

THE SHARE OF ELDERLY PEOPLE (60+) IN THE INCIDENCE OF DISEASES RELATED TO REDUCED PHYSICAL ACTIVITY

Daniela Telebak¹, Živana Vuković Kostić¹, Željko Vuković²

¹Health Insurance Fund of the Republic of Srpska, Zdrave Korde 8,
Banja Luka, Republic of Srpska, Bosnia and Herzegovina

²Institute for Physical Medicine and Rehabilitation "Dr Miroslav Zotović",
Slatinska 11, Banja Luka, Republic of Srpska, Bosnia and Herzegovina

Abstract: *This research addresses the impact of reduced physical activity on the health and social life of individuals aged 60 and older. The research aimed to analyze the share of elderly people in the population affected by specific chronic diseases and to investigate how reduced physical activity may affect their social life. A retrospective research design was applied to analyze data from the Information System of the Health Insurance Fund of Republika Srpska for the year 2021. Data on the number of insured individuals treated for specific diagnoses were collected. Data analysis included the application of the Chi-square test to assess the proportion of elderly individuals relative to the total number of patients with these diagnoses. The research findings indicate a significant impact of reduced physical activity on the elderly, with potential consequences such as social isolation, loss of social identity, depression, increased risk of dementia, and reduced quality of life. Additionally, it was observed that elderly individuals often suffer from chronic diseases, including musculoskeletal disorders, heart diseases, and others. The study highlighted the social, economic, and health challenges associated with the increasing life expectancy of the population. Healthcare costs rise with age, and the decline in functional abilities of the elderly contributes to increased healthcare expenditures.*

Promoting physical activity among older individuals should be a priority in public health policies. Preserving the physical and mental function of older individuals through physical activity can significantly contribute to healthy and successful aging. This requires adapting physical activity programs to the individual abilities of older individuals. All of this should serve as the basis for future interventions and support programs for healthy aging.

Keywords: *physical activity, elderly individuals, health, social life, chronic diseases, healthcare costs*

Introduction

Physical activity is defined as any movement that requires the expenditure of muscle energy [1]. Physical activity can include walking, running, swimming, cycling, strength training, dancing, and other activities that elevate heart rate and accelerate breathing.

The importance of physical activity for the health of older individuals is reflected in numerous positive impacts on health and quality of life, including the preservation of muscle mass and functional abilities, reduced risk of falls, heart diseases, diabetes, and other chronic illnesses, improved mood and self-confidence, and enhanced cognitive abilities [2].

In today's society, the rapid increase in reduced physical activity among newer generations of older individuals represents a concerning trend. On one hand, older individuals face an increased risk of chronic degenerative diseases, including heart diseases, diabetes, and musculoskeletal disorders. On the other hand, the extended average life expectancy exacerbates this issue. The combination of these factors has the potential to significantly compromise the quality of life of older individuals. The stance of the World Health Organization clearly underscores the seriousness of the problem. Reduced functional capacity, although independent, ranks equally with other risk factors for the development of chronic non-communicable diseases such as hypertension, diabetes, high blood lipid levels, and smoking. The consequences of reduced physical activity not only diminish the quality of life of older individuals but also pose a significant financial burden on the healthcare system and society as a whole. This troubling situation stems from a variety of factors, including the decline in muscle mass and strength, accompanying joint pain and bone problems, fear of falls, social isolation, limited access to activities, the presence of health problems, lack of motivation, and a sense of time scarcity. Understanding these factors and their impact on reduced physical activity in older individuals plays a crucial role in developing preventive and intervention strategies to improve their health and quality of life [3,4]. Research worldwide, especially in highly developed countries, points to reduced physical activity in new generations. On one hand, the number of cases of chronic degenerative diseases (cardiovascular, endocrine-metabolic, and locomotor system) is increasing, while on the other hand, we have a longer average human lifespan. The result of the interplay of these two factors inevitably leads to a reduction in the quality of life. The stance of the World Health Organization states that a decreased level of functional capacity is an independent but for most people a reversible factor in unnecessary illness and premature death, and it is on par with other risk factors for the development of chronic non-communicable diseases such as hypertension, diabetes, high blood lipid levels, smoking, and others. The consequences of reduced physical activity, in addition to reducing the quality of life, also result in significantly higher healthcare costs.

