected biological age) – individual aging index.
PA – psychological age.
PA-CA index (psychological age – chronological age).

Men in the 61 to 71 age group exhibit an inverse correlation between calendar age and sports resource ($p \leqslant 0.05$). In other words, men are less likely to exercise as they get older.

The resource of humor correlates inversely with biological age, the aging index, psychological age, and the relative psychological aging index ($p \leqslant 0.05$). This demonstrates that the resource of humor can reduce biological and psychological age and promote biological and psychological anti-aging in this group of men.

4. Conclusion

The conducted study on the interrelation of personal resources with the indicators of biopsychological age suggests that personal resources have their peculiarities in each age group of men and women.

With respect to 25-35-year-old women, it is notable that those of them that are prone to risks feel psychologically younger. Also interestingly, the more these women use the resources of communication, the lower their relative psychological aging index.

In women of the 36-55 age group, sports hobbies are found to have a favorable effect on health, reducing biological age. In this age group, it is also noted that artistic and creative activities can slow down the aging process.

Results on women aged between 56 and 71 suggest that they strive for more peaceful, risk-averse behavior, which can certainly be explained by the desire to devote more time to preserving and improving one's health at this age. The same can explain the more mature psychological age in the women less inclined to take risks.

With respect to the sample of 36-60-year-old men, of note is the following. The results suggest a lowering of activity in men in this group. Specifically, the older they get, the less they focus on spiritual and self-improvement practices and applied activities, and the lower their need for achievement. The resources of organizing one's life and showing kindness and care also show a decline with age.

Meanwhile, the obtained results show that the resources of organization, kindness, care, determination, vigor, and desire to set and achieve goals are the ones linked to lower biological age. Furthermore, engagement in sports reduces the indicators of men's biological and psychological age and promotes anti-aging in this age group.

Thus, the study demonstrates that each age group of men and women differs in the use of various life resources, which have drastically different effects on biological age. This gives reason to conclude that these differences need to be considered in research on the relationship between biopsychological age and personal resources.

Bibliographic references

- Abulkhanova, K. A., & Berezina, T. N. (2001). **Personality time and life time**. St. Petersburg: Aletheya.

- Berezina, T. N. (2020a). "Differences in individual life path choices affecting life expectancy and health in Russia". **E3S Web of Conferences**, 210, 17032. http://dx.doi.org/10.1051/e3sconf/202021017032

- Berezina, T. N. (2020b). "Distribution of biomarkers of aging in people with different personality types in Russia". **E3S Web of Conferences**, 210, 17028. http://dx.doi.org/10.1051/e3sconf/202021017028

- Berezina, T. N. (2021). Oprosnik resursnykh oblastei [Resource areas questionnaire]. In: Berezina, T. N. (Ed.) **Biopsikhologicheskii vozrast i zdorove professionalov: Perspektivy antistareniia** [Biopsychological age and the health of professionals: Perspectives on anti-aging]. Moscow: Zhukovsky Academy Publishing House.

- Berezina, T. N., Buzanov, K. E., Zinatullina, A. M., Kalaeva, A. A., & Melnik, V. P. (2019). "The expectation of retirement as a psychological stress that affects the biological age in the person of the Russian Federation". **Religación. Revista De Ciencias Sociales Y Humanidades**, 4 (18), 192–198.

- Berezina, T. N., & Mansurov, E. I. (2015). "Influence of stress factors on the life expectancy of pilot-cosmonauts". **Voprosy Psikhologii**, 3, 73-83.

- Berezina, T. N., & Rybtsov, S. A. (2021). "Acceleration of biological aging and underestimation of subjective age are risk factors for severe COVID-19". **Biomedicines**, 9 (8), 913. http://dx.doi.org/10.3390/biomedicines9080913

- Berezina, T. N., Rybtsova, N. N., & Rybtsov, S. A. (2020). "Comparative dynamics of individual ageing among the investigative type of professionals living in Russia and Russian migrants to the EU countries". **European Journal of Investigation in Health, Psychology and Education**, 10 (3), 749–762. http://dx.doi.org/10.3390/ejihpe10030055

- Berezina, T. N., Temirkanova, A., Litvinova, A. V., & Kokurin, A. V. (2022). "Using virtual reality techniques to alleviate cognitive fatigue in graduate students working while in college". **European Journal of Contemporary Education**, 11 (1), 36-46. http://dx.doi.org/10.13187/ejced.2022.1.36

