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Research Article

Nutritional Correction of Cognitive Impairment in Patients with Signs of Premature Aging

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ABSTRACT.
This paper deals with the questions of cognitive impairment in patients with signs of premature aging. Within the framework of this paper, it is shown that patients with a "negative" variant of the biological age have lower cognitive abilities than those with a "positive" variant of biological age. It is determined that nutritional support in patients with a "negative" variant of biological age ensures almost the same scores in the evaluation of cognitive functions, as in patients with a "positive" version of biological age. The materials of this paper confirm that the use of nutritional support in women with pre-climacteric or climacteric syndrome and in men with age-related androgen deficiency increases the level of cognitive abilities.

Keywords: elderly and senile age, nutritional support, climacteric syndrome, age-related androgen deficiency, cognitive impairment, geriatric syndromes.

Relevance of the problem.

In recent years, the literature has widely discussed the processes of premature aging and the ways of their correction through preventive geriatric measures [1,2]. This is due to the complex nature of this condition, which develops against the background of polymorbidity in patients predominantly of middle age, which subsequently, in the older age groups, worsens significantly both the clinical status and the quality of life [1,3,4].

The main geriatric syndromes associated with the state of premature aging are: sarcopenia (age-related decrease in muscle mass and strength), malnutrition (deficiency in nutrition and weight loss), cognitive disorders, hypomobility syndrome (restricted movements), sleep disturbance syndrome etc. [1, 2]. Important means of targeting physical development and preventing premature aging are ndrug-free prevention methods, which include physical training and nutrition [3,5,6,7]. Unfortunately, there is a lack of studies of the development and implementation of prevention programs in geriatric practice, especially with regard to nutritional support, namely the use of functional nutrition, for patients with signs of premature aging. The available scientific data concerning other age categories show that functional nutrition and physical training are an effective preventive remedy for diseases, in particular, menopausal syndrome in women and age-related androgen deficiency in men [1,7,8,9].

The lack of evidence-based research in the development of preventive programs for nutritional support and motor training for the

prevention of the development of major geriatric syndromes, which have important preventive value, determined the relevance and tasks of this thesis research.

Objective of the research. To study cognitive disorders in patients with signs of premature aging, find the ways of correction with nutritional support.

Materials and Methods.

The study involved total 1080 people. Patients included in the study were determined their biological age - its "positive" and "negative" variants. "Negative" variant of biological age indicates signs of premature aging. Patients with a "normal" variant of biological age were not included in the study. The groups were selected homogeneously for 5 years to objectify the research data.

We distributed all patients under study as follows:

- 540 women, 270 of them were from 44 to 54 years (mean age 49.1+2.2 years) with hormonal disorders in the form of a premenopausal or climacteric syndrome, 150 of them with a "negative" version of biological age, 120 people with a "positive" variant of biological age, and 270 women from 55 to 64 years old (mean age 57.2+2.4 years) with hormonal disorders in the form of premenopausal or menopausal syndrome, 150 of them with a "negative" version of biological age and 120 women with a "positive" variant of biological age.
- 540 men, 270 of them were from 44 to 54 years (mean age 51.1+2.3 years) with hormonal disorders in the form of age-related androgen deficiency, 150 of them with a "negative" version of biological age, 120 people with a "positive" variant of biological age, and 270 men from 55 to 64 years old (mean age 59.2+2.4 years) with hormonal disorders in the form of age-related androgen deficiency, 150 of them with a "negative" version of biological age and 120 with a "positive" variant of biological age.

All patients, depending on the proposed variant of nutritional support and physical activity, were divided into three groups:

group 1 (control): patients received standard recommendations from a doctor without recommendations on nutritional support and physical activity;

group 2: in addition to the standard recommendations, patients attended aerobic training classes in the form of Nordic walking with a twice-weekly training schedule for 60 minutes under the guidance of the instructor and daily walks lasting at least 30 minutes, without correction of the nutritional status;

group 3: in addition to the standard recommendations, patients attended aerobic training classes in the form of Nordic walking with a twice-weekly training schedule for 60 minutes under the guidance of the instructor and daily walks lasting at least 30 minutes, without correction of the nutritional status + nutritional support in the form of Nutridrink Compact Protein 1 portion 3 times a day + Resurs Faiber 1 portion 3 times a day.

Each group included 90 women from 45 to 54 years with hormonal disorders in the form of a premenopausal or climacteric syndrome, 50 of them with a “positive" variant of biological age, 40 people with a “negative" variant of biological age, and 90 women from 55 to 64 years with hormonal disorders in the form of premenopausal or menopausal syndrome, 50 of them with a "negative" version of biological age and 40 women with a "positive" variant of biological age; and 90 men in each group, 40 of them from 45 to 54 years with hormonal disorders in the form of age-related androgen deficiency, 50 of them with a "negative" variant of biological age, 40 people with a "positive" variant of biological age, and 90 men from 55 to 64 years with hormonal disorders in the form of age-related androgen deficiency, 50 of them with a "negative" version of biological age and 40 with a "positive" variant of biological age.

