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UNIVERSITATEA DIN CRAIOVA

Innovative cross-sectoral training kit for professionals working with elders (caregivers and physical instructors)

KA220-VET – Cooperation partnerships in vocational education and training

Craiova 2024

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**INNOVATIVE CROSS-SECTORAL
TRAINING KIT FOR PROFESSIONALS
WORKING WITH ELDER
(CAREGIVERS AND PHYSICAL
INSTRUCTORS)**

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Introduction

Context

This material is created within the project entitled Innovation and dynamic learning for caregivers, social workers and trainers specialized in physical education of elders, through cross-sectoral approach of both CVT fields, project no 2022-1-RO01-KA220-VET-000089776. The project was cofunded by the European Union, under the ERASMUS+Program, Key Action 2 – Partnerships for cooperation, action type KA220-VET - Cooperation partnerships in vocational education and training. This intellectual output was created by a multidisciplinary team of experts from the partner organizations which implemented the project, namely: Asociația Global Help (leader of the partnership, Romania), Universitatea din Craiova (Romania), Euroform RFS (Italy), Fundació Universitària Balmes (UVic Spain), Home Hope Ltd (Bulgaria).

The present project is complementary to a previous project financed also under Erasmus+ program (STRACOV, “Strategic cooperation in the field of elderly care vocational training focusing on involvement of social-economic actors”, project no 2018-1-RO01-KA202-049507”) which supported the innovation in the field of elderly care training in four European countries-Romania, Bulgaria, Italy and Spain. While the materials dedicated to CVT in the first project addressed elderly care from an integrative perspective but in a more general manner, the present project isolates a topic that deserves further study: how to train the professionals in the field to maintain the physical tone and wellbeing of elders they assist.

Aim of the training kit

The training kit starts from two modules of the general curricula of the elderly caregivers’ qualification (Ensuring the comfort and Mobilization techniques) and will develop the subject of increasing physic tone of the elders, maintain general functional capacity, maintaining musculoskeletal integrity, for preventing certain diseases, and ensuring mental tone and wellbeing for increasing the quality of life. The complex kit is composed by the present material in digital format accompanied by 4 hours of graphic and video materials with subtitles in partners’ languages, allowing to learners from Romania, Bulgaria, Spain and Italy to learn more and to better work to any of these countries on the topic of wellbeing and improving physical status of the elders. The DVD will be created following the structure of this training material. Each learner that will go through this training kit will learn the basic principles and methodology of physical activity in old age. He/she will gain a realistic insight of how a program should be shaped according to the elder’s status and conditions (autonomous/semi-autonomous). He/she will find about different materials, devices, equipment and applications used in the field. They will learn about pathologies, restrictions and ways to motivate elders to take action and to eliminate sedentarism behaviour, which is on the top of risk factors of global mortality. Thus, they will provide better care services and they will become more attractive human resources for a wide range of employers in social care: NGOs, day centers for leisure or recovery, gyms, nursing homes etc. The training kit will get to at least 500 relevant organizations (in DVD format) and to other people who will subscribe to the platform for online learning – during project time.

The content start from simple to complex, the first two modules answer the question of WHY? (Why should the elderly do physical activity?) and enable readers with scientific arguments, the third one shows the caregivers and physical instructors HOW to start the process, how to motivate the older adults to start the physical activity, to break the barriers of sedentarism, and the four following ones actually show them WHAT should be

done (what type of exercises, frequency, intensity etc); the last module explores more complementary activities (energizers, exercises for maintaining mental tone).

Summary of the modules

The first module of the training kit delves into the aging phenomenon, clarifying concepts and the elderly's approach and attitude towards physical activity. It offers insights into the unprecedented demographic shift in the EU and examines individual-level aging indicators. It covers the European Strategy on Active and Healthy Ageing, which guides member states in promoting these aspects. The module suggests reevaluating caregiver qualifications in light of active aging, including low-impact physical activity for beneficiaries. Additionally, it introduces classic concepts like physical activity, fitness, exercise, sedentary behavior, and inactivity, highlighting their changes with age through research evidence. The module underscores the contrast between positive elderly attitudes toward physical activity and the prevalence of unhealthy sedentary behavior. Finally, it addresses external and personal factors influencing physical activity in old age.

Module no 2 examines sedentary behavior and strategies to counteract it among older adults. It explores the negative impacts of sedentarism or inactivity on physical and mental health (which ranks the fourth place in the top of major risk factors for global mortality), emphasizing the prevalence of inactivity among older adults in European countries. The module suggests tailored physical activity guidelines for individuals aged 65 and above, focusing on gradual increases, personalized goals, and light-intensity activities. Strategies to break sedentary habits, collaboration between specialists in care facilities, and address frailty are highlighted. The bibliography offers supporting sources for the module's insights. The methodologies for putting into practice these strategies will be analysed extensively in chapters 4-8.

Module no 3 explores the motivational area and the age psychology applied in working with elderly people. It presents different scientific approaches on age psychology or development of ages, and it enables the caregivers with a lot of tools for verbal, non-verbal communication techniques, empowerment techniques and a deep understanding of the needs and changes in old age. The modules reinforce the idea that PA plays an essential role in building a positive identity during ageing. This chapter presents to the learner the most appropriate way of presenting/promoting physical activity to an older person (e.g, avoiding intimidating image of senior professional athletes) and setting goals in the most realistic way possible.

The Module no 4 enables caregivers and physical instructors who would like to work in a geriatric institution to a diversity of tools for screening the beneficiary physical fitness before participation in PA. It includes examples of questionnaires and 7 tests widely used by specialists (such as Chair stand test or 6-Minute walk test, which are annexed at the end of this training material). It also gives the reference values/ranges that are optimal for man or women in different interval of age (65-69, 70-70, 75-79 etc) for a proper assessment. It also presents WHO ICOPE App that may be used for initial assessment and for monitoring the health status and functionality of participants in the PA program. It also offers guidance on the accessibility of activities from selecting the appropriate locations, ensuring safety and comfort for participants to creating the atmosphere and ensure hygiene and cleaning. It also shows the way a caregiver may cooperate with other specialists (like physical education/therapist) in order to gather proper information for assessment or to prepare the specific activity. After older adults have learned their exercise routine, the caregiver becomes a valuable support resource in ensuring their commitment to the program over time.



Modules no 5, 6, 7 and 8 cover a wide range of exercises to be performed in a safe way by older adults. Module no 5 includes endurance activities which make the cardiorespiratory system stronger and more fit, module no 6 focuses on strengthening activities (resistance training) as an effective modality to improve muscle function, functional performance, and health parameters in older adults. Module no 7 provides neuromotor activities that incorporate different motor skills, including balance, coordination, gait, agility, and proprioceptive training. Module no 8 presents flexibility/stretching and mindfulness activities for seniors. All the 4 modules follow a unitary structure: introduction, specific benefits, type of activities, duration and frequency (minutes per week, minutes per session, how often, repetitions and sets), intensity, progression, examples of specific activities for older people, assessment, special considerations (if the case).

Module no 9 gives a complementary set of tools to the caregiver, in order to maintain the mental tone and comfort of the elderly. After this module, the caregiver will learn better to ensure active relaxation daily and to maintain the concentration or memory capacity of the beneficiary. It starts with simple techniques (in domestic atmosphere– how to organize the space for relaxing activities) to attention and concentration activities (such as word games, concentration games) or exercises for abstract thinking and verbal comprehension (concept mapping, riddles and Brain Teasers etc) or tasks for sorting and classifying information (organizing Photos or Documents, sorting by Size, Shape, or Color etc) or more complex problem-solving games. It also brings ideas and examples of activities to stimulate curiosity, creativity, and assertive communication with mutual benefits for the elderly and for their caregivers and families during their social interaction.

MODULE 1

The ageing phenomenon. Conceptual clarifications and the attitude of the elderly towards physical activity



Image 1. Source: <https://worldmigrationreport.iom.int/wmr-2022-interactive/>

Introduction

This module delves into the multifaceted aspects of the aging phenomenon, spanning from individual experiences to broader societal implications. Initially, we provide an encompassing view of chronological, biological, and psychological aging. Additionally, we examine global population aging as a demographic trend, juxtaposed with the imperative of cultivating active aging through physical engagement and a wholesome lifestyle. The repercussions of aging are elucidated, alongside the substantial merits stemming from consistent physical activity, which possesses the potential to mitigate both physical and cognitive manifestations of aging.

Subsequently, our focus shifts to the intricate interplay between physical activity and an array of personal and external determinants. Beyond personal predispositions such as gender, age, habits, and educational background, external forces including cultural, social, and political contexts exert notable influence over activity levels. This comprehensive exploration sheds light on the intricate network of factors that either facilitate or impede physical activity participation.

1.1 Background on the ageing phenomenon

Ageing is the gradual natural process involving changes in the body's organs, tissues, and cells, leading to old age characterized by weakened organism and slowed physiological functions. This phase is marked by physical and cognitive decline. Old age's onset at 65 is linked to retirement, not just biological factors. Biological age relates to changes common in a given age group due to lifestyle, illness, or other factors. The ageing process can be accelerated by *environmental* factors (air pollution, exposure to toxic and irritating substances or materials, excessive exposure to UV rays) and *personal habits* (smoking, alcohol, drug abuse, excessive stress and an unhealthy diet rich in fat, sugar and junk food), while psychological age reflects behavior regardless of chronological age.

Old age includes the following two subdivisions: advanced adulthood and late adulthood:

- Advanced adulthood (60-75);
- Late adulthood (over 75 years old).

As we advance in age, it is essential to recognize that the ageing process is multidimensional it is influenced by a complex interaction of biological, psychological, social, and environmental factors.

It's also important to highlight that population ageing is a global demographic phenomenon especially in Europe with implications for social and economic welfare systems. In this context, European and global strategies have been established to address the challenges of population ageing and promote active and healthy ageing. One example of these strategies is the United Nations' Agenda 2030 (Ministry of Social Rights, Agenda 2030) for Sustainable Development, which includes the Sustainable Development Goals (SDGs).

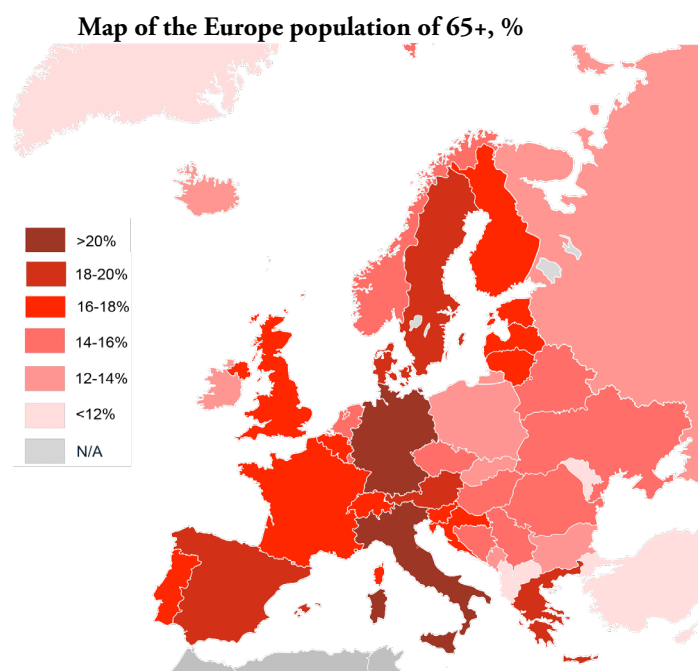


Image 2. Source: [University of Valencia -Facultat de Ciències Socials](#)

The Sustainable Development Goals (SDGs) provide a global roadmap for addressing socio-economic, environmental, and health challenges, including population aging. Within these strategies, the importance of physical activity and a healthy lifestyle in the aging process is recognized. Regular physical activity can have numerous benefits for older adults, including improving cardiovascular health, muscle strength, mobility, balance, and cognitive function. Furthermore, physical activity can help prevent and control chronic diseases, such as cardiovascular diseases, diabetes, and osteoporosis, which are common in old age.

Regarding European and global strategies to address population aging and promote active and healthy aging, it is important to highlight some of the implemented actions and policies. In Europe, the European Strategy on Active and Healthy Aging has been developed with the aim of providing guidance to member states in promoting active and healthy aging. This strategy focuses on four key areas: health and healthcare, enabling environments, active participation, and security. It seeks to encourage the participation of older people in society, promote autonomy and independence, and ensure access to quality healthcare services (European Commission, 2022).

At a global level, the World Health Organization (WHO) has developed the Global Strategy and Action Plan on Aging and Health. This strategy aims to provide a framework for the development of policies and programs that promote healthy aging worldwide. It focuses on areas such as promoting healthy lifestyles, disease prevention, access to healthcare services, creating age-friendly environments, and improving care and support for older persons.

In the context of the Sustainable Development Goals (SDGs), several objectives are directly related to aging and the health of older persons, which are detailed below:

Goal number 3: "Good Health and Well-being"

- *Access to quality healthcare services:* For older persons, access to quality healthcare services is essential. This includes preventive healthcare, diagnosis and treatment of chronic diseases, as well as long-term care services when necessary. Ensuring that older persons have access to adequate healthcare services is fundamental to their ongoing health and well-being.

- *Prevention and treatment of diseases:* Aging is often associated with a higher risk of chronic diseases such as cardiovascular diseases, diabetes, and neurological disorders. SDG 3 aims to prevent these diseases through the promotion of healthy lifestyles and access to preventive healthcare services. Additionally, it focuses on ensuring that older persons receive appropriate treatment and palliative care when necessary.
- *Promotion of mental health:* Mental health is an important component of well-being in old age. SDG 3 also addresses the promotion of mental health, recognizing that mental health concerns can be common among older persons. It promotes awareness, prevention, and adequate care for mental health disorders in this population.

Goal number 11: "Sustainable Cities and Communities"

This goal focuses on creating safe, accessible, and inclusive environments for all people, including older adults. Here is more information about its relationship with aging:

- *Designing safe and accessible environments:* As people age, they may face mobility and accessibility challenges. SDG 11 promotes the design of urban and community environments that are safe and accessible for people of all ages. This includes creating infrastructure that allows older adults to move with ease and safety within the community.
- *Social participation:* Social participation and inclusion are crucial aspects of well-being for older persons. This goal aims to encourage the active participation of older adults in community life, enabling them to contribute to society and maintain meaningful social connections.
- *Access to basic services:* Access to basic services such as healthcare, transportation, adequate housing, and recreational activities is essential for the quality of life of older persons. SDG 11 addresses the importance of ensuring that these services are available and accessible to all people, regardless of their age.