There are several reasons for reduced physical activity in older individuals: muscle loss and weakness, joint problems, fear of falls, social isolation, health issues, limited access, time constraints, and more [3,4].

After around the age of 40, it is possible to detect a decline in the function of physiological systems, accompanied by anatomical and ultrastructural changes. For example, progressive cognitive decline affects memory and learning; skeletal muscles atrophy and become progressively weaker (known as sarcopenia), and age-related decreases in bone mineral density lead to osteopenia and osteoporosis. Chronological age is a convenient and often very good predictor of health status, disease burden, and

physical abilities, but there is significant variability among individuals, with some older people enjoying very good health while others exhibit an accelerated onset of weakness and disability.

The aim of this study was to investigate the prevalence and impact of reduced physical activity on the occurrence of various diseases in individuals over the age of 60, including hypertension, acute myocardial infarction, cerebral infarction, atherosclerosis, osteoporosis with and without pathological fractures, obesity, and depression.

Materials and Methods

For the purposes of our research, we chose a retrospective design. This design allows us to analyze data from past periods to gain insight into specific disease patterns and their association with the elderly population. The retrospective design was an appropriate choice due to the availability of data in the Health Insurance Fund's information system.

Data and Data Source: The data used for our research were collected from the information system of the Health Insurance Fund of the Republic of Srpska for the period from January 1, 2021, to December 31, 2021. From this source, we obtained information about patients diagnosed with specific diseases (hypertension, acute myocardial infarction, cerebral infarction, atherosclerosis, osteoporosis with and without pathological fractures, obesity, and depression).

Sample Selection: In the context of our analysis, we specifically extracted those patients who were aged 60 and older from the total number of patients with the mentioned diagnoses. This selection aimed to investigate the specific participation of this population concerning diagnosed diseases and their impact on older individuals.

Data Analysis and Chi-Square Test: To assess whether patients aged 60 and older were significantly more frequently diagnosed with the mentioned diseases compared to the younger population, we applied the Chi-Square test. This statistical test allowed us to analyze the degree of involvement of older patients relative to the total number of patients with these diagnoses. We will present and interpret the results of this test in detail in the later part of the research.

Ethical Considerations: It is important to note that we carefully considered the ethical aspects of this research, especially concerning the use of data from the Health Insurance Fund's information system. We ensured that all data were treated with due privacy and patient anonymity, thus adhering to ethical guidelines and regulations.

Results

The percentage of insured individuals aged 60 and older in 2021 among the total number of cases with specific diagnoses in secondary and tertiary healthcare facilities, according to the data from the Health Insurance Fund, is highest for cerebral infarction (89%), followed by atherosclerosis (82%), osteoporosis (80%), hypertension (76%), and acute myocardial infarction (70%). The financial cost for these diagnoses in 2021 amounted to approximately 10 million KM, of which about

74% of that amount was allocated for the treatment of insured individuals aged 60 and older.

Table 1: Number of cases by diagnosis for 2021

Diagnosis	N	N (+60 years old)	Hi ²	df	p
I11	62	47 (76%)	16.516	1	.000
I21	1402	980 (70%)	222.086 1.088.63	1	.000
I63	1803	1602 (89%)	1	1	.000
I70	533	436 (82%)	215.612	1	.000
M80	68	49 (72%)	13.235	1	.000
M81	133	11 (8%)	92.639	1	.000
E66	6	0 (0%)			
F32	346	64 (18%)	137.353	1	.000

N=Total number of cases; +60=respondents older than 60 years; Hi²=Chi square test; p=significance level; I11= hypertensive heart disease; I21= acute myocardial infarction; I63= cerebral infarction; I70= atherosclerosis; M80= osteoporosis with pathological fracture; M81= osteoporosis without pathological fracture; E66= obesity; F32= depression.

