

## **Modifiable risk factors for premature aging.**

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### **Abstract**

**In the present stage of knowledge and scientific development, the role played by a wide cluster of factors in accelerated ageing has been proved. Furthermore, it is possible to modify most of them.**

**Aim:** The aim of this study is the research and analysis of the major modifiable risk factors for premature ageing.

**Materials and methods:** A direct individual anonymous survey of 340 elderly and old people (65 and over) has been conducted.

**Results and discussion:** The analysis of the social status and health condition as a self-assessment of the respondents proves polymorbidity greatly provoked, most often by the social environment risk factors. The relative share of cardiovascular and cerebrovascular diseases is the highest. The elderly suffer from two, three and even more diseases and conditions. It is necessary to develop guidelines for the prevention of accelerated ageing on the basis of complete and accurate information on the risk factors.

**Conclusion:** The analysis of the behavioural risk factors shows the presence of elements of objective health risks. A substantial part of the identified risk factors are subject to modification, and even to prevention provided prompt modern and efficient prophylactic actions are taken.

**Keywords:** Risk factors, Premature/accelerated ageing.

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### **Introduction**

Modern preventive gerontology is faced with global strategic tasks related to the prophylaxis of premature ageing and increasing life expectancy while maintaining an active lifestyle on the part of the elderly.

Ageing is a process nature has irreversibly programmed us all with. A dominant trend in the modern world is demographic ageing, the dimensions of which are on a global scale. Ageing is unavoidable and natural phenomenon of life that everyone experiences as he or she advances in age. In recent years, however, a number of studies provide conclusive evidence that ageing, in most cases, begins prematurely.

In the majority of the cases (85-90%), accelerated type of ageing (premature ageing) is observed. The term 'premature ageing' is used to describe any partial or more accelerated rate of ageing, resulting in a certain individual ageing faster than average for his/her age group [1].

According to Grigorov [2], accelerated ageing is characterized by the premature development of age-related changes or with those changes being more expressed in one period of a person's life or another.

The key problem is to identify the mechanisms of ageing, with a focus on the causes of premature ageing and its prevention. The risk factors that are considered significant for the onset and progress of accelerated ageing are illustrated in Figure 1.

The term "risk factor" is to be understood as the range of factors increasing the likelihood of and contributing to premature ageing through the development of certain diseases, especially in the presence of several factors. The identification of those factors and their timely elimination facilitate physiological ageing.

The main areas on which efforts to prevent accelerated ageing should be focused are: influencing the risk factors; increasing the income of the population; improving social protection and medical services; promoting a healthy way of life including an active exercise routine, a balanced diet and eradicating bad habits, a good work and rest balance; early diagnostics, prophylaxis and adequate treatment of diseases [3].

The aim of this study is to research and analyze the major modifiable factors for premature ageing.

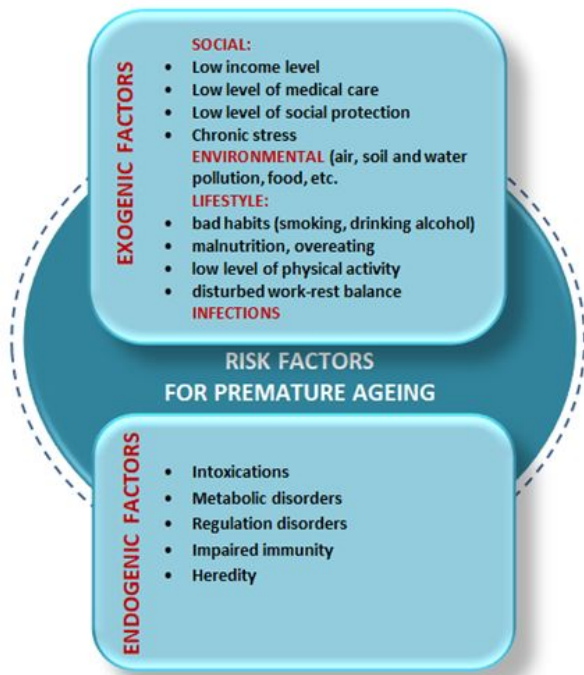


Figure 1. Risk factors for premature ageing.