Together, these two Sustainable Development Goals (SDGs) recognize the importance of addressing the needs of older persons in terms of health, well-being, mobility, and social participation, with the aim of creating sustainable and inclusive communities where people of all ages can thrive. This is essential to ensure that population aging occurs in a healthy manner and that older persons enjoy a high quality of life.

Currently, in Spain, Italy, Romania, and Bulgaria, the understanding and implementation of the Sustainable Development Goals (SDGs) remain a significant focus in policy and society. These countries recognize that the SDGs provide a global framework for addressing a range of socio-economic, environmental, and health challenges and are committed to their fulfilment. Below, will provide information on how these goals are addressed in the mentioned countries and their progression as of the current date (*source: Global Compact Spanish Network, June 12, 2023, "How is the European Union progressing on the 2030 Agenda?"*).

Spain has maintained its focus on ensuring a healthy life and promoting well-being for all ages. Access to quality healthcare remains a priority, and efforts have been made to reduce health inequalities, especially among different regions of the country. It has also worked on sustainable urban planning and improving the quality of life in its cities. The country has developed an elderly care system with a wide range of services, including care homes, day centers, and home care services. Investments are ongoing to improve the quality and accessibility of these services. Prevention and health promotion programs targeting the elderly population, including physical activities and nutrition programs, have been implemented. An example is the "Active Aging" program, which focuses on

promoting healthy and active aging. It is developed at the regional and local levels in collaboration with health and social services authorities, offering a wide range of activities and services designed to keep older people physically and mentally active. (*Source: Official website of the Community of Madrid , 2023*).

Italy has continued to focus on health promotion and disease prevention, implementing policies to address specific health issues, including the aging population. The country emphasizes the importance of maintaining healthy lifestyles, including a balanced diet and physical activity. Italy is committed to improving the quality of life for older adults through care services and active aging programs.

Romania has improved its healthcare system and certain progress has been made also in social care system, and it is working on disease prevention and the promotion of healthy lifestyles, particularly in addressing specific health challenges in rural areas. Prevention programs for diseases and healthy lifestyles among older adults are promoted. Special funds through POR program have been granted in 2017/2018 for social care infrastructure (construction of day centres for elderly) and similar funding was launched in 2023 through PNRR, Component 13 – Social reforms, Investment I4 (encouraging public-private partnerships).

Bulgaria has worked on improving healthcare and promoting disease prevention. In 2023, public health programs have been implemented, addressing specific health challenges. The country is focused on improving the health of all age groups but has placed particular emphasis on enhancing care for older people, including long-term care services and the promotion of independent living. Bulgaria emphasizes the importance of physical activity and healthcare in older age.

In conclusion, European and global strategies to address population aging and promote active and healthy aging are crucial for ensuring a better quality of life for older adults. It is essential for governments, international organizations, and society to work together to further implement these strategies and ensure that the rights and needs of older adults are comprehensively addressed. Additionally, raising public awareness about aging and the vital role that older adults play in society is necessary.

By collectively focusing on active and healthy aging, we can create more inclusive and supportive communities where older adults can continue to make meaningful contributions and enjoy a fulfilling life. Investing in the health and well-being of older adults will lead to a more sustainable and equitable future for all generations.

1.1.1 Active ageing

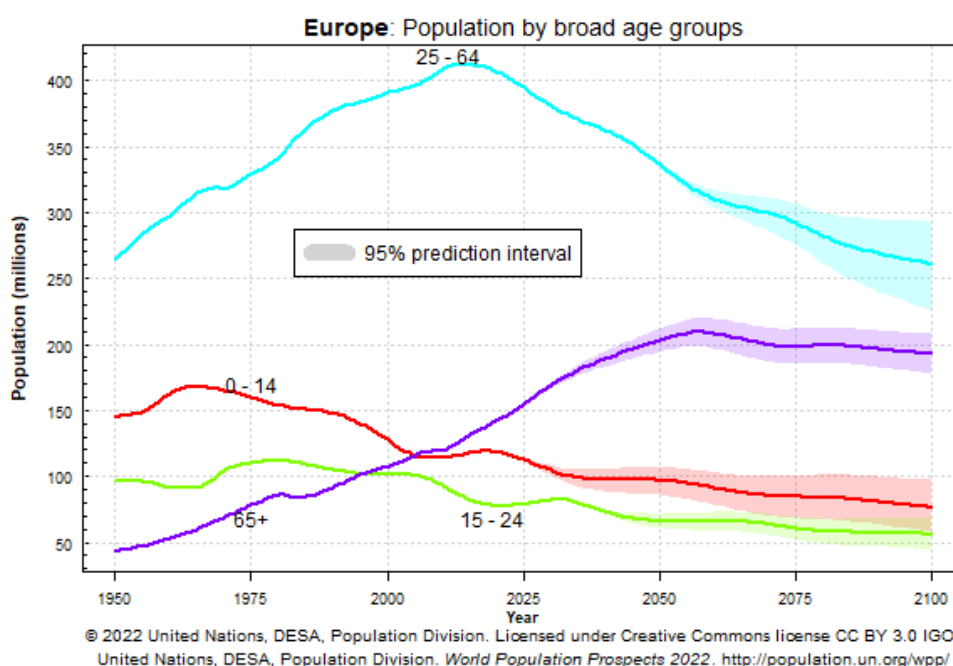
In the European Union, population ageing is a significant trend that affects many of its member countries. In countries like Germany, Italy, and Spain, the proportion of older people in the population is rapidly increasing. These countries are among those with the highest life expectancy in Europe, meaning that an increasing number of people are reaching advanced ages.

In countries like Sweden and Denmark, which also have high life expectancy, policies and programs aimed at promoting active ageing have been implemented. These programs include adapted physical activities for older people, such as senior gym classes, group walks, and dance classes. People from these countries are aware of these opportunities provided to them (DK 53%, SE 51%). In other countries like Romania, Bulgaria, Slovakia, even Italy a small percentage of the population considers that the area where they live in offers them many opportunities to be physically active (BG 13% of the population totally agrees, RO 18%, SK 20%, IT 21%, Special Eurobarometer 525, p 53).

It is important to note that the physiology of older adults is universal, and the benefits of physical activity in old age are applicable in all countries. Low-impact and moderate activities are recommended everywhere to maintain the health and well-being of older people.

Population ageing in Europe may be explained on the one hand, by a *reduction in mortality* as a result of improved health conditions and medical advances and on the other, a *contraction in the birth rate* due to the growing economic and employment difficulties afflicting the younger segments of the population. As the graph below shows, this trend will lead to a growing disproportion, between the younger segment of the population and the adult and elderly segment of the population, which is constantly expanding. This disproportion is decisive in social and economic terms, since it inescapably redefines the dynamics of welfare systems, which are increasingly weighed down by rising welfare costs and the difficulties of sustainability of the social care and health system. For these reasons, it is of paramount importance that the longevity of the population corresponds as much as possible to years lived in good health, through a healthy and active ageing process. In this context, professionals working in elderly care need to learn about these strategies and broaden their knowledge and skills to assist the elderly in the process of active ageing.

Fig 2: UN, World Population Prospects (2022),
Source: <https://population.un.org/wpp/Graphs/Probabilistic/POP/65plus/900>



Since the early 2000s, the World Health Organisation (WHO) has begun to affirm the social need to move towards an ageing characterized by the maintenance of the physical, intellectual, working and social capacities of the elderly, no longer seen only as a bearer of needs but as a resource for society. *Active ageing* therefore defines the need to reframe a strategy for promoting health and enhancing the value of the person over 64, in line with the objectives that WHO Europe defines in the *framework* offered by the *Strategy and action plan for healthy ageing in Europe, 2012-2020*.

Physical activity is therefore central to the process of ensuring healthy and active ageing in society. There is a great deal of scientific evidence underlining the importance of regular physical activity, especially in the elderly population.

In many countries around the world, population ageing is a reality that poses challenges similar to those mentioned earlier. With advancements in medicine and improvements in living conditions, people are living longer, leading to a growing proportion of elderly individuals in the population.

As highlighted above, life expectancy is increasing, but not without consequences! Scientific studies show that the number of people aged 60 and over in the population is projected to reach 1.4 billion by 2030 and 2.1 billion by 2050.

In Italy, the proportion of older adults in the population has been increasing significantly in recent years. In 2021, approximately 23% of the Italian population was 65 years old or older. This figure is projected to continue rising due to increasing life expectancy and declining birth rates in the country. It is estimated that by 2030, the proportion of older adults in Italy could reach 27% of the total population, and by 2050, this percentage could reach 34% (Eurostat - Population and Housing Statistics. Data for 2021 and projections for 2030 and 2050).

Similar demographic changes have been observed in Bulgaria, Romania, and Spain also. In Bulgaria, around 22% of the population was 65 years old or older in 2021, and this rate is expected to increase in the coming years due to improvements in life expectancy and declining birth rates (World Population Review - Bulgaria Population 2021). In Romania, approximately 19% of the population was 65 + in 2021, and this percentage is projected to continue rising in the coming decades (World Population Review - Romania Population 2021). Similarly, in Spain, around 20% of the population was older than 65 years in 2021, and this percentage is expected to increase as the population ages (World Population Review - Spain Population 2021).

This ageing trend in the four countries poses challenges for healthcare systems, social services, and pension systems. Moreover, promoting healthy lifestyles and encouraging physical activity among older adults becomes essential to improve their overall well-being and prevent age-related chronic diseases and disabilities. Also, in this context, the importance of the caregiver profession increases, and the skills that a caregiver should acquire must take into account the high life expectancy and active aging trend worldwide.

Regarding the physiology of older adults and their capacity to engage in low-impact or moderate activities, it is essential to consider that ageing brings natural physiological changes in the body. These changes can affect muscle strength, bone density, flexibility, and cardiovascular capacity. However, it is important to emphasize that ageing is not a sentence to inactivity or lack of participation in physical activities.

Detailed guidelines for recommended physical activity levels in older age are presented in Module no 2.

1.1.2 Signs of ageing (at individual level)

Biological ageing begins earlier than is generally believed. It is, in fact, in early ageing more precisely around the age of 30, that an inevitable process begins and manifests itself through specific and recognizable symptoms related to the different functions of organs and tissues. Biological ageing, although related to many different environmental and random factors, is essentially a genetically programmed event that occurs through changes in the functioning of the nervous, immune, and endocrine systems.

The main signs of ageing include:

- Loss of overall energy and force
- Decreased muscle power and lean mass
- Hypertension

- Decreased visual and hearing capacity
- Memory loss
- Increased cholesterol levels
- Increase in cardiovascular diseases
- Bone weakening
- Decreased neural plasticity

From the physical point of view, the age-related loss of muscle mass will be particularly analyzed here, as it is particularly impacting on the enjoyment of a healthy and active old age and independent life. The loss of muscle mass progresses gradually but from the age of 60 it becomes more evident. Among the main causes: *hormonal factors* such as reduced blood levels of growth hormone and testosterone; *neurodegenerative factors* such as depletion of the nerve cells that control skeletal muscle activity and finally, *poor eating habits* and *sedentary lifestyle* that result in weakened muscles and their atrophy. Muscle weakness, poor resistance to physical exertion, slowness in the simplest movements, difficulty in carrying out daily activities and the need of support from others, are just some of the consequences of losing muscle mass. Although a physiological process, these changes can be partially counteracted and slowed down through a combined approach of *proper nutrition, including supplements* and *exercise* (Revista Española de Geriatria y Gerontología, 2011, p.105).

1.2 Conceptual clarification and attitudes of elderly towards physical activity

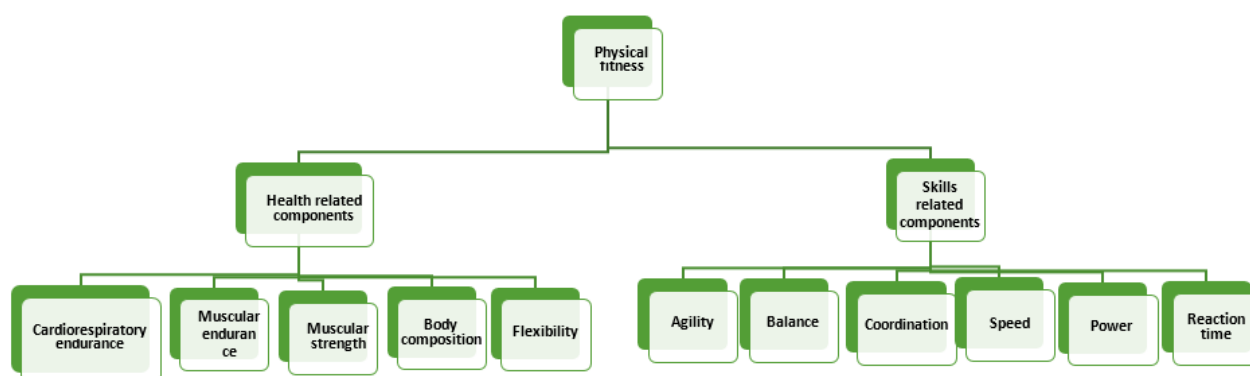
- ✓ definition of physical activity and its components
- ✓ definition of physical inactivity, definition of sedentarism (SB)
- ✓ the increase of SB with age – evidence from research studies

In this module we briefly present classic concepts and clarifications such as *physical activity*, *physical fitness*, and *exercise* in parallel with *sedentary behavior* and *physical inactivity*, extracted from reference literature to establish a common framework in study of the link between physical activity and health outcomes of older adults.

Physical activity is defined as “any bodily movement produced by skeletal muscles that results in energy expenditure that can be measured in kilocalories” or kilojoules. Researchers reveal that “physical activity in daily life can be categorized into occupational, sports, conditioning, household, or other activities” (idem). Physical activity is different from exercises because the latter are planned, structured and repetitive (Caspersen e.a, p.126-128), therefore exercises are just a subcategory of the physical activity. Both exercises and physical activity are positively correlated with physical fitness, but not in the same measure, more effects on physical status shall be obtained from structured exercises. In the case of seniors, which are not anymore involved in occupational areas it is important to mention that there are other forms of physical activities that may be considered, such as conditioning exercises, sports, household tasks (for example, yard work/gardening, cleaning the car, and home repair), and other leisure activities. It is well known that physical activity promotes a virtuous circle on older adults: some physical activities (not only the repetitive exercises) help the older adults to gain health benefits which leads to better performance of their daily activities, including “eating, dressing, bathing, getting into or out of a bed or chair, and moving around the house or neighbourhood” (U.S. Department of Health and Human Services; 2018,

p. 67). Physical status (or physical fitness) includes a set of attributes that are either health- or skill-related (figure no 2).