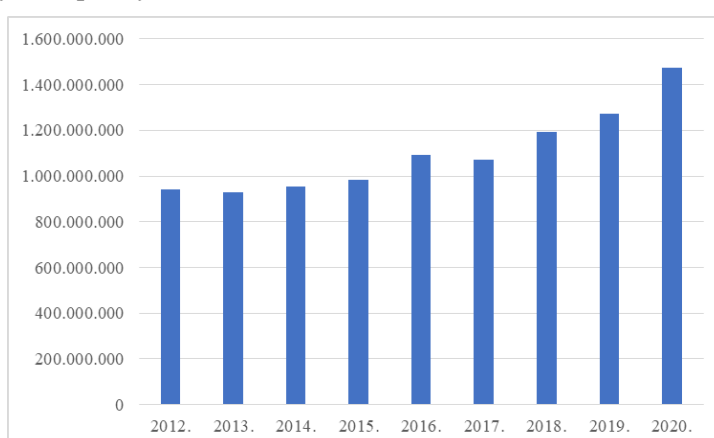
Table 1 presents data on the number of patients with the specified diagnoses during 2021. The analysis of the results of the Chi-square test indicates statistically significant differences in the proportion of older patients (aged 60 and above) compared to the younger population for certain diagnoses.

- For diagnoses I11 (hypertension), I21 (acute myocardial infarction), I63 (cerebral infarction), I70 (atherosclerosis), and M80 (osteoporosis with pathological fracture), it was found that patients aged 60 and above were statistically significantly more represented in the total number of patients with these diagnoses. The Chi-square test statistic for these diagnoses was significant at $p < .001$.
- In contrast, for diagnosis M81 (osteoporosis without pathological fracture), it was found that respondents aged 60 and above accounted for less than 10% of the total number of patients with that diagnosis. This difference was also statistically significant.
- Similarly, within the diagnosis F32 (depression), less than 20% of patients were aged 60 and above, which was also statistically significantly lower compared to younger patients.
- For diagnosis E66 (obesity), only 6 cases were registered, and all of them were younger than 60 years old.

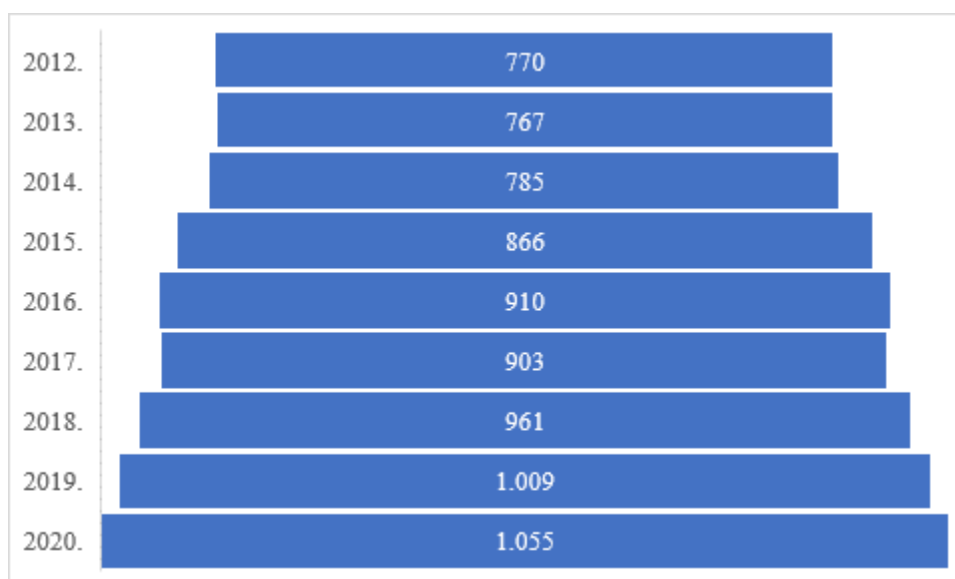
These findings suggest a significant association between certain diseases and the older population, while some other diseases are much less prevalent among older individuals. This has important implications for healthcare planning and providing adequate care to older patients.