## Materials and Methods

A direct individual anonymous survey of 340 elderly and old people (aged 65 and over) has been conducted.

### Applied methods

**Descriptive statistics using quantitatively measurable values:** The results are presented as mean (Mean), standard deviation (Std. Deviation) and standard error of the mean (Std. Error Mean).

**Dispersion analysis (one way ANOVA):** Alternative analysis has been applied to processing quality indicators, and the result is presented with a relative share; A non-parametric analysis – Pearson’s correlation criterion ( $\chi^2$ -x<sup>th</sup> square) in testing hypotheses for a statistically significant correlation between the investigated factorial and resultative indicators; Spearman correlation analysis – for the purpose of assessing the degree of dependence between the researched indicators; graphic analysis – for the purpose of illustrating processes, phenomena and certain regularities and dependencies; For the level of significance of the zero hypothesis, it is assumed that  $P < 0.05$ .

## Observations and Results

The analysis of the social-demographic characteristics of the respondents showed the greatest relative share of the surveyed in the 60-70 age group – 50.6%, followed by that of 71-80 year-olds – 43.5%, and the 81+ group -5.9%. The distribution by sex was as follows: 58.2% were women, and 41.8% were men. According to our findings, the share of those living in the city (62.4%) is greater than that of the elderly living in the country (37.6%). In terms of marital status, the group of the

married ones is the biggest – at 53.8%, followed by that of the single one (widows and widowers) – 30.9%. The results of the survey show a definite ‘feminisation’ of old age – the widows outnumber the widowers.

A direct connection between the development of diseases and premature ageing has been established. When the ageing processes develop, both normally and pathologically, the adaptive and compensation capabilities of the organism deteriorate. This facilitates the development of a series of diseases [4].

Our survey shows that 44.1% of the respondents have been diagnosed with circulatory disorders, followed by diseases of the respiratory system (25.6%), of the bones and muscles (24.1%), of the nervous system (19.7%), of the endocrine system (16.5%), of the gastrointestinal tract (10.6%), of the urogenital tract (9.4%) etc. Pathology in this age range is characterized by multiplicity. In this line of thoughts, only 27.7% of the surveyed have been diagnosed with only one disease, and 49% have been diagnosed with two or three diseases and conditions.

The analysis of the results of the survey shows that on average, women suffer from a greater number of diseases  $P=0.046$  ( $u=2.003$ ). Women suffer from three diseases more often than men (33.4%), and the percentage of men not suffering from any diseases is greater (21.1%)  $P=0.036$  ( $\chi^2=15.00$ ). As regards ‘place of residence’, it has been established that city dwellers suffer from a greater number of diseases on average  $P=0.011$  ( $u=2.56$ ) and they also develop chronic diseases more often  $P=0.002$  ( $\chi^2=13.00$ ).

The link between obesity and health has been emphasized numerous times. Obesity is also considered as the result of unhealthy eating habits (excessive intake of calories, highly processed foods, and excessive consumption of fat, sugar and salt), and inadequate physical activity. In the past decades, obesity has been discussed as an epidemic in almost all developed countries (and in many of the developing one) more than ever. The elderly are especially susceptible to excessive weight, which in turn triggers the onset of many serious health problems. In cases of obesity, the likelihood of developing cardiovascular diseases, diabetes, some types of cancer, problems of the bones and muscles, etc., increases exponentially. The Body Mass Index (BMI) is used for the assessment of the incidence of excessive weight, obesity and the pertaining risks within the population.

48.2% of the men and 44.2% of the women are overweight. The results of 14% of the women and 8.9% of the men with obesity, categories 1 and 2, cause concern, as the risk of developing diseases is high (Table 1).