Fig 2. Components of physical fitness, adapted from Caspersen e.a, p.128



At the opposite pole there is the concept of physical inactivity, which is not identical with sedentarism, but it is strongly related to it. There is a consensus regarding the concept of physical inactivity, which may be seen as “an insufficient physical activity level to meet present physical activity recommendations” (Tremblay et al, 2017, p.9). The recommendations stated by the global community of physical education and health specialists regarding the adults and older adults are detailed in the second module (not achieving 150 min of moderate-to-vigorous-intensity physical activity per week). Inactivity is defined in a similar way by the US Department of Health and Human Services as *participation in no activity beyond baseline activities of daily life*.

Some researchers characterize the Sedentary Behaviour by a lack of movement, and others by postural allocation. Sedentary behavior (SB) is defined most frequently as “any waking behaviour characterised by an energy expenditure ≤ 1.5 metabolic equivalents (METs), while in a sitting, reclining, or lying posture” (Tremblay et al, 2017). The literature gives examples of sedentary activities that do not increase energy expenditure substantially above the resting level (Owen e.a, 2011 apud Tremblay et al, 2017): “sleeping, sitting, lying down, and watching television, and other forms of screen-based entertainment”. These examples are recurrent in almost all definitions: TV watching, computer/devices use, sitting in a bus, reading etc. It is relevant that the specialists define the sedentary behavior for people with physical impairment who use a manual wheelchair or a power chair, which may be the case of some of the older adults. In their case some sedentary activities would be: “use of electronic devices (e.g., television, computer, tablet, phone) while sitting, reclining or lying; reading / writing / drawing / painting / talking while sitting; sitting in a bus, car or train; moving from place to place in a power chair; being pushed while passively sitting in a manual wheelchair” (Tremblay et al, 2017, p.9).

Many studies reveal the fact that the prevalence of SB and the inactivity increase with advancement in age: adults aged 50 to 64 years old report inactivity rate of 25,4%, 65 to 74 years old (26,90%), and 75 years and older – 35,3% (apud Mora J.C, Valencia W M., 2018). Older adults aged ≥ 65 years are considered the most sedentary age group comparing to adults in general, for example older adults spend on average 8.5-9.6 h daily sitting time, comparing to adults in general, who spend more than 4 hours and 30 minutes of sitting time/day (apud Wullems JA e.a, 2016). The SB prevalence of older adults mentioned in a study with 96,004 adults included as a whole sample and country-by country in 2002, 2005, 2013, and 2017 of the Sport and Physical Activity EU Special Eurobarometers’ data. From this sitting time, the most frequent pattern for older adults is the screen time: “older adults watch on average 3.3 h TV daily, with more than half of the age group (54 %) sitting in front of the TV for

3 h, while 65 % of older adults use computers, but less than 10 % use it more than 1.6 h daily” (Harvey et al. 2013 apud Wullems et al., 2016, p.565). In this context we may observe the positive attitude of the elderly worldwide towards light or moderate physical activity and the gap between the attitude and their real behavior characterized by sedentarism (e.g. “98% of adults over the age of 50 recognize the importance of physical activity to maintain health, yet only a small minority of these adults meet the minimum daily physical activity recommendations”, Ory et al, 2010). British data indicate that at least half of people aged 70 and over spent more than 80% of their time being sedentary (Davis et al., 2011, apud Stamatakis e.a, 2012). The same gap between the positive attitude and the unhealthy behavior is encountered in different Romanian research: Sabau e.a (2011) conducted an empirical study on a small group of Romanian elders. The results show that “the elderly are aware of the positive effects of physical exercises but they are not involved in such practice in the same measure”. Most respondents recognized the benefits of physical activities for health, the percentage for the women interviewed (82.85%) being slightly higher than the percentage of men (75.86%). Meanwhile from the group of the respondents 48.27% of men answered that they were inactive (no physical activity) and 65.71% of women do not practice any sort of physical activities. We mention the limitations of the cited study from Romania, which is carried out on a small sample of respondents.

1.3 Relevant variables in the practice of physical activity in old age

Europe's unprecedented ageing trend corroborated with the observation of World Health Organization regarding the insufficient rate of the world's adult population (more than a quarter) influence the way care services meet current demands in many European Countries. Physical inactivity is in fact considered one of the leading risk factors for noncommunicable diseases (NCDs) and death worldwide. In particular, it increases the risk of cancer, heart disease, stroke and diabetes by 20–30% (American Diabetes Association, 2018). Physical activities have a considerable impact on the mental and physical health of individuals, but these practices are correlated with numerous factors, both personal and external, which play a decisive role in the physical practices of individuals. External factors refer to the cultural, social and political environment of each individual, while personal factors take into account a multitude of aspects such as: gender, age, personal habits, social circle, education, etc.

1.3.1 External factors

Firstly, we'll consider the external determinants before looking at parameters that are specific to each individual, but which have an essential role in their health. As you may know, some nationalities tend to do more sport than others, for example the Nordic European nationalities (e.g, Finns) comparing to Mediterranean nationalities (Portugal, Greece) or Poland (observe Module no 2 for further evidence).

The behavior towards physical activity (PA) differs not only among individuals from different countries but also among people living within a single country. For example, a study from 2019 revealed that individuals living in the northern regions of Brazil were more likely to be inactive compared to those residing in the southern regions (Santos da Silva e.a, 2023, p.7). This study aimed to investigate the factors related to participation in physical activity (PA) in Brazilian older adults, considering sociodemographic aspects, eating habits, self-rated health, activities of daily living, noncommunicable diseases, mental health, and public policies. A cross-sectional

design was used, and data were collected from the Brazilian National Health Survey in 2019, with a sample of 22,726 participants aged 60 years or older, of both sexes. The results of the study showed that men were more active than women, and those living in the north and northeast regions of Brazil were more likely to be inactive compared to the southeastern region. These findings are predictable considering the significant socioeconomic gaps, variations in infrastructure, levels of urbanization, and disparities in life expectancy between both regions. The socio-economic factors from rich South part, can significantly impact the accessibility to engage in physical activity, through the availability of spaces for such activities, which predominantly consist of private facilities in Brazil. Additionally, those with higher educational levels and higher incomes, healthy eating habits, positive self-rated health, better functional autonomy, and access to public places for PA near their home were more likely to be active. However, having noncommunicable diseases (NCDs), such as hypertension and diabetes, was not associated with higher levels of PA in this study. On the other hand, the presence of depression also did not show a significant association with participation in PA.

Nevertheless, the perspectives and policies developed in each country have an important impact on people's practices. A report published by the WHO in 2020, entitled *Assessing national capacity for the prevention and control of non-communicable diseases*, demonstrates each country's commitment to tackling physical inactivity. Through this report, we discover that 91% of countries have a policy, strategy, or action plan to address physical inactivity, but only 79% have an operational policy, strategy, or action plan. Globally, European countries have adopted more plans to combat non-communicable diseases and factors that lead to their development. The national recommendations for physical activity in these countries are mainly aimed at children over 5 years old, adolescents and adults, and only later at older people. Aspects on which policies can act to promote physical activity are numerous and not negligible. Indeed, they play a role in the existence of adapted public spaces, the existence of sports associations, the awareness of sports practices, their accessibility, etc. In recent years, we observe a rise in policies related to physical activity and, at the same time, towards ageing as well.

Furthermore, the place of residence is a decisive factor, as shown by ESTAT in the table entitled Persons performing physical activity outside working time by duration in a typical week, most frequent activity status, quantile, and degree of urbanization (Eurostat, 2021). People living in rural areas spend proportionally less time on physical activities than people living in cities or on the urban periphery. Many reasons could be given (travel time for sports activities, work, shopping, etc.). However, the data collected vary considerably depending on the country and its culture. For example, 5.6% of Romanians living in rural areas admit to not practising sport, compared to 69% in Croatia. This difference is related to a combination of socioeconomic, cultural, and environmental factors that influence participation in physical activities in both countries.

Socioeconomic factors: Economic development levels and access to resources can vary significantly between countries. In Romania, people in rural areas may have less access to sports facilities, organized physical activity programs, and recreational opportunities compared to those living in urban areas or more developed countries like Croatia.

Cultural factors: Cultural attitudes towards physical activity and sports can also vary between countries. In some places, the culture may promote an active and healthy lifestyle, while in others, physical activity may not be as valued or prioritized.

Environmental factors: The physical and geographical environment in which people live can influence their opportunities for sports participation. In rural areas of Romania, the infrastructure may be less conducive to physical activity, while in some regions of Croatia, the natural environment may favor outdoor activities.

Educational and awareness factors: Education and awareness about the benefits of physical activity also play an important role in people's participation in sports. Lack of information or knowledge about the importance of physical activity for health could contribute to lower participation rates in some areas.

1.3.2 Personal factors

From a sociological point of view, people aren't born equal. Each individual has his or her own particularities resulting from gender, genetics, social context, age, etc. In this section, we will discuss some personal factors that significantly influence sedentary behaviours.

Firstly, age and gender are key characteristics. Indeed, as we have seen previously, age obviously has consequences for the health status of individuals. The sex of a person at birth is accompanied by certain physical characteristics which have consequences on the behaviours of individuals, particularly in terms of their physical activities. Genetics can also reveal certain inherited physical characteristics that can affect physical activity. Some hereditary diseases are real barriers to daily exercise, as are non-genetic diseases such as arthritis, obesity and depression. Also, it has been mentioned in the review literature that over the years men are less sedentary than women, in all age groups maybe because of smaller amount of free time for leisure or sport in case of women (Benedetti et al, 2008, p.4). This disparity between gender opportunities is being treated by update European Strategies but there is still progress to be made.

Also, social relationships have a major role in people's actions. For example, a person who associates with people who play sports will tend to do so as well, by mimicry. As sport is strongly associated with social interaction, it becomes, in old age, one of the main criteria for motivating people to engage in sport. In fact, seniors who maintain social contact have fewer health problems.

These social circles also have an impact on the habits of each individual. The most relevant habits to consider are based on the consumption of individuals and their behaviour toward it. As many scientific studies show, a healthy lifestyle contributes to physical well-being. By healthy lifestyle, we mean a balanced diet and a very low consumption of toxic substances, such as cigarettes and alcohol.

In addition, education level is another determinant. We observe that people with higher level of education are likely to have better health outcomes and to engage in more physical activities. Similarly, people's income plays a significant role. Indeed, salaries can allow individuals to practice leisure activities to a greater or lesser extent, which are often sports-related. Some sports are not accessible to everyone, not only from a financial point of view. It should be considered that the practice of a physical activity can in some cases generate a multitude of costs and inconveniences that are not suitable for everyone. For example, the price of the activity, the journey and the conditions to reach the activity: these factors can be limiting for the most disadvantaged people.

In conclusion, physical activity is intrinsically linked to many determinants. Some are inherent to individuals and others depend on habits, personal and professional background, socio-demographic and political context. Inequalities are omnipresent, also in health which is, in fact, not equally distributed neither between countries nor within them, but as we have seen, physical activity is the main ally of a good health and of an active life throughout its duration.

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MODULE 2

Strategies to counteract sedentarism and inactivity among aged people



Image 1. Representation of a healthy heart

2.1 The prevalence of sedentarism and inactivity among aged people from Europe

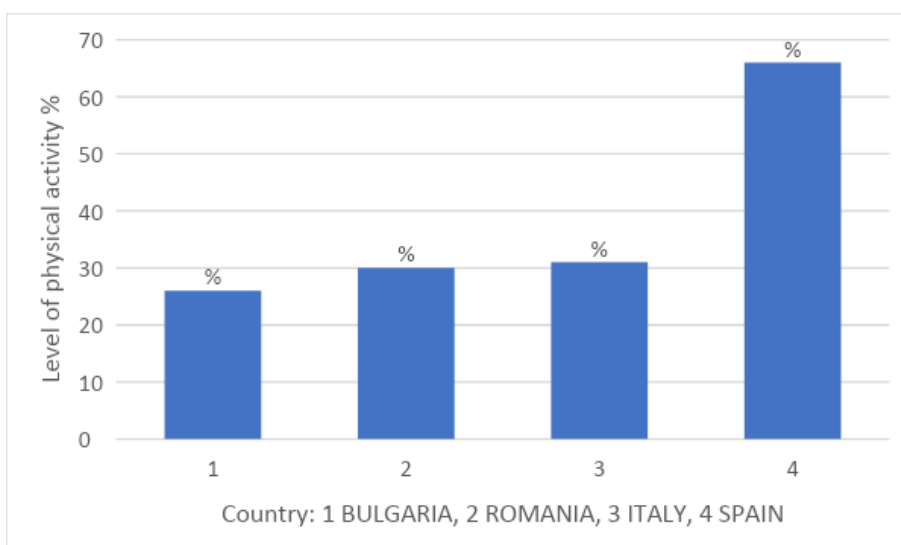
Although physical activity is considered a key factor for a healthy life and it is associated with better physical and cognitive functioning, with improved mental health (including reducing the risk of developing mental health problems, Maynou et al, 2021, p.2) and with increased life expectancy, different comparative analyses across Europe are revealing the prevalence of sedentarism and/or inactivity among older people. One of the most extended analyses (Gomes e.a, 2017) is using data from the “Survey of Health, Ageing, and Retirement in Europe” from 2016: the target group of this survey is formed by 19298 people aged 55 + (mean age 67.8 ± 8.9 years; 11430 people from which 59.2% female) from 16 European countries, including Italy and Spain. We cite below some of the findings of this study:

- the overall prevalence of inactivity among individuals aged 55 + in the 16 European countries included in the study was 12.5%
- variation of physical inactivity between countries, ranging from 4.9% (Sweden) to 29% (Portugal)
- the significant variables associated with physical inactivity were: “increasing age, depression, physical limitations” (such as changes in mobility, arm function or fine motor limitations), also poor sense of meaning in life, the presence/absence of social support and memory loss. For example, in terms of behavior these physical limitations may be described as: the difficulty in walking 100 meters by themselves or receiving help for personal care or household tasks from family or a professional (during last year, reported at the time of the interview).

This general picture of the prevalence of sedentarism is confirmed by the conclusions of other studies treating the prevalence of sedentarism worldwide. For example, another research considering a period of 15 years of SB monitoring between 2002-2017 highlighted an increase in SB for EU adults both as a whole and while considering genders separately (López-Valenciano et al, 2020, p.3). Romania, Bulgaria and Italy showed higher prevalence in 2017 than the expected rate (idem, p.4). Meanwhile, Spain is one of the countries which introduced public health guidelines on SB on its general policy (idem, p.8). Also, an interesting result is that older women included in the study have been proved to be less sedentary than older men, probably because they still spend more time on household activities (idem, p.8). This result provides evidence that physical activity may be considered and counted/measured also in terms of occupational and household, not only in terms of physical exercises.