According to statistical data from the Republic of Srpska Institute of Statistics, there has been continuous growth in total healthcare expenditure during the observed period. In 2012, the annual healthcare expenditure amounted to approximately 943,460,000 KM, while in 2020, it reached approximately 1,475,184,000 KM. These data clearly indicate a significant increase in investments in the healthcare sector during that period.

Furthermore, there has also been a constant increase in healthcare expenditure per capita in the Republic of Srpska. In 2012, the average expenditure per capita was approximately 770 KM, while this amount increased to about 1,055 KM in 2020. These data indicate continuous efforts and engagement in providing healthcare to the population of the Republic of Srpska, which can have a significant impact on the accessibility and quality of healthcare services.



Graph 1: Total consumption in healthcare of the Republic of Srpska in the period from 2012 to 2020

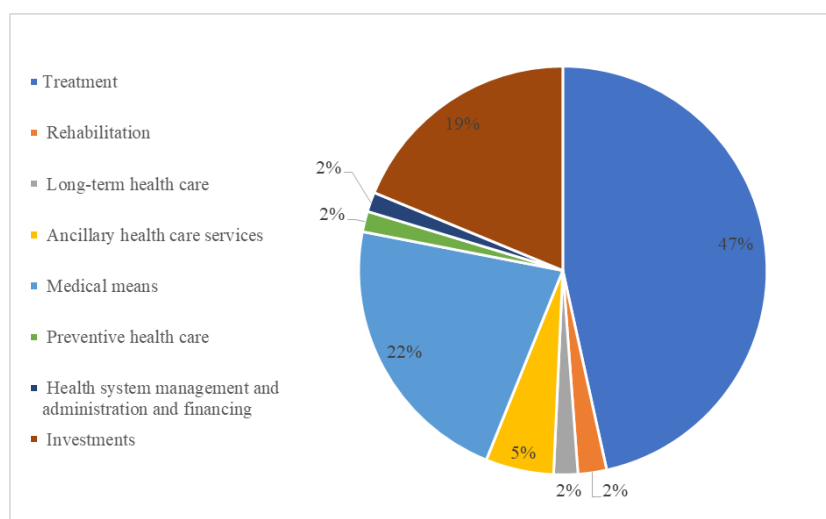


Graph 2: Consumption per inhabitant of the Republic of Srpska in the period from 2012 to 2020

In 2020, according to statistical data from the Republic of Srpska Institute of Statistics, the majority of financial resources allocated to the healthcare sector in the Republic of Srpska were directed towards various aspects of healthcare services. Specifically:

- The largest portion of financial resources, precisely 47%, was allocated to hospital treatment, indicating a significant part of the budget dedicated to providing specialized medical care and patient hospitalization.
- 22% of funds were allocated for the procurement of medical supplies, highlighting the importance of maintaining an adequate supply of medical materials and equipment within the healthcare system.
- Investments in infrastructure improvement and the modernization of healthcare institutions accounted for 19% of the total healthcare budget.
- 2% of the funds were allocated for patient rehabilitation, which is essential for the recovery process and postoperative care.
- Preventive and long-term healthcare were also represented, each with a 2% allocation of financial resources, emphasizing the importance of preserving health and providing long-term care for patients.

These data emphasize the distribution of funds in the healthcare sector of the Republic of Srpska in 2020 and highlight the diverse aspects within the healthcare sector that are essential for providing adequate healthcare services to the population.



Graph 3: Healthcare expenditure in the Republic of Srpska in 2021

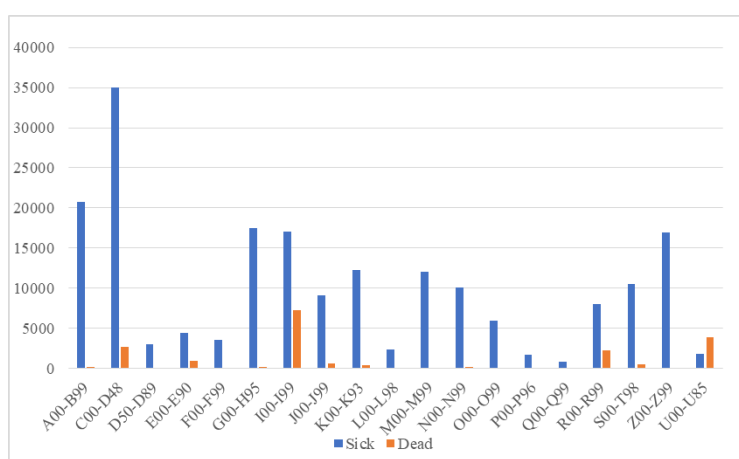
According to the analysis of data from the Institute of Public Health of the Republic of Srpska for the year 2021, it is evident that the most commonly diagnosed diseases in the territory of RS encompassed the following categories:

- **Neoplasms:** This includes various forms of tumors and malignant diseases, which constituted a significant portion of illnesses during the mentioned year.
- **Infectious and parasitic diseases:** These types of diseases, including potentially infectious infections, were also significantly present in the RS territory.
- **Diseases of the nervous system and sensory organs:** This category includes various neurological diseases and sensory impairments, further highlighting the wide range of health challenges faced by the region.
- **Diseases of the circulatory system:** Heart and vascular diseases, as well as their complications, represented a significant portion of illnesses and often led to fatal outcomes.

When it comes to causes of death, the following leading factors were recorded in 2021:

- **Diseases of the circulatory system:** Heart and vascular diseases remained the leading cause of death during that year.
- **Consequences of infection with the Covid-19 virus:** The Covid-19 pandemic had a significant impact on the number of deaths and occupied a prominent place among the causes of death.
- **Neoplasms:** As in the case of illnesses, malignant diseases were one of the leading risk factors for death.
- **Ill-defined conditions:** This category includes a wide range of conditions that are not clearly defined but contributed to the overall number of deaths.
- **Endocrine diseases and metabolic disorders:** These disorders were also a significant factor in the number of deaths during the mentioned year.

These data emphasize the challenges and priority areas in the healthcare sector of the Republic of Srpska in 2021 and can be useful for planning healthcare resources and interventions in the future.



Graph 4: Number of patients and deaths in the Republic of Srpska in 2021 by disease group

Discussion

The aim of our research was to analyze the proportion of individuals aged 60 and older in the population affected by specific chronic diseases and explore how reduced physical activity can impact their social life. Our findings clearly indicate a significant influence of reduced physical activity on the social life of older individuals.

In particular, we found that reduced physical activity can lead to social isolation and a decrease in opportunities for social interaction. This can result in the loss of social identity, an increased risk of depression, and even dementia. We also observed that reduced physical activity significantly diminishes the quality of life of older individuals.

Our findings align with similar studies in the literature [5,6]. These results underscore the importance of promoting physical activity among the older population to prevent adverse effects on their social life and mental health.

Furthermore, lifestyle and advancements in medicine leading to increased longevity create significant societal, economic, and healthcare challenges. Life expectancy is increasing at a faster rate than the period spent in good health, known as "years of healthy life" [7]. This necessitates additional resources in the fields of healthcare and social support.

For example, in the Republic of Srpska, we have observed a decline in the average life expectancy for both women and men from 2017 to 2021. This trend requires careful resource planning in the healthcare and social support sectors to ensure adequate assistance for the older population.

We have also identified that musculoskeletal disorders are the most common chronic disabling conditions among individuals aged 65 and older, while heart and circulatory diseases, respiratory conditions, endocrine disorders, and mental disorders also play a significant role [8]. The incidence of these chronic diseases significantly increases after retirement, highlighting the need for timely interventions to preserve the health of older individuals.

In general, regular physical activity plays a key role in preserving the physical abilities of older individuals. This fact is crucial for adapting physiological systems, regulating metabolism, and increasing overall aerobic activity. Therefore, promoting physical activity among the older population can directly reduce the risk of chronic diseases and improve the quality of life [9,10].

Given the growing proportion of the elderly population in society, we expect healthcare costs and challenges associated with the older population to continue rising. Therefore, it is essential to take measures to ensure the sustainability of the healthcare system and provide adequate support to older individuals [11,12].