Table 1. Body mass index by sex.

| Classification                       | Men   | Women |
|--------------------------------------|-------|-------|
| Underweight (BMI <18.5)              | 1.8%  | 2.3%  |
| Within normal limits (BMI 18.5-24.9) | 41.1% | 39.5% |

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|   |       |       |
|---|-------|-------|
| Overweight (BMI 25.0-29.9)              | 48.2% | 44.2% |
| Obesity, categories 1 and 2 (BMI >30.0) | 8.9%  | 14%   |
| Total                                   | 100%  | 100%  |

Obesity is the main risk factor for diabetes, described in detail in the sources of reference [5-7]. Overweight elderly people run a higher risk of hypertension, brain stroke, ischemic heart disease, diseases of the joints (osteoarthritis and gout), and some types of cancer.

A large-scale analysis of over five million people proved that higher BMI is a risk factor for the development of the ten most significant malignancies, among which the leading ones are – cancer of the uterus, the kidneys, the bladder, the liver, the colon, the mammary gland, etc. [8].

According to data provided by WHO, insufficient physical activity ranks fourth among the risk factors for premature death and morbidity on a global scale [9].

In the elderly and the old, hypokinesia has an especially negative impact on the functional status of various organs and systems. As one progresses in age, he/she is more likely to get into a vicious circle, since ageing limits muscular activity, and age-related hypokinesia is a prerequisite for accelerated ageing.

The data from the survey on the self-assessment of the physical activity show that moderate activity prevails among the majority of the respondents – 63.8%, but the fact that 26.8% of the surveyed describe their physical activity as low, is quite alarming. Nowadays, the advance of technology inspires a significant imbalance and a sharp decrease in physical activity among the population. In the past 60-70 years, living conditions have changed dramatically – in our daily life, we all use a range of labor-saving devices, appliances and equipment that significantly reduce personal physical strain. As people progress in age, there are numerous factors hampering active

physical exercise. Involutive processes, atrophy and frequent polymorbidity have a negative effect on the way of life and everyday habits of elderly people. The very stage in life connected with retirement, entailing the end of active employment and significant narrowing of the social circle, should not be underestimated. In the cases of many elderly people, this stage is characterized by decreased activity and its limitation to routine everyday activities – shopping and doing housework.

The distinctive for elderly people polymorbidity can lead also to other consequences. The presence of several diagnoses or pathologies is combined with the aging process. The combination of many diseases and aging can deepen the harm and limitations and have an effect on patients' response to drug and drug therapy. A consequence of polymorbidity is the risk of polypragmasy, which can lead to drug interactions and side effects [10].

The survey shows that with age, many people devote less and less of their time to physical activity. The results for 26.5% of the respondents, who devote to physical activity less than an hour a week, are a cause of concern. In this respect, Vizev [11] points out that “the lack of physical activity is the most reliable sign of premature ageing”.

The respondents state the following reasons for doing exercise: good health – 91.2%, wellbeing – 40.3%, doctor's recommendations – 38.8%, and the opportunity to meet people and have enjoyable free time – 37.4%.

Almost half of the surveyed believe that there are no barriers to doing physical exercise – 48.8% (Table 2). Over one third states that a disease prevents them from being active physically – 34.4%, and 25% share they feel feeble and unwilling to do physical exercise. Our survey confirms Vizev's [11] claim that “The lack of motivation for physical activity (motor activity) is the most reliable sign of old age”.

**Table 2.** Barriers to doing physical exercise.

| Barriers to physical exercise  | Number | %     |
|--|--------|-------|
| To me, there are no barriers to physical activity  | 166    | 48.8% |
| Diseases   | 117    | 34.4% |
| Overall feebleness and unwillingness to be physically active   | 85     | 25.0% |
| Lack of accessible and affordable sport centres and facilities suitable for the elderly                      | 15     | 4.4%  |
| Lack of awareness of the positive effect of physical activity and forms of physical activity suitable for me | 10     | 2.9%  |
| Shortage of money  | 19     | 5.6%  |
| Other  | 1      | 0.3%  |

Physical activity is one of the most important components of a healthy way of life and a determining factor for the physical and mental health status of the individual. The promotion of physical activity is also connected with overcoming behavioral stereotypes and objective difficulties resulting from the ageing process. That is why it is important that in the third stage of

their third life cycle individuals should reconsider, rediscover and realize their potential and capabilities, and not condemn themselves to being passive, immobilized and inactive.