The data presented above for the four countries of the partners’ organisations of the project (Bulgaria, Italy, Romania, Spain) are also confirmed in the complex document *Physical activity factsheets, 2018*. This is a survey issued by The Regional Office for Europe of the World Health Organization that contains the 2018 update of the physical activity country factsheets of the 28 European Union Member States of the WHO European Region, that were first published in 2015. The highest level of sufficient physical activity monitored in adults from the four countries is registered in Spain, with 66% for adults aged 18-69 years and with 68% for older adults 60-69 years (see fig 2.1). For the other 3 countries the prevalence for adults and older adults age groups are not analyzed separately. The measuring methods used for sufficient level of PA were not identical in all 28 countries this is why we have consulted also other sources, being difficult to compare levels among countries.

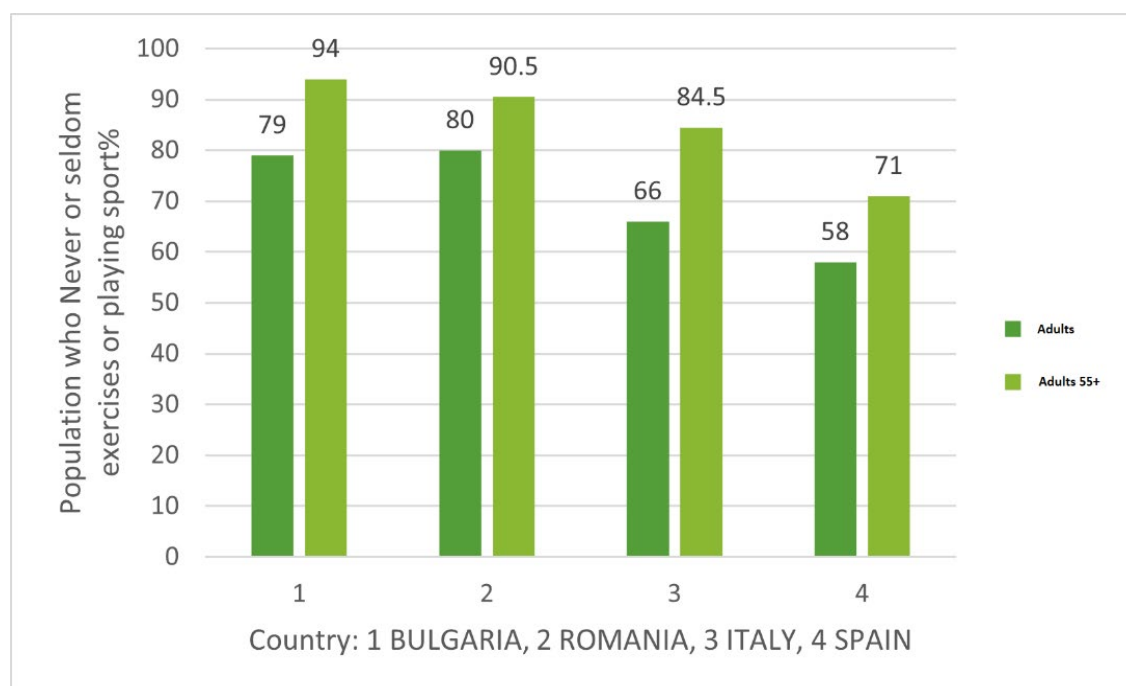
Fig 2.1. Chart of prevalence of sufficient physical activity level in adults from BG, RO, IT, SP



Source: adapted from Physical activity factsheets, 2018

Similar results appear in the Special Eurobarometer no 525 from 2022, with the mention that in this Eurobarometer there were included rates of frequency of exercise or playing sport and frequency of engaging in other physical activity, outside sport. Romania and Bulgaria have higher rates of population for both categories analyzed (people who never/seldom practice sport or people who do not practice any other physical activity), compared to Italy or Spain. The rate of adults aged 55+ who do not do practice sport or exercises is even higher. The rate of adults aged 55+ who do not do practice sport or exercise is even higher, but the ranking for the four mentioned countries changes slightly (Romania has a slightly lower rate compared to Bulgaria, in the 55+ age segment).

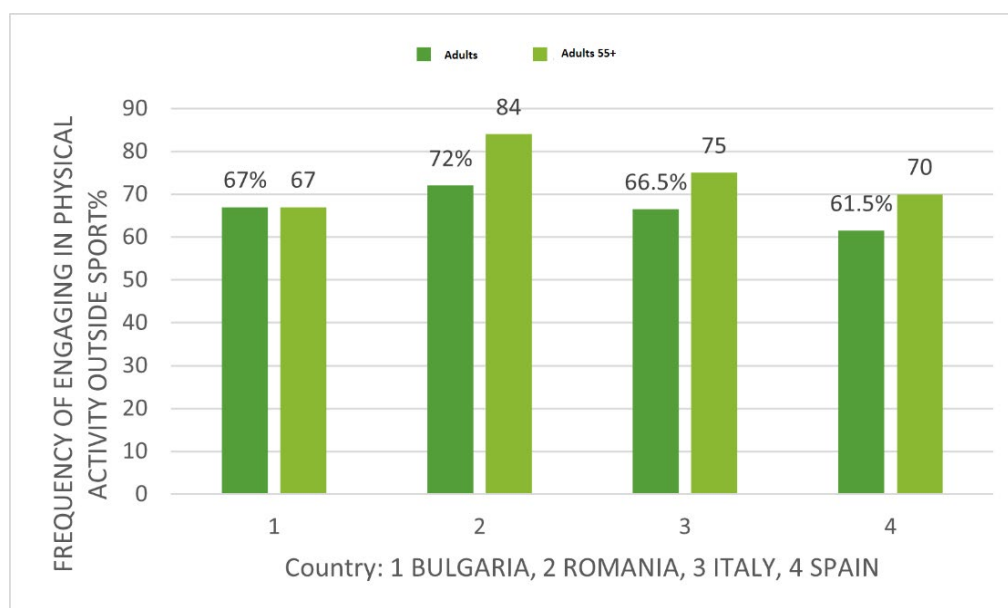
Fig 2.2 Rate of the population that never or seldom exercises, %



Source: adapted from Special Eurobarometer 525, 2022

The rate of adults who never or seldom engage in other physical activity (outside sport) such as cycling from one place to another, dancing, gardening is generally lower for the 4 countries comparing to rate of adult population practicing sports. Thus, the Eurobarometer shows that the rate of adults aged 55+ who practice other forms of physical activity is much more satisfactory than that of those 55+ who practice any sport. This result could outline a strategy to combat the sedentary lifestyle of the elderly in the 4 mentioned countries, which would include light physical activities (dancing, gardening etc) rather than specific sports.

Fig 2.3 Rate of the population that never or seldom engages in other physical activity outside sport, %



Source: adapted from Special Eurobarometer 525, 2022.

Thereby, level of sufficient physical activity in different European countries varies in adulthood from modest scores of 26%-31% (Bulgaria 26%, Romania 30%, Italy 31%) to 66% (Spain) or 67% (Sweden) and similar even lower results are present in older age (e.g, 55% for older adults in Sweden) (Physical activity factsheets, 2018). Also, data we encounter in 2022 highlight that respondents from Nordic countries are the most likely to exercise or play sport: Finland (71%), Luxembourg (63%), the Netherlands (60%), and Sweden and Denmark (59% in both countries). The medium percentage of people in EU who regularly practice any form of PA is 6% in 2022. In Romania the percentage is 2% (among the lowest self-reported results, similar to Poland), in Bulgaria the percentage of the population is 4%, in Italy it is 3%, in Spain it is 11%. The highest scores are reported for Luxembourg respondents (13%), Ireland (13%) and Finland (18%) (Special Eurobarometer 525 report, 2022, p.10). The results for the segment which regularly practice PA are similar with those of the segment of population which never engages in PA within the same country.

We might have expected things to happen differently, in states where the culture of physical education has had more time to take root on the background of an active democracy, community involvement and public policies. Despite clear benefits of physical activity, we find out that 27.5% of US adults 50 and over, approximately 31 million persons, self-reported as inactive (Mora J.C, Valencia W M., 2018).

2.2 Impact of sedentarism among older adults' life

Sedentarism influences in many negative ways the daily life of older adults, from risk of falls to depression and reducing functioning capacity. For example, falls are *major causes of mortality, morbidity, and premature nursing home placement for older adults*. Depression is more frequent among older adults than in adulthood because of losing the sense of meaning and purpose in life (often as a consequence of retirement) and it “*increases their risk of suicide, dementia and functional decline*” (Kanamori et al, 2018). A group of researchers (Wullems and colleagues) conducted in 2016 a meta-analysis of the specific literature (94 other relevant articles) analyzing the identified and suggested associations between SB and health outcomes in older adults, such as: cardio metabolic health, body composition, physical independence, quality of life, muscle-tendon health, bone health, cognitive/mental health and (all-cause) mortality (see Wullems JA e.a, 2016). The conclusions regarding the positive or negative associations revealed by those studies are synthesized in the figure 2.4 and more detailed explanations are present in Table 2.2 listed below. The negative associations are overwhelming compared with few positive associations which can not be explained only by the SB, meaning other influencing factors intervene. At the same time, physical inactivity is considered among the leading risk factors for global mortality no matter the age (ranking fourth place after high blood pressure, dietary habits and tobacco smoking, WHO, 2021) and it is also a major contributing factor for functional decline or disability and for poor health outcomes, including frailty in older people (Gomes et al, 2017, p.72).

A recent systematic review shows that nearly 50% of older adults who are residents of a nursing home present functional decline (FD) over the time of institutionalization. In the cited study, in 1 year, 38.9% to 50.6% of residents experienced functional decline. The licensed nursing hours delivered and the presence of a geriatrician within the Nursing Home staff were considered as protective factors against FD (Moreno-Martin e.a, 2022). In this situation the promotion of physical activity is at least as necessary as in the case of the elderly who are autonomous and who are not institutionalized, in order to avoid functional decline and to prolong certain degree of autonomy.

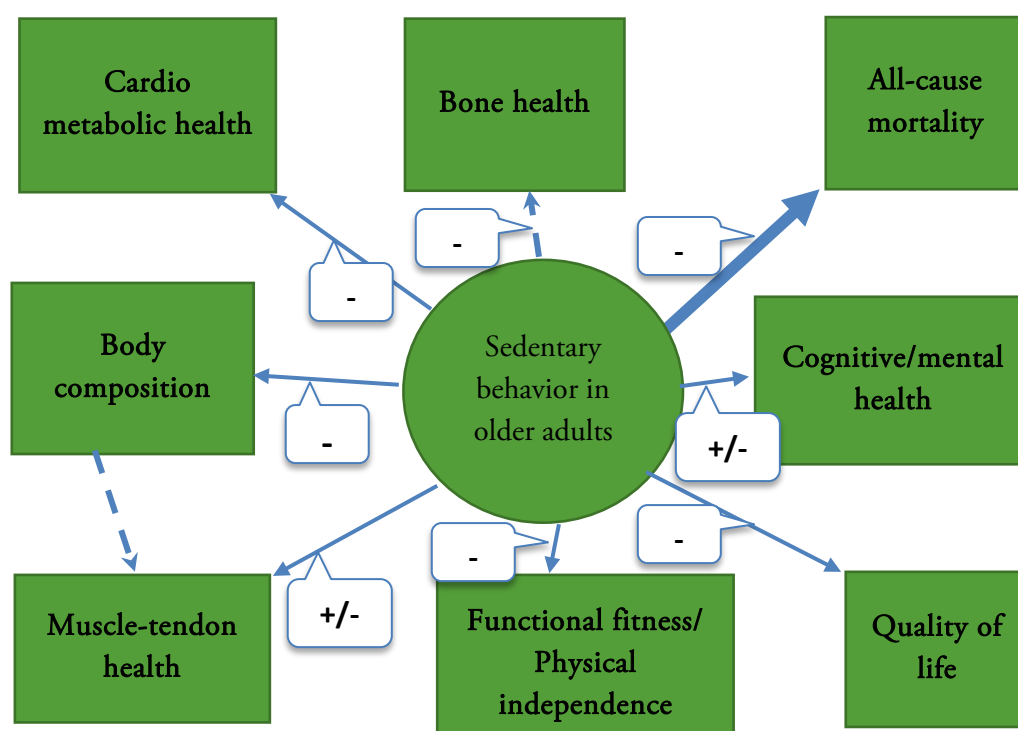


Fig 2.4. Overview of associations between SB and health components apud. Wullems and colleagues, 2016, p.557

Legend for Figure 2.4:

+ indicates positive association

- indicates negative association

Solid lines represent the evidence (identified associations in previous research studies)

Dashes lines represent suggested associations only

Associations in Bold line represent a reconfirmation by a systematic review of other authors

Table 2.1 Detailing the associations identified between SB and health outcomes from overview literature

Category of health component	Evidence for positive association	Evidence for negative association
Bone health	-	Skeletal Sedentary Behavior shifts bone balance, boosting resorption, reducing mineral content, and raising osteoporosis risk. (Kim et al. 2003; Tremblay et al. 2010).
Cardio metabolic health & mortality	-	<p>TV viewing and self-reported SB are positively associated with (1) dyslipidemia (high triglycerides, low HDL), (2) obesity, (3) hypertension, (4) glucose intolerance (in women only) and (5) cholesterol index and (6) diabetes prevalence (Stamatakis et al. 2012). (Gao et al. 2007; Gardiner et al. 2011c; Inoue et al. 2012; Lenz 2014; Stamatakis e.a 2012) apud Wullems, 2016, p 558-561.</p> <p>One of the most interesting studies regarding the negative association between SB and cardio-metabolic risk factors was conducted in England with a sample of 2765 participants ≥ 60 years who self-reported SB and it was published in 2012; from these people 649 persons had also accelerometer data available. We cite some of the most relevant results: ► Associations are more consistent for self-reported sedentary behavior. ► “Risk factors included BMI (body mass index), waist circumference, cholesterol ratio, Hb1Ac* and diabetes”. ► Self-reported sedentary time excluding TV watching is found to be associated only with diabetes. ► Sedentary behavior measured by accelerometer is only associated with waist circumference (Stamatakis e.a 2012).</p> <p>* Hemoglobin A1c (HbA1c) is a form of hemoglobin that is bound to glucose. It is determined through a blood test that is routinely performed in people with type 1 and type 2 diabetes mellitus.</p>
Musculoskeletal health (muscle-tendon)	TV viewing correlates with reduced muscle strength, whereas the converse is true for computer usage or reading (Hamer and Stamatakis 2013, Wullems, 2016, p 557). The positive effect may be explained by the educative purpose	<p>- The negative effect of TV exposure for a long time a day might result from lower energy expenditure corroborated with unhealthy eating behaviors during TV watching (Wullems, p.557).</p> <p>- Higher level of TV watching was also related to sarcopenia and limited physical function by certain specialists (Gianoudis et al. 2015, ibidem); sarcopenia</p>

	of computer use/reading – which may be used as mental stimulation tools for improving cognitive performance capacities (Visser and Koster 2013; Lenz 2014, apud Wullems, 2016, p 559).	is seen as a natural process during ageing and it is defined as the progressive decline of muscle mass and strength, among older adults which affects different functions including walking.
Functional fitness	-	Physical inactivity of older people increases the chances of appearance of functional dependence; also, the dependence may occur for these people if they weren't active during their middle age (Dogra, Stathokostas 2012; Marques et al. 2014).
Mental/cognitive health and Quality of life (QoL)	-	<ul style="list-style-type: none"> - SB is inversely associated with cognitive performance (Balboa-Castillo et al. 2011; Steinberg et al. 2015) with vitality, sociability and mental health (Balboa-Castillo et al. 2011) - non-sedentary elderly people show lower indicators of depression and dementia – evidence from a study with 869 subjects (Benedetti et al., 2008) - “physical activity is able to reduce and/or delay the risks of dementia, although it cannot be stated that physical activity avoids dementia” (idem)