The duration of the follow-up was 3 months. To evaluate cognitive functions, the Russian version of the MMSE (Mini Mental State Examination) scale was used [10].

At the heart of statistical methods of data processing was the method of statistical registers with dynamic randomization according to the characteristics studied. At the same time, the thesis involved the processing of the research data, calculation of mean absolute and relative

values and the mean error; the significance of the differences between the two populations was estimated using the Student's t test (the difference in the indices was considered reliable at t>2, p<0.05).

RESULTS AND DISCUSSION.

One of the objectives of the study was to evaluate the effectiveness of various dietary regimens and physical training by determining cognitive functions in patients with hormonal imbalance and signs of premature aging. The results are shown in Table 1.

Thus, women of group 1 aged 45 to 54 years with a "positive" version of biological age had 34.3 + 0.6 points when assessing cognitive functions, in group 2 - 38.0 + 2.1 points, p <0.05 with significant differences between the index of the first and second groups; in group 3 - 43.8+1.2 points, p <0.05 significant differences between the index of the second and third groups; p <0.05 significant differences between the index of the first and third groups. Thus, the group actively adhering to nutritional support and physical activity had a reliable maximum score for cognitive functions.

Thus, women of group 1 aged 45 to 54 years with a “negative" version of biological age had 28.1+0.8 points when assessing cognitive functions, in group 2 - 31.3+1.2 points, p <0.05 with insignificant differences between the index of the first and second groups; in group 3 - 42.0+1.1 points, p <0.05 significant differences between the index of the second and third groups; p <0.05 significant differences between the index of the first and third groups.

Patients with a "negative" version of biological age have lower cognitive performance than patients with a "positive" version of biological age. Thus, the group actively adhering to nutritional support and physical activity had a reliable maximum score for cognitive functions. However, it should be noted that nutritional support in patients with a "negative" variant of biological age ensures almost the same scores in the evaluation of cognitive functions, as in patients with a "positive" version of biological age, which confirms the fact that nutritional support can increase the level of cognitive abilities.

Table 1: Cognitive function assessment according to the "Mini Mental State Examination" survey of women with premenopausal or climacteric syndrome and signs of premature aging (in points)

Group	Women of 45 to 54 years (n=90)		Women of 55 to 64 years (n=90)	
	“+” variant BC (n=40)	“-” variant BC (n=50)	“+” variant BC (n=40)	“-” variant BC (n=50)
1	34.3+0.6	28.1+0.8*	30.1+0.8	25.1+0.8*
2	$38.0+2.1^{1-2}$	$31.3+1.2^{*}$	$37.3+1.2^{1-2}$	$28.4+1.2^{*}$
3	$43.8+1.2^{1-3,2-3}$	$42.0+1.1^{1-3,2-3}$	$39.9+1.2^{**,1-3}$	$37.8+1.2\ ***,^{1-3,2-3}$

*p<0.05 in comparison with the indicator "+" variant BC of the same age;

**p<0.05 in comparison with the indicator "+" variant BC of other age group;

***p<0.05 in comparison with the indicator “-" variant BC of other age group;

$^{1-2}$p<0.05 significant differences between the indicator of group 1 and 2;

$^{2-3}$p<0.05 significant differences between the indicator of group 2 and 3;

$^{1-3}$p<0.05 significant differences between the indicator of group 1 and 3;

Women of group 1 aged 55 to 64 years with a “positive" version of biological age had 30.1+0.8 points when assessing cognitive functions, in group 2 - 37.3+1.2 points, p<0.05 significant differences between the indicator of the first and second groups; in group 3 - 39.9+1.2 points, p<0.05 significant differences between the index of the second and third groups; p<0.05 significant differences between the index of the first and third groups. Thus, the group actively adhering to nutritional support and physical activity had a reliable maximum score for cognitive functions. Patients of this age group had all parameters lower than patients aged 45 to 54 years, which is due to age-related decrease in cognitive abilities.

Thus, women of group 1 aged 55 to 64 years with a “negative" version of biological age had

25.1+0.8 points when assessing cognitive functions, p<0.05 in comparison with the indicator “+” variant BC of the same age; in group 2 - 28.4+1.2 points, p <0.05 with insignificant differences between the indicator of the first and second groups, p<0.05 in comparison with the indicator “+” variant BC of the same age; in group 3 - 37.8+1.2 points, p <0.05 significant differences between the indicator of the first and third groups, p<0.05 in comparison with the indicator “-” variant BC of other age group.

Thus, the group actively adhering to nutritional support and physical activity had a reliable maximum score for cognitive functions. Patients of this age group had all parameters lower than patients aged 45 to 54 years, which is due to age-related decrease in cognitive abilities. It should be noted that nutritional support in patients with a "negative" variant of biological age ensures almost the same scores in the evaluation of cognitive functions, as in patients with a "positive" version of biological age.