According to Berlin and Colditz [12], people who are more active physically run a lower risk of developing ischemic heart disease. Studies of men show a reverse dependency between

physical activity and the risk of colorectal cancer [13]. Large-scale cohort studies of women also establish a significant negative correlation between physical activity and colorectal cancer [14]. Regular moderate physical activity may help maintain the functional independence of elderly people [15].

According to Oxley [16], physical activity significantly contributes to overcoming depression, and may reduce the risk of senile dementia.

Another problem that is typical now-a-days, is unbalanced diet, which also, as individuals advance in age, is associated with the onset of certain diseases, which in turn cause accelerated ageing. In this respect, the quality of the diet and food is important not only to health but also to longevity.

Old people with chronic diseases, in most cases, have to stick to a certain diet  $P=0.012$  ( $\chi^2=8.88$ ). In the categories by place of residence, respondents living in the city follow diets more often – 35.8%  $P=0.004$  ( $\chi^2=8.23$ ), as compared to those living in the country – 21.1%. A possible reason for these results could be the higher number of people with diseases among the surveyed city dwellers. Apart from the fact that diseases require certain diets, it can be concluded that city residents have a higher health culture and health awareness of the role and importance of healthy eating habits.

The analysis of the survey findings shows that the willingness to follow a healthy or appropriate diet is in direct proportion to the level of education of the respondents  $P=0.009$  ( $\chi^2=13.42$ ) and so is the willingness to be acquainted with the principles of dietetic nutrition  $P=0.022$  ( $\chi^2=14.78$ ). A moderate correlation dependency has been established  $P=0.001$  ( $r=0.368$ ).

Our survey has also established the prevalence of a three-meal diet – 54.1%. The best and the most rational is the four-meal diet, in which the first breakfast constitutes 25% of the total daily calorie intake, the second breakfast – 15%, lunch – 35%, and dinner – 25%. The last meal for the day should 2-3 hours before sleep. Only 25.6% of the respondents have adopted the four-meal diet. In some cases, their diet may include a varied number of meals, depending on the specific disease. What causes concern is the fact that 14.5% of the surveyed stated they had fewer than 3 meals a day.

Table 3 presents a detailed visualization of the factors influencing the choice of food.

**Table 3.** Factors influencing the choice of food.

| Factors influencing the choice of food | Number | %     |
|--|--------|-------|
| Appearance                             | 125    | 36.8% |
| Preferred flavor/taste                 | 255    | 75.0% |
| Habits                                 | 81     | 23.8% |
| The price of food products             | 153    | 45.0% |
| Energy and nutrient content            | 18     | 5.3%  |
| Medical considerations                 | 84     | 24.7% |
| Advertising                            | 11     | 3.2%  |

|              |    |      |
|--------------|----|------|
| Manufacturer | 11 | 3.2% |
| Other        | 4  | 1.2% |

The preferred taste/flavor proves to be the leading factor for 75% of the respondents, which is also connected with inadequate awareness and knowledge of the principles of gerodietetics. 45% of the surveyed state that the price of food products is the predominant factor influencing their choice. A balanced diet is a feasible mission, yet will-power and sensible choice of foods are not sufficient. Low income is the underlying cause for the difficulties in maintaining adequate and healthy eating habits; it is the low income that puts in elderly in the awkward position of having to make difficult choices and coping with deprivation.

If we have to list the main food products in the daily menu of the respondents, these will be: bread and pasta (54.1%), cheese (53.2%), vegetables (40.6%), and fruit (46.2%). This list is extremely modest and unpretentious, yet it reflects the difficult situation that most elderly people are in – forced to survive on their minimal pensions. Taking into account this general trend, it is hard to achieve balance and variety in one's diet.

In the medical information space there are numerous studies, sufficient in scope, proving the harm caused by smoking. Smoking is among the behavioral risk factors associated with a series of chronic diseases in the group of the elderly. 32.1% of the surveyed admitted to being compulsive smokers.