Source: adapted from Wullems et al, 2016, pp.557-559

2.3 The Real-life Benefits of Physical Activity - a perspective based on multiple factors and intervention strategies

The benefits of physical activity as health outcomes or skills are widely spread and explained in books, research papers, practical guides, and training materials. The outcomes may be described either as health (mental tone/cognitive performance, quality of life, cardio-vascular system, bone health) or in terms of skills such as coordination or balance (as in the figure no 2.1) in order to prevent the falls, which are a major cause for immobilization of elders. The importance of keeping active in older age is reaffirmed in different studies and guides: “moderate to vigorous physical activity is associated with a reduced risk of chronic diseases, including Type 2 diabetes, cardiovascular diseases, cancer, depression, and metabolic syndrome” (Gill et al 2015, apud Gomes et al, 2016, p. 72). Also, physical activity may be used as a prevention method for mental health, reducing the risk for depression in older adults who often experience a sense of isolation or lack of meaning/purpose. A study conducted on Japanese older adults (on a sample of 1,422 adults aged 65 years or older) suggested that engaging in physical activity at least twice a week and/or participating in group exercises can reduce the likelihood of experiencing depression examined with the geriatric depression screening scale, GDS15 (Kanamori et al, 2018, p.4). But what is it to be done when depression has been already installed? PA seems to be also the answer, due to the fact that physical activity affects in a positive way how individuals cope with depressive symptoms by enhancing social interaction meaning expanding their sociability and also by physical stimulation (meaning a better corporal and senses awareness) (Benedetti et al, 2008, p.5).

PA may have a role in prophylaxis (it prevents the development of Alzheimer, it slows the cognitive decline, it prevents the bone fractures by strengthening the muscle and bone system, it decreases the occurrence of cardiovascular conditions or events like heart attacks, hypertension or congestive heart failure) and in the same time it may be seen as a remedy tool in the life of older adults (it reduces insulin resistance, also it reduces bone mineral loss and osteoporosis, it diminishes musculoskeletal pain, it decreases the consumption of medication, it maintains the neural plasticity, it increases the self-esteem, the cohesion and the social integration of the elderly, it improves the quality of sleep etc, Aguilar-Chasipanta e.a, 2020, pp 688-691).

Even in cases where it seems impossible or improbable, physical movement is recommended; for example, after a hip fracture surgery, intensive exercise can improve participants' physical function to a greater extent than regular or no exercise (Bai et al., 2023). Also, for elders who experience osteoarthritis, which is a common condition in older age, it is recommended "to practice regular physical activities, to lower their risk of getting other chronic diseases, such as heart disease or type 2 diabetes, and to help maintain a healthy body weight". It is very difficult to break the vicious circle. An older adult with osteoarthritis might encounter pain and fatigue, posing challenges to initiating or sustaining regular PA. Both, the elder and the caregiver should be aware that exactly aerobic and strengthening activity (muscle-tendon) performed in a safe way, "provide therapeutic benefits for people with osteoarthritis". Basically, it may decrease the pain, and precisely the fear of pain is one of the obstacles for not starting the activity in the first place in this condition and it has been demonstrated it brings improvements in physic function (Physical Activity Guidelines for Americans, p.82). Furthermore, when the recommended level of physical activity has been achieved in practice, no impact on the progression of osteoarthritis has been observed (idem, p. 43).

Based on the widely accepted idea that physical activity has multiple health benefits, we identified guides or sources that set the general guidelines for adults worldwide up to 65 years of age. One of the most well-structured sources we suggest is an article written in 2007 by a group of researchers from the American College of Sports Medicine and the American Heart Association. But our real interest is in adapting and narrowing these recommendations of physical activity in older adults, aged 65 and more. One of the reference guidelines is entitled "Physical Activity Guidelines for Americans" and it was published in 2018 by two reputable organizations, namely U.S. Department of Health and Human Services in cooperation with the American College of Sports Medicine and the American Heart Association. The cited paper reached its second edition in 2019, being the result of a rigorous scientific review process and provides recommendations on physical activity to promote health and well-being in older adults, considering the particularities and specific needs of this age group.

We encounter major differences in the recommendations for the two age groups, due to the specificity of seniority age, the presence of some limitations, chronic diseases, or the state of frailty. It is demonstrated that in general, an older person will exert a higher level of effort to fulfil the same activity than a young person who is generally more fit. This is the reason older adults may experience certain activities, such as some types of yoga (hata yoga) or tai chi, not as light-intensity activities as they are considered on an absolute scale for younger adults, but as moderate or vigorous intensity. This is why specialists discuss in the case of older adults of the relative intensity of effort on a scale from 0 to 10, taking into consideration the modification of breathing and heart rate (cited guide, p.71).

Table no 2.2 Key guidelines for adults vs older adults regarding the physical activity in close relation with the health status

Guidelines for adults	Guidelines for adults aged 65+
<p>For significant improvements in health, adults with no serious conditions are recommended to engage in a minimum of 150 to 300 minutes (2 hours and 30 minutes to 5 hours) per week of physical activity with moderate intensity. Alternatively, they can opt for 75 to 150 minutes (1 hour and 15 minutes to 2 hours and 30 minutes) per week of vigorous-intensity aerobic exercise, or a balanced combination of both moderate- and vigorous-intensity aerobic activities.</p> <p>When considering frequency, it is recommended that "aerobic activities should be distributed across the week" rather than confined to a single session. This approach not only enhances efficiency but also serves as a motivating factor for adults trying to remain fit and healthy.</p>	<p>High levels of activity are not feasible for many older adults; we may consider for older adults the lower rate of the interval (at least 150 minutes a week etc).</p> <p>We should be aware that every type of activity counts for energy balance and healthy weight; when vigorous intensity activities are not possible, light or moderate activities are worth considering (such as taking the stairs rather than the elevator or 10 minutes of walking in a park/yard).</p> <p>In case of chronic conditions or low physical fitness of older adults, it is possible not being able to perform even 150 minutes of moderate-intensity aerobic activity/ week; in this case "they should be as physically active as their abilities and conditions allow".</p> <p>In case of older adults it is more appropriate to discuss about a relative intensity (comparing to adults) and they "should determine their level of effort for physical activity relative to their level of fitness, in a sustainable and safe way".</p> <p>Older adults with chronic conditions should understand "whether and how their conditions affect their ability to do regular physical activity safely"(see Table 4 with special consideration in case of different pathologies-Module no 5).</p> <p>For older adults with certain health conditions, seeking guidance from healthcare professionals and experts in physical activity is advisable to establish and sustain a consistent physical activity routine. In their case, health specialists should provide recommendations for suitable types of activities and strategies to advance at a secure and gradual rate and the caregivers may assist or help the beneficiary to put into practice the plan.</p> <p>In case of older adults who are more exposed to falls and risks of injury, "their amount of physical activity should be increased gradually" (in brief repetitive bouts).</p> <p>It is unrealistic to expect from a person who was inactive most of his life to change his behavior suddenly at an older age. This is why the example below may be seen as a method of change of sedentary behavior with small steps, gradually:</p> <p><i>An inactive older person could start with "a walking program consisting of 5 minutes of slow walking several times each day, 5 to 6 days a week. The length of walking time could then gradually be increased to 10 minutes per session, 3 times a day, and the walking speed could be increased slowly". This gradual improvement may take from few weeks to few months for those with low physical fitness.</i></p>

Source: U.S. Department of Health and Human Services; 2018, pp. 68-75

In nursing homes or day centers for seniors, generally a multidisciplinary team establishes the program activities for group sessions or individually, according to the specific nature of the group. The caregiver may assist the beneficiary especially when it takes to light intensity activities or relaxing activities and a physical instructor may assist the beneficiary in order to perform moderate or vigorous activities – whenever it is possible. For example, the qualification program of elderly caregiver in Romania mentions under thematic content also some mobilization techniques and exercises for: maintaining muscle tone, maintaining joint mobilization, stimulation of

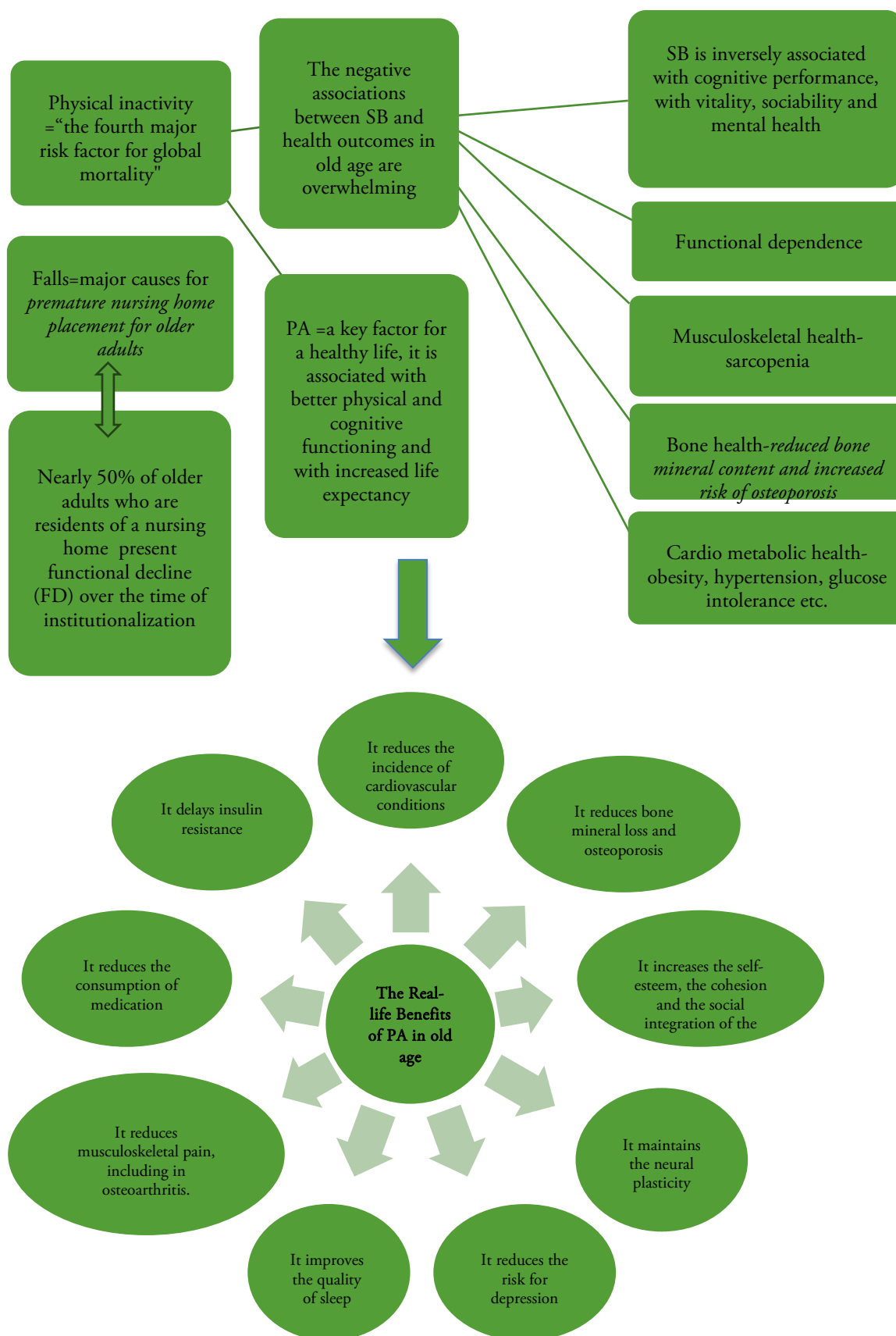
metabolism, stimulation of blood circulation, etc. The caregiver and the physical instructor willing to work in a geriatric center/day center for elders should know the general recommendations limits for a beneficiary to be performed in a week; starting from here they may personalize the activities or to assist the elder in a safe way, also respecting the physicians' or physical therapists' recommendations.