Several measures can be taken to enhance physical activity among older individuals, including exercise programs for seniors, promoting walking and outdoor activities, organizing group activities, emphasizing regularity in exercise, and adapting the environment to facilitate physical activity. These measures can have a positive impact

on the health of older individuals and contribute to reducing healthcare costs in the future [13,14].

Conclusion

In conclusion, it is important to emphasize that our research has confirmed that physical activity is a key component of successful aging. Our goal was to investigate the impact of reduced physical activity on the health and social life of older individuals, and our findings clearly demonstrate that physical activity is associated with a range of benefits that contribute to healthy and successful aging.

Specifically, physical activity can prevent the loss of physical and cognitive function, improve mental health, and promote social engagement. These advantages are crucial for older individuals to maintain their independence and quality of life.

Given the ongoing increase in the older population, promoting a lifestyle that encourages physical activity should be high on the list of priorities for public health policymakers. It is important to note that the intensity and frequency of physical activity should be tailored to the capabilities of older individuals, taking into account their individual needs and abilities. There is a defined threshold for the minimum level of physical activity that should be achieved to reap health and functional benefits, and this knowledge should serve as the foundation for future interventions and programs supporting healthy aging.

In conclusion, physical activity plays a pivotal role in preserving the health and function of older individuals and should be an integral part of strategies promoting healthy aging.

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UDIO STARIJIH OSOBA (60+) U POJAVI OBOLJENJA POVEZANIH SA SMANJENOM FIZIČKOM AKTIVNOŠĆU

Daniela Telebak¹, Živana Vuković Kostić¹, Željko Vuković²

¹Fond zdravstvenog osiguranja Republike Srpske, Zdrave Korde 8, Banja Luka, Republika Srpska, Bosna i Hercegovina

²Zavod za fizikalnu medicinu i rehabilitaciju “Dr Miroslav Zotović”, Slatinska 11, Banja Luka, Republika Srpska, Bosna i Hercegovina

Sažetak: Ovo istraživanje se bavi uticajem smanjene fizičke aktivnosti na zdravlje i socijalni život starijih osoba starijih od 60 godina. Cilj istraživanja je bio analizirati udio starijih osoba u populaciji oboljelih od određenih hroničnih oboljenja i istražiti kako smanjena fizička aktivnost može uticati na njihov socijalni život. Retrospektivni dizajn istraživanja primijenjen je za analizu podataka iz informacionog sistema Fonda zdravstvenog osiguranja Republike Srpske za 2021. godinu. Prikupljeni su podaci o broju osiguranika koji su se liječili od određenih dijagnoza. Analiza podataka obuhvatala je primjenu Hi-kvadrat testa za procjenu udjela starijih osoba u odnosu na ukupan broj pacijenata sa dijagnozama. Nalazi istraživanja ukazuju na značajan uticaj smanjene fizičke aktivnosti na starije osobe, sa potencijalnim posljedicama kao što su društvena izolacija, gubitak društvenog identiteta, depresija, povećan rizik od demencije i smanjenje kvaliteta života. Takođe smo primijetili da starije osobe često pate od hroničnih bolesti, uključujući poremećaje mišićno-skeletnog sistema, srčane bolesti i druge. Istraživanje je istaklo društvene, ekonomske i zdravstvene izazove povezane sa povećanjem očekivanog životnog veka stanovništva.

Troškovi zdravstvene zaštite rastu sa godinama, a smanjenje funkcionalnih sposobnosti starijih osoba doprinosi povećanim zdravstvenim izdacima. Promovisanje fizičke aktivnosti među starijim osobama treba da bude prioritet u javnim zdravstvenim politikama. Očuvanje fizičke i mentalne funkcije starijih osoba kroz fizičku aktivnost može značajno doprineti zdravom i uspješnom starenju. To zahteva prilagođavanje programa fizičke aktivnosti individualnim sposobnostima starijih osoba. Sve ovo treba da bude osnova za buduće intervencije i programe podrške zdravom starenju.

Ključne riječi: fizička aktivnost, starije osobe, zdravlje, socijalni život, hronične bolesti, troškovi zdravstvene zaštite.