Similarly to smoking, alcohol abuse, in addition to boosting the risk of cardiovascular pathology, cancer, stomach ulcer, etc., is also one of the factors for mortality as a result of alcohol intoxication, injuries, road accidents, murders and suicide. Alcohol has a detrimental effect on the health status and exacerbates chronic diseases, which escalate in the group of the elderly, and is a major cause of premature death.

One of the questions addressing the way of life is connected with the consumption of alcohol. Men drink alcohol more often (54.3%)  $P=0.001$  ( $\chi^2=26.34$ ), as compared to women – 26.6%.

The constant mental and emotional pressure is also among the key risk factors for accelerated ageing. As they grow older, people feel greater and greater anxiety, and in some cases the situation exacerbates, persists for a longer period of time and prevents people from performing simple everyday tasks and functioning normally. More than  $\frac{3}{4}$  (77.1%) of the respondents state they feel anxious 'at times', and 15.3% state they experience constant anxiety. It is established that those of the surveyed who live in the country attend to be more anxious (21.1%)  $P=0.001$  ( $\chi^2=17.68$ ), as compared to those living in the city (11.8%). Most of the elderly residing in the country live there alone, far from their children and grandchildren. It can be inferred that this anxiety is a profound experience of loneliness. Women tend to feel more anxious than men  $P=0.002$  ( $\chi^2=14.46$ ), which is probably due to their greater instability and susceptibility to stress.

It was important for us to establish also the experienced moments of stress and life events. The results show that 87.9%

of the respondents have experienced a really stressful situation. These high results confirm the fact that mental-emotional stress is an inseparable part of people's lives. Acknowledged or not, stress is an integral part of our everyday lives.

In their large-scale study, Holmes and Rahe [17] 1967, established the relationship between significant stressogenic events and the subsequent onset of diseases, such as stroke, heart attack, oncological problems, etc. In this respect, the factors causing stress are varied in type and of varied weight. The more dramatic events a person has been through, the greater the risk of the onset of a disease. A quarter of the respondents have stated they have experienced a combination of several stressogenic events – 22%.

The most common of the stressogenic events referred to above is the death of a loved one – 76%. In the Social Readjustment Rating Scale, the death or loss of a loved one ranks first among the stressors with the greatest intensity and impact. According to the same authors, there is a statistically significant relationship and dependency between the intensity of the stressor and the probability for developing a disease [17]. Chronic injuries and diseases come next-27%. Deteriorated health entails a series of limitations and dependences, and invariably leads to a pessimistic outlook on life in the future. In addition to chronic diseases, the elderly are faced with social events with a high level of emotional impact. Retirement is one of these events, as it is associated with partial loss of identity-career, colleagues and friends.

## Discussion

The analysis of the social and health status as a self-assessment on the part of the respondents confirms polymorbidity which is significantly triggered by the risk factors of the environment, in most cases.

Cardiovascular and cerebrovascular diseases have the greatest share. The old and the elderly often suffer from 2, 3 and more diseases.

The guidelines for the prophylaxis and prevention of premature ageing should be developed on the basis of comprehensive and accurate information about the risk factors.

The analysis of the behavioral risk factors indicates the presence of objective health risks. The following behavioral health risks are quite common-hypodynamia, obesity, smoking, alcohol abuse and chronic stress.

The majority of the identified risk factors are modifiable, and can be prevented through prompt, efficient prophylactic activities.

## Conclusion

The number of people experiencing accelerated ageing is increasing every year, and so is the incidence of the premature development of age-related changes and subsequent early incapacitating. The wide cluster of risk factors related to the conditions, style and way of life in modern societies, transform

people's health status for the worse and trigger a series of health, social and mental problems, which make the quality of life worse and accelerate the process of ageing.

This puts the problem of premature ageing (accelerated, early ageing) on the agenda, as well as all pertaining issues: the discomfort (health, social and mental discomfort) in this stage of a person's life, the care and methods of prevention and prophylaxis among senior citizens.

Innovative approaches are needed so that the efforts focused on the prevention and prophylaxis of premature ageing efforts could be successful. It is necessary to widen the scope of the activities of medical specialists concerning their ability to take an active part in geroprophyllaxis by optimizing their education and training, and expanding their competences connected with the prophylaxis and prevention of premature ageing.

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