- Cornwell, B., Laumann, E. O., & Schumm, L. P. (2008). "The social connectedness of older adults: A national profile". **American Sociological Review**, 73 (2), 185–203. http://dx.doi.org/10.1177/000312240807300201

- Cutler, D., & Lleras-Muney, A. (2010). "Understanding differences in health behaviors by education". **Journal of Health Economics**, 29 (1), 1–28. https://doi.org/10.1016/j.jhealeco.2009.10.003

- Finkelstein, M. A. (2006). "Dispositional predictors of organizational citizenship behavior: Motives, motive fulfillment, and role identity". **Social Behavior and Personality: An International Journal**, 34 (6), 603-316. https://doi.org/10.2224/SBP.2006.34.6.603

- Friedman, H. S., & Martin, L. R. (2012). **The longevity project: Surprising discoveries for health and long life from the landmark. Eight-decade study**. Plume Books, pp. 272.

- Friedman, M., & Rosenman, R. (1974). **Type A behavior and your heart**. New York: Knopf, pp. 276.

- Furukawa, T., Inoue, M., Kajiya, F., Inada, H., Takasugi, S., Fukui, S., Takeda, H., & Abe, H. (1975). "Assessment of biological age by multiple regression analysis". **Journal of Gerontology**, 30 (4), 422-434. https://doi.org/10.1093/geronj/30.4.422

- Grande, A. J., Keogh, J., Silva, V., Scott, A. M. (2020). "Exercise versus no exercise for the occurrence, severity, and duration of acute respiratory

infections". **Cochrane Database of Systematic Reviews**, 4, CD010596. http://dx.doi.org/10.1002/14651858.cd010596.pub3

- Hampshire, A., Trender, W., Chamberlain, S. R., Jolly, A. E., Grant, J. E., Patrick, F., Mazibuko, N., Williams, S. C. R., Barnby, J. M., Hellyer, P., & Mehta, M. A. (2021). "Cognitive deficits in people who have recovered from COVID-19". **EClinicalMedicine**, 39, 101044. http://dx.doi.org/10.1016/j.eclinm.2021.101044

- Kim, E. S., Hagan, K. A., Grodstein, F., DeMeo, D. L., De Vivo, I., & Kubzansky, L. D. (2017). "Optimism and cause-specific mortality: a prospective cohort study". **American Journal of Epidemiology**, 185 (1), 21–29. https://doi.org/10.1093/aje/kww182

- Koteneva, A. V. (2020). "Psychological factors of biopsychological age of law enforcement personnel". **Agathos**, 11 (2(21)), 221-231.

- Long, B., Brady, W. J., Koyfman, A., & Gottlieb, M. (2020). "Cardiovascular complications in COVID-19". **The American Journal of Emergency Medicine**, 38 (7), 1504-1507. http://dx.doi.org/10.1016/j.ajem.2020.04.048

- Morozova, E. V., Shmeleva, S. V., Sorokoumova, E. A., Nikishina, V. B., & Abdalina, L. V. (2015). "Acceptance of disability: Determinants of overcoming social frustration". **Global Journal of Health Science**, 7 (3), 317–323. https://doi.org/10.5539/gjhs.v7n3p317

- Robert, M., Kenneth, E., & Veith, R. C. (2005). "Depression, the autounomic nervous system, and coronary heart disease". **Psychosomatic Medicine**, 67 (Suppl. 1), 29–33. https://doi.org/10.1097/01.psy.0000162254.61556.d5

- Rybtsova, N. N., Berezina, T. N., Kagansky, A. M., & Rybtsov, S. A. (2020). "Can blood-circulating factors unveil and delay your biological aging?" **Biomedicines**, 8 (12), 615. http://dx.doi.org/10.3390/biomedicines8120615

- Shannahan, M. J., Hill, P., Roberts, B. W., & Eccles, J. (2012). **Conscientiousness and health across the life course: A critical review and new hypotheses**. Paper presented at The Working Group on Conscientiousness and Healthy Aging.

- Snowdon, D. (2008). **Aging with grace: What the nun study teaches us about leading longer, healthier, and more meaningful lives**. Random House Publishing Group, pp. 256.

- Voitenko, V. P. (1982). Biological age. In: Chebotarev, D. F., Frolkis, V. V. (Eds.) **Physiological mechanisms of aging** (pp. 144–156). Nauka: Moscow.

- Zinatullina, A. M., Melnik, V. P., & Zimina, A. A. (2021). "Personal factors of biological aging in working and non-working respondents in late maturity period". **International Journal of Health Sciences,** 5 (3), 639–648. http://dx.doi.org/10.53730/ijhs.v5n3.2790