Men were found to have similar patterns as women (Table 2).

Men of group 1 aged 45 to 54 years with a “positive" version of biological age had 33.3+0.6 points when assessing cognitive functions, in group 2 - 38.2+2.1 points, p<0.05 significant differences between the indicator of the first and second groups; in group 3 - 44.8+1.2 points, p<0.05 significant differences between the index of the second and third groups; p<0.05 significant differences between the index of the first and third groups. Thus, the group actively adhering to nutritional support and physical activity had a reliable maximum score for cognitive functions.

Thus, women of group 1 aged 45 to 54 years with a “negative" version of biological age had 28.2+0.8 points when assessing cognitive functions, in group 2 - 32.1+1.2 points, p <0.05 with insignificant differences between the index of the first and second groups; in group 3 - 43.5+1.1 points, p <0.05 significant differences between the index of the second and third groups; p <0.05 significant differences between the index of the first and third groups.

Patients with a "negative" version of biological age have lower cognitive performance than patients with a "positive" version of biological age. Thus, the group actively adhering to nutritional support and physical activity had a reliable maximum score for cognitive functions. However, it should be noted that nutritional support in patients with a "negative" variant of biological age ensures almost the same scores in the evaluation of cognitive functions, as in patients with a "positive" version of biological age, which confirms the fact that nutritional support can increase the level of cognitive abilities.

Table 2: Cognitive function assessment according to the "Mini Mental State Examination" survey of men with age-related androgen deficiency and signs of premature aging (in points)

Group	Men of 45 to 54 years (n=90)		Men of 55 to 64 years (n=90)	
	“+” variant BC (n=40)	“-” variant BC (n=50)	“+” variant BC (n=40)	“-” variant BC (n=50)
1	33.3+0.6	28.2+0.8*	31.2+0.8	26.2+0.8*
2	38.2+2.1$^{1-2}$	32.1+1.2*	38.3+1.2$^{1-2}$	29.4+1.2*
3	44.8+1.2$^{1-3,2-3}$	43.5+1.1$^{1-3,2-3}$	39.9+1.2$^{**,1-3}$	39.8+1.2 ***,$^{1-3,2-3}$

*p<0.05 in comparison with the indicator "+" variant BC of the same age;
**p<0.05 in comparison with the indicator "+" variant BC of other age group;
***p<0.05 in comparison with the indicator “-" variant BC of other age group;
$^{1-2}$p<0.05 significant differences between the indicator of group 1 and 2;
$^{2-3}$p<0.05 significant differences between the indicator of group 2 and 3;
$^{1-3}$p<0.05 significant differences between the indicator of group 1 and 3;

Men of group 1 aged 55 to 64 years with a “positive" version of biological age had 31.2+0.8 points when assessing cognitive functions, in group 2 - 38.3+1.2 points, p<0.05 significant differences between the indicator of the first and second groups; in group 3 - 39.9+1.2 points, p<0.05 significant differences between the index of the second and third

groups; p<0.05 significant differences between the index of the first and third groups. Thus, the group actively adhering to nutritional support and physical activity had a reliable maximum score for cognitive functions. Patients of this age group had all parameters lower than patients aged 45 to 54 years, which is due to age-related decrease in cognitive abilities.

Men of group 1 aged 55 to 64 years with a “negative" version of biological age had 26.2+0.8 points when assessing cognitive functions, p<0.05 in comparison with the indicator “+” variant BC of the same age; in group 2 - 29.4+1.2 points, p <0.05 with insignificant differences between the indicator of the first and second groups, p<0.05 in comparison with the indicator “+” variant BC of the same age; in group 3 - 39.8+1.2 points, p <0.05 significant differences between the indicator of the first and third groups, p<0.05 in comparison with the indicator “-” variant BC of other age group.

Thus, men with hormonal imbalance were found to have the same features of reduction and recovery of cognitive abilities as women. Patients with a "negative" version of biological age have lower cognitive performance than patients with a "positive" version of biological age. Thus, the group actively adhering to nutritional support and physical activity had a reliable maximum score for cognitive functions. However, it should be noted that nutritional support in patients with a "negative" variant of biological age ensures almost the same scores in the evaluation of cognitive functions, as in patients with a "positive" version of biological age, which confirms the fact that nutritional support can increase the level of cognitive abilities.

Thus, in order to prevent the development of cognitive impairment in women with pre-menopausal and menopausal syndrome and a "negative" variant of biological age, and in men with age-related androgen deficiency and a "negative" variant of biological age, it is expedient and reliably effective to adhere to nutritional support programs and sufficient physical activity.

SUMMARY

1. The group actively adhering to nutritional support and physical activity had a reliable maximum score for cognitive functions.
2. Patients with a "negative" variant of biological age achieve almost the same scores in the evaluation of cognitive functions, as in patients with a "positive" version of biological age.
3. The use of nutritional support in patients with signs of premature aging increases the level of their cognitive abilities.

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