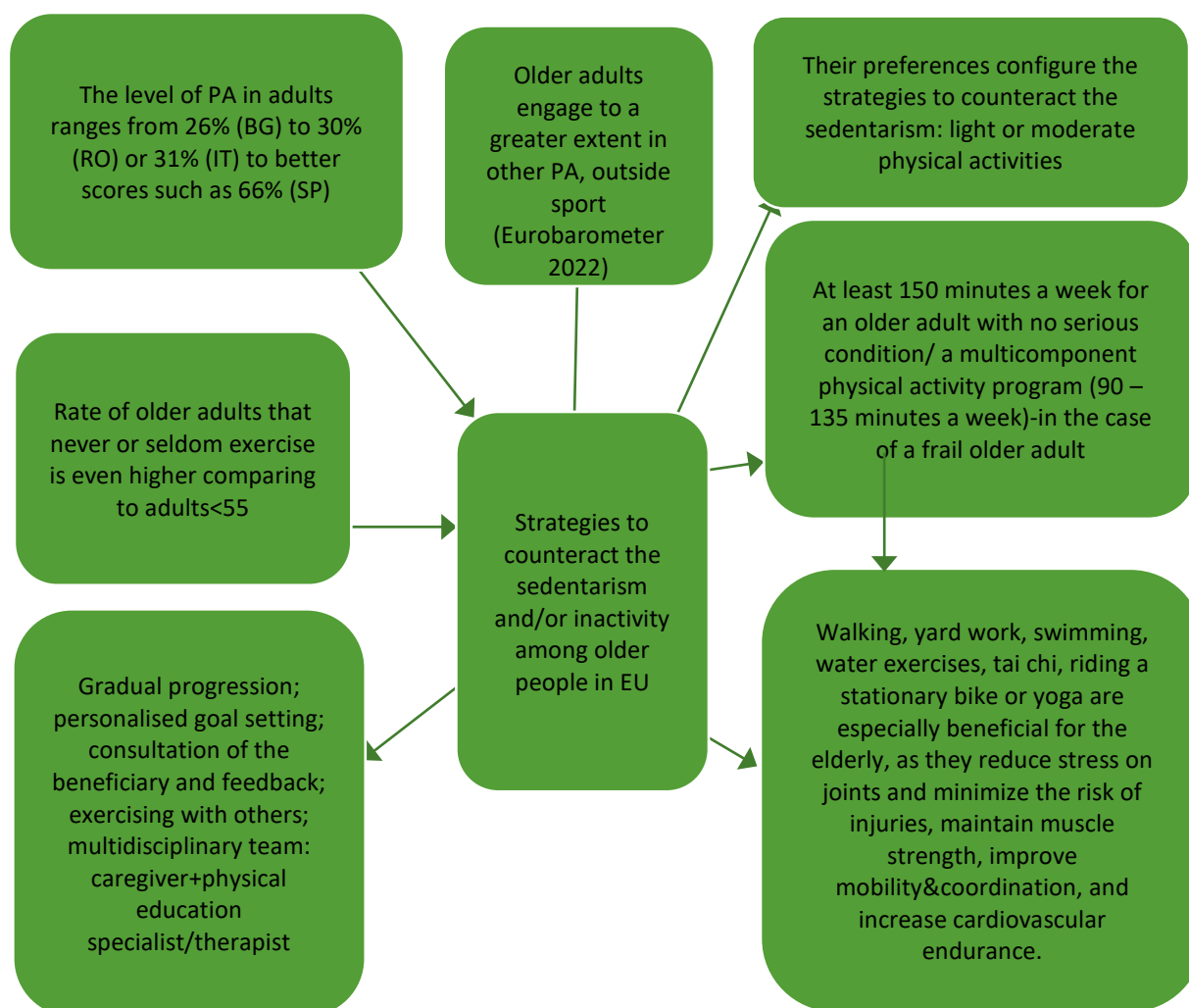
One of the most frequent fears of the elderly interviewed in various researches, including senior athletes is avoiding the state of frailty and vulnerability (see module no. 3). But what can we do when this state of frailty has already set in? The specialists state that it is never too late to become active and some physical activity is preferable than none; engaging in PA has the potential to improve walking and gait, strength and balance, daily activities (under self-reported assessment), and overall quality of life (idem, p.76). In the case of a frail older adult, it is recommended a shorter program of activities, conceived as a multicomponent physical activity program (90 – 135 minutes a week, compared with 150-300 minutes a week for an adult with no serious/chronic condition). The specialists recommend for frail older adult to perform “sessions of 30 to 45 minutes of at least moderate intensity, for 3 or more times a week, over at least 3 to 5 months”, as the most effective way to increase functional ability in frail older adults (*Physical Activity Guidelines for Americans*, p. 76).

The strategy most commonly advised by specialists to mitigate sedentary behavior in older individuals involves "interrupting extended periods of sitting (bouts) with light-intensity physical activity at the very least." (Wullems e.a, 2016, p 547). The programs for elders should be tailored taking into consideration their present limitations (for example, the mobility barriers or using a wheelchair etc) to increase their mobility and their functional daily performance. Also, the type of activities proposed, and their intensity should be adapted, since we have mentioned previously the elders seem to prefer more other PA than real sports. Low-impact or moderate activities such as walking - which has less risks of injury than running - , yard work, swimming, water exercises, tai chi, riding a stationary bike or yoga are especially beneficial for the elderly, as they reduce stress on joints and minimize the risk of injuries, being also gentle to the joints for not involving any contact to the ground or other hard surfaces, which is the case of sports that involve contact or collision (*Physical Activity Guidelines for Americans*, 2019). These activities can help maintain muscle strength, improve mobility and coordination, and increase cardiovascular endurance. In the end, these programs may have a great effect on decreasing the morbidity, the hospitalization rate and the demand on the healthcare system.

“Successful intervention programs to reduce SB in older adults might include personalised goal setting and feedback as part of behavioural self-monitoring” using a consultation approach (Gardiner et al. 2011b; Fitzsimons et al. 2013).

Instead of conclusions, we propose below three graphic figures with the main ideas to remember.





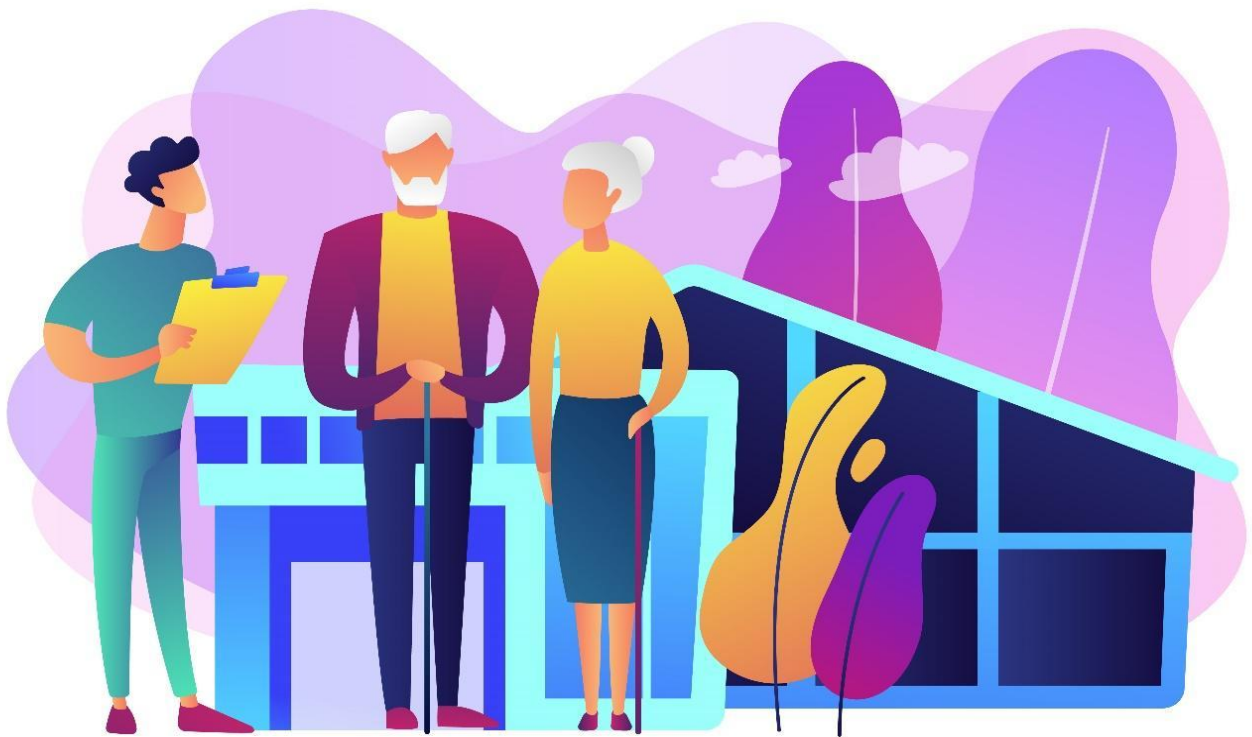
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MODULE 3

Psychology of the elderly and motivation techniques. Behavior and habit change theory.



3.1 Age psychology applied in working with elderly people

3.1.1 Age psychology – theoretical concepts and practical applications

The psychology of ages is a branch of psychology that deals with the study of the sequential changes that occur in an organism, as it goes through the conception-death route (Golu F, 2015). The study of the psychological and emotional changes that occur throughout a person's life is a key element in the psychology of the ages. This discipline focuses on how thinking, behavior, emotions, and social relationships develop and change during different stages of life.

Regarding the psychology of ages or development, as it is also called, the approaches are different according to the basic idea from which each specialist starts; thus for J. Piaget the cognitive dimension is the central concern and for L. Kohlberg an essential role in the psychology of ages is the way of judging some moral dilemmas. For J. Bowlby, the theory of attachment represents the central idea and S. Freud considers the stages of the development of psychosexuality vital.

The American psychologist and psychoanalyst E. Erikson affirms the fact that the development potential of the individual finds its fulfillment throughout existence. Each stage of life is open to a new psychosocial acquisition, as a result of a new developmental crisis. The developmental stage related to old age, or the eighth developmental stage, is called "Integrity versus Despair." Integrity appears when the individual can look back on his own existence, with satisfaction, accepting both his own successes and failures. The opposite situation consists in embracing the idea that there is no time available for the operation of major changes, new objectives and their achievement, moment where despair sets in. The individual becomes disgusted with life, develops a negative self-image that cannot be changed. The conflict of this stage of old age is that of facing death wholeheartedly or with despair.

The stages of development involve in a holistic approach the following aspects:

- physical development
- cognitive development
- psychosocial development
- moral development

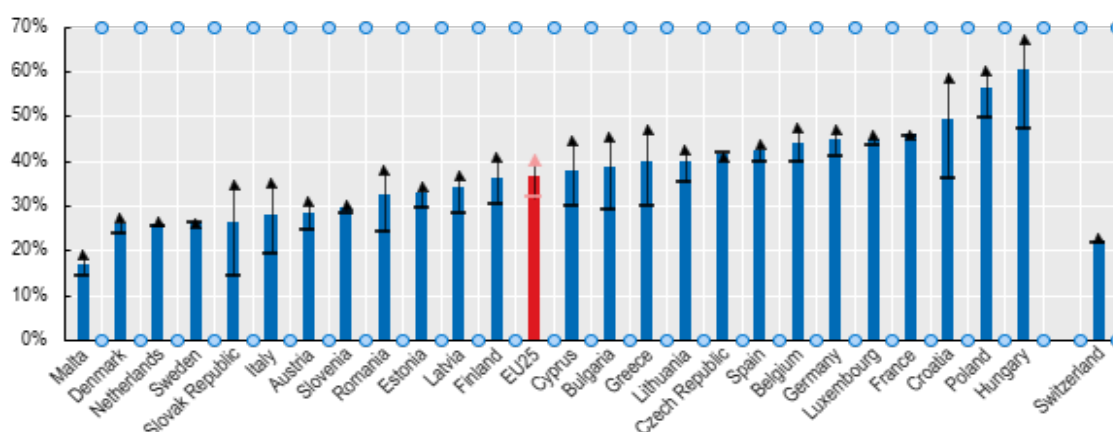
Physical development in the elderly is an aspect that focuses on physiological changes and the aging process in the human body. While each individual has a unique experience with aging, there are certain general characteristics of physical development in the elderly. Here are some relevant aspects:

1. Changes in the cardiovascular system
2. Decreased muscle mass and bone density
3. Changes in the nervous system
4. Changes in sensory functions (sight, hearing, taste and smell)
5. Changes in the hormonal system

It is important to note that each person has an individual experience with aging and that the pace and intensity of physical changes may vary. Proper grooming, regular exercise, healthy eating and monitoring of general health can help maintain optimal health as we age.

Based on the most recent “Survey on Health, Aging and Retirement in Europe (SHARE)”, around 37% of people aged 65 and over reported having at least two chronic diseases in 2017 and around 36% in 2020. Women report multiple chronic diseases more often than men (41% vs. 32% on average in 2017 and 40% vs 32% in 2020). Chronic diseases in this study include “Alzheimer’s disease, cancer, chronic kidney diseases, chronic lung diseases, diabetes, heart attack, hip fracture, Parkinson’s disease, stroke, rheumatoid arthritis and osteoarthritis”. As expected, the prevalence of chronic diseases increases with age. Among people aged 80 and over, 56% of women and 47% of men report, on average, several chronic diseases in EU countries.”

Fig. 1 Multiple chronic conditions among people aged 65+ in 2020



Source: Eurostat, Survey of Health, Ageing and Retirement in Europe (wave 8), 2017, 2020

Practical applications

1. Create a safe and comfortable environment - We must ensure that their home is adapted to their specific needs, removing obstacles that can lead to accidents or falls. Installing grab bars, non-slip floors and adequate lighting can go a long way in preventing accidents and maintaining their independence.

2. Supervise medication administration and maintain a treatment schedule - In this regard, ensuring adequate supervision of medication administration is essential. Providing assistance in organizing medications, setting alarms, and recording administration can help avoid mistakes and maintain their health.

It is also important to schedule regular medical visits and encourage open communication with medical specialists.

3. Provide adequate nutrition and an adapted physical exercise program – In the case of the elderly with diseases and poor physical condition, it is important to provide them with balanced and nutritious food adapted to their specific needs. In collaboration with a nutritionist, a food plan can be developed to meet individual needs. Also, depending on the physical capacity of each person, physical exercises can be established whose intensity is correlated with the health status of the beneficiaries: starting from walking or maintenance gymnastics to sports activities such as Yoga, dancing, swimming, games like ball games, weight and machine training.

4. Provide emotional and social support - In caring for elderly people with diseases and poor physical condition, emotional and social support play a crucial role in maintaining well-being. Social isolation can have a negative impact on the mental and physical health of the elderly, so it is important to provide them with opportunities for socialization and interaction. Regular visits from family and friends, recreational activities, and participation in support groups can help improve their quality of life.

Cognitive development in the elderly is an aspect that refers to changes and the cognitive transformations that occur with aging. Some of the main problems that elderly people can face in terms of cognitive development can be:

1. **Memory:** Memory can change as we age. Some people may experience difficulty retaining and retrieving new information (short-term memory), while others may have a memory of past events (long-term memory) still intact. However, with practice and active memory use, memorization can be maintained and improved.

2. **Thinking and problem-solving:** Thinking and problem-solving skills may remain intact in the elderly, although it may take longer to arrive at a solution or process complex information. Rich life experience and accumulated knowledge can contribute to more mature thinking and effective problem solving.

3. **Cognitive flexibility:** Cognitive flexibility refers to the ability to adapt thinking and change mental strategies in the face of new or challenging situations. In general, this ability may decline with age. However, through mental exercises and cognitive training, cognitive flexibility can be preserved and improved.

4. **Attention:** Attention can experience changes as we age. The elderly may have difficulty sustaining attention for long periods of time or managing multiple tasks simultaneously. However, with practice and active concentration, attention can be improved and maintained at good levels.



Practical applications

1. Create a familiar and structured environment - a familiar and structured environment can help to the stabilization and comfort of the elderly. It is important to keep a familiar setting around them by displaying photos, personal items or decor that hold meaningful memories and experiences. Also, organizing your space and maintaining a consistent routine can help reduce confusion and anxiety.

2. Provide clear and adapted communication - Communication with the elderly requires patience, empathy and a tailored approach. It is important to speak slowly and clearly, using short, concise sentences and simple words or adapting vocabulary. Gestures and facial expressions can be used to support understanding of messages. Careful listening and patience are essential in interacting with these people, and validating and encouraging them will certainly contribute to the quality of the dialogue, increasing confidence and self-esteem.

3. Foster cognitive stimulation and appropriate activities - Cognitive stimulation can improve the quality of life of the elderly. Activities tailored to their needs and abilities can include memory games, art activities and picture reading. They can stimulate thinking, concentration, memory, but also motor skills. Also, participating in occupational therapy or music therapy programs can be beneficial in maintaining cognitive and emotional skills.

4. Provide emotional support and social assistance - Elderly people may need emotionally and socially support in order to face challenges and feel connected. Families and friends play an important role in providing emotional support and maintaining social connections. Creating support groups, where experiences, best practices can be shared, can be beneficial for both older people and their carers.

Psychosocial development in the elderly refers to changes and the social and emotional adaptations that occur as a person ages. At this stage of life, the individual may experience various challenges and changes in social relationships, in personal identity, and in adapting to new roles and tasks. Here are some relevant aspects of psychosocial development in the elderly:

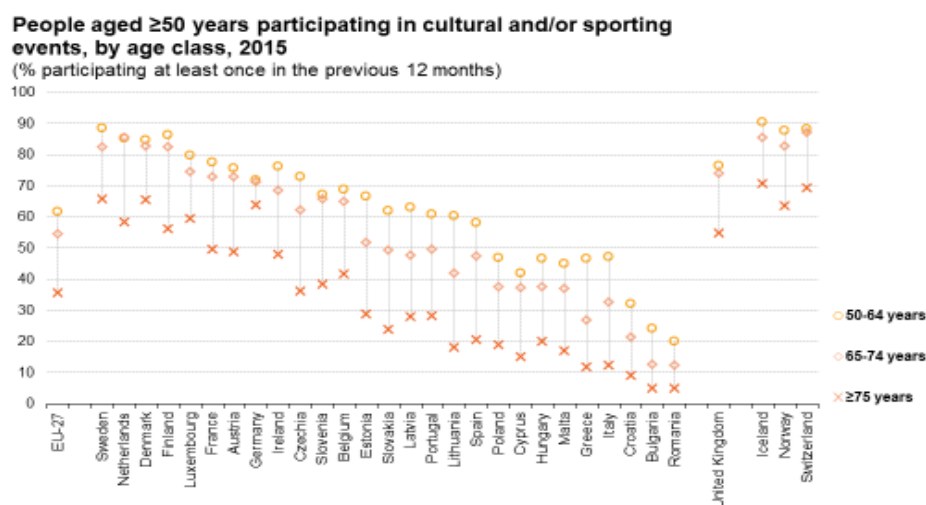
1. **Social Relationships:** Seniors may experience changes in social relationships as they enter this stage of life. Losses of friends and family members may occur, as well as a reevaluation of the social circle. At the same time, new opportunities may arise to build relationships and social connections through involvement in community activities, support groups or volunteering.

2. **Personal identity:** Older adults may face the challenge of redefining their personal identity as they retire from careers and other previous roles. The potential to develop an identity based on rich life experience and the exploration of personal passions and interests can contribute to a positive adaptation to this stage.

3. **Adapting to change:** Aging brings with it a series of physical and functional changes. Adapting to these changes can be a difficult process for older people. It is important to find coping strategies and provide support in managing physical changes, such as maintaining autonomy and functionality, as well as managing health problems and addiction.

4. **Emotional development:** Older people can experience a wide range of emotions at this stage of life, including satisfaction and fulfillment, but also sadness, loneliness or anxiety. Managing and expressing emotions in a healthy way can play an important role in psychological well-being.

5. **Wisdom and life satisfaction:** Many seniors can develop a sense of wisdom and life satisfaction. The accumulated experience and perspective on life can contribute to a deeper and more appreciative understanding of the world around us. According to the study "Ageing Europe — looking at the lives of older people in the EU" carried out by Eurostat "participation in cultural and/or sports events tends to decrease as the population ages. This can be related to a number of issues, including: lack of interest; lack of a means of transport; lack of people to participate with; poor health; lower income levels; distance from urban centers (where most events take place). In 2015, more than three-fifths (61.6 %) of the EU population aged 50-64 participated in cultural and/or sporting events (at least once in the 12 months preceding the survey); lower shares were recorded for people aged 65-74 (54.5%) and for people aged 75 or more (35.6%).



Note: the figure is ranked on the share of the adult population (aged ≥16 years) participating in cultural and/or sporting events. Cultural and sporting events are defined as trips to the cinema, live performances (theatre, music concerts, ballet), trips to cultural sites (historical monuments, museums, art galleries or archaeological sites) or sporting events.
Source: Eurostat (online data code: ilc_scp01)

Practical applications

1. Respect for autonomy and independence - We must recognize and support the right to express one's preferences and make one's own decisions. This can be involving them in care planning, giving them options and ensuring they retain a degree of control over their daily lives.

2. Maintain social connections and relationships - It is important to ensure that they have opportunities to maintain and develop their social relationships. This may include facilitating interactions with family and friends, organizing themed meetings, participating in group activities, and accessing community and social events. A strong social connection can contribute to emotional well-being and maintain cognitive functions.

3. Promote activity and involvement in interests and hobbies - In elderly care, it is needed to promote activities and involvement in interests and hobbies, as they can bring joy and satisfaction, as well as support psychosocial development. Whether it's reading, painting, gardening or other favourite activities, encouraging and facilitating these activities can help maintain vitality and personal identity.

Moral development it refers to changes and transformations in consciousness moral and in evaluating moral values and behavior as a person ages. It is a stage of life in which the individual can reflect on the moral values and principles he has developed over time and can integrate the experiences and learnings gained into a deeper understanding of morality.

Here are some relevant aspects of moral development in the elderly:

1. Reflecting on values and principles: There may be processes of reconsideration and re-evaluation of values and priorities in the light of experiences and knowledge gained. This can lead to a consolidation of some moral values and principles or to their change according to new perspectives and understandings.

2. Moral wisdom: Over time, elders can develop deeper moral wisdom. It involves the ability to evaluate moral situations in a more balanced and comprehensive way, taking into account multiple perspectives and considering the moral consequences of actions. Moral wisdom can be the result of rich life experience and processes of reflection and integration of moral values and principles.

3. Empathy and compassion: The elderly can develop a heightened sensitivity to the suffering and needs of others. Life experience and encountering various situations and challenges can stimulate the development of empathy and compassion. This can lead to greater concern for the well-being of others and active involvement in actions to help and support those in need.

Practical applications

1. Foster volunteer Activities and Community Involvement - It can be a great opportunity for seniors to connect with the community and contribute to the good of others. These activities can help them develop empathy, generosity and social responsibility. Involvement in projects to help those in need or in charitable actions can strengthen moral values and promote a sense of fulfilment and usefulness among the elderly. The exchange of letters between seniors and high school students on a particular topic creates close bonds and gives both generations different perspectives on the topic at hand.

2. Facilitate ethical Discussion Groups and Moral Debates - Organizing ethical discussion groups and moral debates on topical issues can be an engaging way to encourage elders to explore and reflect on values and

ethics. These activities can address topical issues or general themes such as human rights, social justice, moral dilemmas and personal values. Through discussions and arguments, they can develop their moral thinking and express their personal opinions and values.

3. Offer participation in continuing education and training programs - These programs may include courses on human rights, applied ethics, social and civic values. Encouraging lifelong learning can contribute to moral development and maintain the interest of elders in current ethical and moral topics. In developed countries there are such programs held within institutions such as Universities for seniors. For countries with low economic power, pro bono courses can be organized, supported by volunteers or even family members where appropriate.

3.1.2 Physical activity – key factor in building a positive aging identity.

The aging process is a stage of life where physical, psychological and social changes can have a significant impact on the individual. Physical activity plays an essential role in building a positive identity during ageing, helping to maintain health, independence and self-esteem. It helps maintain a healthy body weight, strengthen the cardiovascular system, muscles and bones. By increasing their level of physical activity, seniors can reduce their risk of chronic diseases such as diabetes, heart disease and osteoporosis. Good physical health contributes to a positive identity and greater life satisfaction.

Physical activity can increase self-esteem and personal satisfaction in the aging process. By achieving physical activity goals and seeing personal progress, seniors can gain confidence in their own abilities and feel that they are still capable of pushing their limits. Participating in physical activities can also provide opportunities for socializing and interacting with other people, which helps to increase a sense of belonging and develop positive social relationships. Sport not only has physical benefits, it can also have a significant impact on mental health. Regular exercise can reduce levels of stress, anxiety and depression and increase well-being and sleep quality. By releasing endorphins and stimulating the brain, physical activity can contribute to a positive identity, an optimistic attitude and increased psychological resilience in the face of life's challenges.

In the article "Sport participation and positive development in older persons", Joseph Baker and Jessica Fraser-Thomas emphasize the fact that negative stereotypes towards aging and the elderly prevail in Western society and this aspect can generate the tendency of seniors to avoid physical activity and sports. Some studies suggest that seniors internalize these negative attitudes and stereotypes about the elderly, which causes them to avoid sports activities, considering them too risky. Some researchers considered that the model of some performance athletes can represent a motivational factor regarding the decision to exercise, but the response of the elderly was not entirely the expected one. The difference between the proposed target - the performance athlete and the self-image of the person in question was so significant that any initiative to get closer to that target was eradicated. Hence the need to identify the most appropriate way of presenting physical activity and setting goals in the most realistic way possible. The surprising conclusion is that "the image of an athlete can be considered rather intimidating or inappropriate, even for the elderly who are already involved in moderate sports activities". In conclusion, the examples of athletes should be used with caution and the elderly prefer images with easy group activities - as a motivational trigger (Baker e.a, 2009, p.8).

Physical activity goals must definitely be **SMART**:

Specific, clearly and precisely defined. A specific objective answers the questions: Who?

Measurable, meaning that it can be measured in an objective way. For example, we can set as a goal to increase the duration of practicing sports exercises from 10 minutes daily to 15 minutes daily. In order to follow that growth but also to have an overview of the progress, the beneficiary can keep a diary of the evolution of the objectives.

Attainable, realistic possible to achieve in the context in which we find ourselves. We should consider available resources, abilities and current circumstances. An important aspect in this sense is that the goal set should be daring, placed slightly above the limit that can be easily reached in the idea of motivating. Objectives that are easy to achieve risk demotivating and those that are very difficult to achieve risk intimidating. Like the example given earlier where the image of the performance athlete (the very difficult goal to achieve) can discourage an elderly person from trying to exercise.

Relevant, it must be related to your values, personal needs, interests and overall goals. For example, if we value health and well-being, we can set a relevant goal like "exercise 3 times a week for the next 6 months."

Time determined – with a deadline or determined in time, it is important to set a deadline by which we want to achieve our goal. Deadlines give us a time frame and motivate us to organize our time and focus on concrete actions.

3.2 Motivational psychology applied in working with the elderly

3.2.1 Motivational psychology – theoretical concepts

Motivational psychology is a branch of psychology that deals with the study of the reasons and mental processes that underlie motivated human behavior. It explores the factors that influence a person's wants, needs, and goals and how they determine his actions and efforts.

Motivational psychology examines various theories and models that explain human motivation. These may include theories such as Maslow's basic needs theory, Deci and Ryan's self-determination theory, Locke and Latham's goal theory, Vroom's expectancy theory.

This branch of psychology has applications in various fields, including education, human resource management, sports, health and personal development. By understanding the motivational processes of individuals, motivational psychology can help optimize performance, satisfaction, and well-being in various life contexts.

3.2.2 Maslow's pyramid – theoretical concepts and practical applications

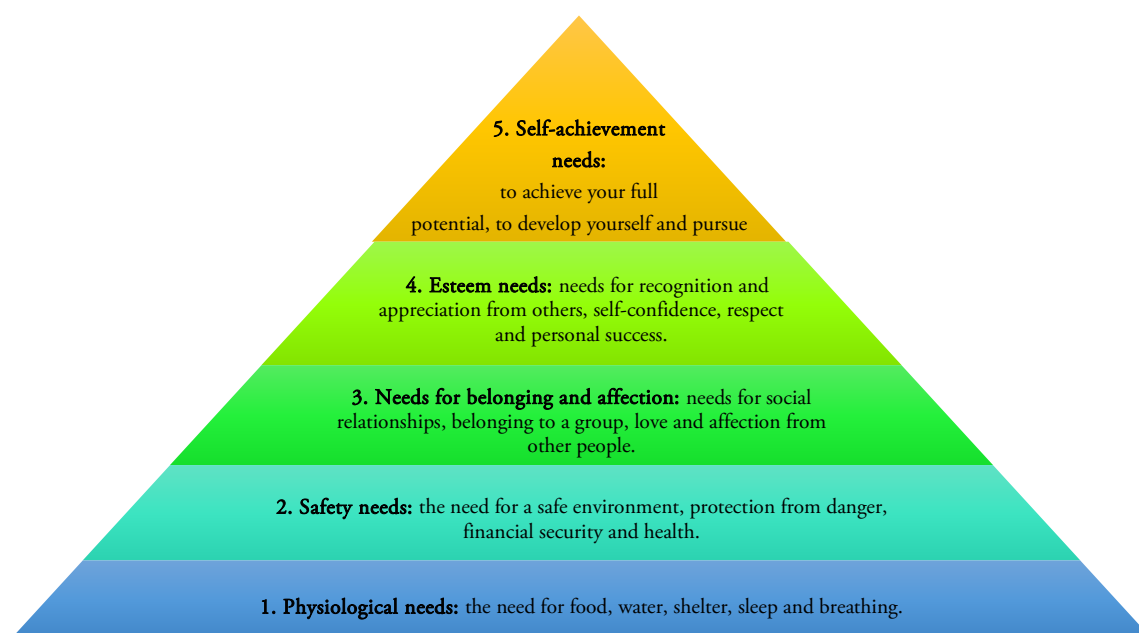


Figure 2, Maslow Pyramid

Maslow's pyramid, also known as the hierarchy of human needs, is a model of motivation and human development developed by psychologist Abraham Maslow in the 1940s. He was the first to propose that human motivation is driven by hierarchical needs that must be satisfied in order. This model has become one of the best known and most widely used models of motivation and human development.

1. **Physiological Needs:** These are the basic needs required for human survival such as the need for food, water, shelter, sleep and breathing.

2. **Safety Needs:** After satisfying physiological needs, people seek security and stability, such as a safe environment, protection from danger, financial security, and health.

3. **Belongingness and Affection Needs:** Once safety needs are met, individuals seek social relationships, group membership, love and affection from other people.

4. **Esteem Needs:** After satisfying belongingness needs, people begin to desire recognition and appreciation from others, self-confidence, respect and personal success.

5. **Self-Actualization Needs:** These are the highest levels of the pyramid and represent the desire to reach one's full potential, develop and pursue one's passions and personal goals.

According to Maslow's theory, satisfying the needs at the lower levels is essential before you can progress to the higher levels.



Practical applications

1. Make sure their physiological needs are met before starting any activity. To create a positive environment you can start activities by reiterating that physiological needs have been met: "Now that you are rested, we can start a group activity" or "Since you have already served the meal, we can go for a walk."

2. Reassure your beneficiaries that their safety needs are met: "Because we checked with your doctor and your health allows, we can try these exercises together," "Since we have this machine that monitors your health, it's okay try to get up yourself".

3. The need for belonging can help us motivate beneficiaries to participate in group activities, to be integrated and valued. In this sense, you can create different thematic groups that also have a name, you can pave the halls with personal works, you can create logos of the working groups, personalized T-shirts. The need for affection can be satisfied through and can in turn generate bonds between members of activity groups.

4. The need for esteem will cause the beneficiaries to get involved in activities, to bring their contribution in everything they undertake. To stimulate these things, competitions can be organized with different prizes covering a wide range of talents.

5. The need for self-achievement is what will lead the beneficiaries to continue the development process, learn and get involved in new projects.

3.2.3 The ecological model for an active life

The ecological model for an active life is particularly relevant and beneficial for older people. As we age, regular physical activity and engaging in an active lifestyle become increasingly important for maintaining overall health and quality of life.

At the individual level, the ecological model emphasizes the personal abilities and preferences of older people. These can vary significantly depending on individual health, fitness level and interests. It is essential to identify physical activities that suit the specific abilities and needs of each older person, so as to avoid the risk of injury and promote engagement and enjoyment of being active.

Social factors have a significant impact on the elderly. Community and social interactions can provide a support network and motivation to maintain an active lifestyle. Participating in age-specific exercise groups, recreational activities or clubs can help encourage and support each other to stay active. Engaging in social activities can also have cognitive and emotional benefits, contributing to overall well-being and an active lifestyle. Environmental factors and physical infrastructure play an important role in the ecological model for older people. The availability and accessibility of appropriate facilities for physical activity, such as parks, age-appropriate fitness centers, and specialized exercise programs, can be crucial in encouraging active participation by older adults. Infrastructure that facilitates safe movement, such as well-maintained pavements and accessible public transport systems, can also play a significant role in promoting physical activity among older people.

To provide practical examples of the ecological model for active living, we will look at each level of the model and how it can be applied in a context specific to older people:

1. The individual level:

- An older person can choose and be encouraged to engage in physical activities that suit their abilities and preferences, such as walking in the park, yoga or swimming. These activities can be carried out both on their own initiative and on their own, as well as by requesting the support of families or nursing home for elders employees.
- They can set personal goals and training plans adapted to age and health, in collaboration with a trainer or fitness specialist.
- They can use wearable technology, such as fitness bracelets or smart watches, to monitor physical activity and receive real-time feedback, which can be a source of motivation.

2. Social level:

- Older people can participate in exercise groups or social clubs in their community where they can meet and interact with other people with similar interests in physical activity.
- They can engage family members, friends or neighbors in joint activities, such as regular walks around the neighborhood or organizing team sports activities; they can also request the employees of nursing home for elders to organize such common activities.
- They can involve the local community and local organizations to organize age-appropriate physical activity events and programs, such as charity marathons or group dance classes.

3. Environmental and infrastructure level:

- They can explore community facilities such as age-appropriate fitness centers or recreation centers that offer programs specifically designed for seniors.
- They can use the parks and green areas near them for walks or outdoor exercises, benefiting from fresh air and natural environment.
- They can involve local government and responsible organizations to improve infrastructure, such as creating safe and accessible bike lanes or sidewalks.
- They can request the management of the nursing home for elders where they are accommodated to create a infrastructure necessary to run the activities.

3.3 Communication theory applied in working with elderly people

Communication in working with older people is extremely important and requires special attention and sensitivity. There are some key principles and aspects in communication theory in working with the elderly that can improve the relationship and interaction with them:

1. Empathy and respect: It is essential to show empathy towards the elderly person and treat them with respect and dignity. Listen carefully and show interest in their experiences, thoughts and feelings.

2. Non-verbal communication: Gestures, facial expressions and eye contact can be just as important as words. Pay attention to your body language and tone of voice to convey warmth and understanding.

3. Clear and adapted language: Use simple, clear language adapted to the older person's level of understanding (especially in the case of cognitive decline). Avoid using complex language or technical terms that may be confusing or difficult to understand.

4. Patience and time: Give the elderly person enough time to express their thoughts and feelings. Be patient and avoid rushing or interrupting them.

5. Active listening: Listen carefully and show interest in what the older person is saying. Repeat and clarify the information to make sure you understand it correctly.

6. Empowerment: Encourage the older person to express their opinions and preferences. Involve her in decisions and give her autonomy as much as possible.

7. Cultural sensitivity: Be aware of cultural differences and the unique experiences of the older person. Respect and adapt communication according to their cultural values and customs.

These principles can help build a relationship of trust and respect when working with older people, facilitating effective communication and better collaboration in their care and support.

3.3.1 Effective communication and positive discourse – theoretical concepts and practical applications

Positive speech refers to the use of words and phrases that promote optimism, encouragement, and inspiration. This type of speech has a strong impact on our emotional state and perception of ourselves and the world around us.

Here are some key aspects of positive discourse:

1. Avoiding negative language: Try to avoid negative expressions, harsh criticism or words that can negatively affect the mood of those around you. Instead of focusing on problems or mistakes, focus on solutions and strengths.

2. Using encouraging words: Choose words that support and encourage the people around you. Use phrases like "congratulations", "nice to hear from you", "excellent work" to motivate them and show their appreciation.

3. Focus on solutions: When someone brings up a problem, focus on identifying and discussing possible solutions instead of getting stuck in negativity or criticizing.

4. Recognition and Appreciation: Notice and appreciate the efforts, achievements and positive qualities of those around you. Give sincere compliments and recognition to boost their self-esteem and motivation.

5. Avoiding phrases like "Yes..., but...". This formula is not indicated because everything that will follow the word "but" will cancel everything that was previously mentioned as positive, the interlocutor will remain under the impression of negative feedback at the end of the phrase.

6. Using the language of responsibility, assuming personal opinion as personal and not indisputable truth.

7. Exploring alternatives to directive discourse.

8. Avoiding starting questions with the wording "why?". This type of approach places the interlocutor in the position of the guilty who must defend himself, the accused who must justify himself, or the person who is attacked. In any of these situations, the response of the interlocutor can be: either to attack, or to block, or to give up. Neither of these is desirable and nullifies collaboration between the parties.

Positive discourse can improve relationships, increase self-esteem, collaboration and engagement, and contribute to a more optimistic and healthy work or life environment. By choosing our words carefully and focusing on the positive, we can significantly influence our perspective and emotions and those around us.



Practical applications

1. Instead of the expression "Don't go down the ladder without using the handrail" the indicated wording is "For your safety it is better to use the current hand when going down the ladder". The latter wording leads us to

the solution, to the beneficial side of the situation, compared to the first wording that puts the interlocutor in a defensive position, to justify himself.

2. Instead of the expression "Yes, you exercised today, but not for 20 minutes as needed" is indicated the wording "In the following days we will reach the target of 20 minutes of exercise. Congratulations for today, we are on the right track!".

3. Instead of saying "You're tired, you can't continue weight training." indicated is the wording "I think you are tired. It is? Or can we still try to finish the exercises with weights?".

4. Instead of saying "Don't even think about quitting now!" indicated is the formulation "How would it be if you tried a little longer to continue the activity?".

5. Instead of saying "Why haven't you eaten anything?" indicated is the wording "I notice you haven't eaten. Did something happen? Can I help you with that?"

3.3.2 Nonverbal communication in working with the elderly

Non-verbal communication can be observed through different aspects such as body position, facial expressions, gestures and their interpretation. Here are some examples of non-verbal communication in the context of working with the elderly:

1. Body position:

- A leaning forward position with a straight back and relaxed shoulders can indicate interest and attention in communication.
- A bent and stiff posture may indicate physical or emotional discomfort and may require a more delicate and careful approach.
- Crossing the arms can be an indication that the person in question closes the collaboration, either to defend himself, feeling in a dangerous, unpleasant, embarrassing situation, or because he wants to display an attitude of superiority, feeling that the interlocutor does not live up to the level of expectation.
- Avoiding eye contact, bowing the head, can be signs of an intentional closure or can be involuntary, unconscious gestures, which, however, have the same consequence, namely the interruption or difficulty of communication, collaboration.

2. Facial mimicry:

- A warm and bright smile can convey warmth and affection, showing that we are open and friendly.
- A frown or expression of confusion may indicate confusion or concern and may require further clarification or explanation.

3. Gesture:

- Soft and slow gestures, such as light stroking on the hand or hugging movements, can convey compassion and emotional support.
- Sudden, short, energetic gestures can be an indicator of irritation, of the desire to set things up, to attack either to defend oneself or to strengthen one's position.

Interpreting these elements of non-verbal communication involves careful observation of body position, facial expressions and gestures and can help interpret the emotional state and needs of the elderly. The collaboration of non-verbal and paraverbal communication with the verbal one, more precisely with the actual message transmitted through words, leads to a better understanding and to the avoidance of erroneous decoding of messages.

It is important to be sensitive and attentive to non-verbal signals and to interpret them in the specific context of the elderly person. Each individual may have their own unique nonverbal expressions and gestures, and understanding them requires attention and adaptability in communication.

Practical applications

Whenever we are not sure that we have understood a message correctly, transmitted through any of the communication methods listed above, we must check the reality with the sender of the message.

It is necessary to be careful not to distort, omit or generalize the message or parts of it, because our interpretation will be different from what the sender intended to convey. It is also important to avoid projecting our own thoughts, opinions, experiences onto the people we work with and to be open and curious in the communication process.

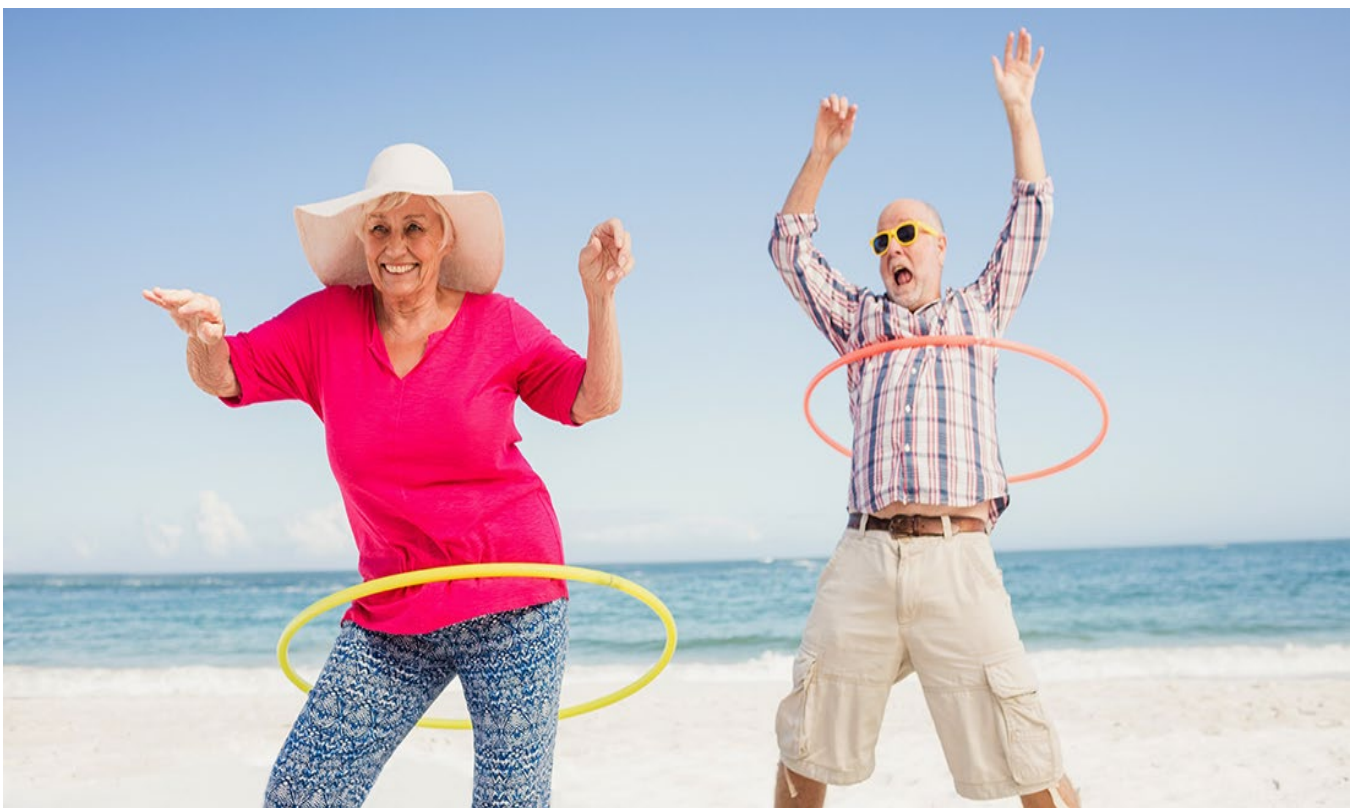
For example the approach “Why are you sitting in this position with your arms crossed? It looks like you don't want us to work today.” can be rephrased “It seems to me that today you are less engaged than usual, if that is true, can you tell me what is bothering you? Is it possible that I can help you? ”.

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MODULE 4

Program design: Guidelines for physical activity in old age



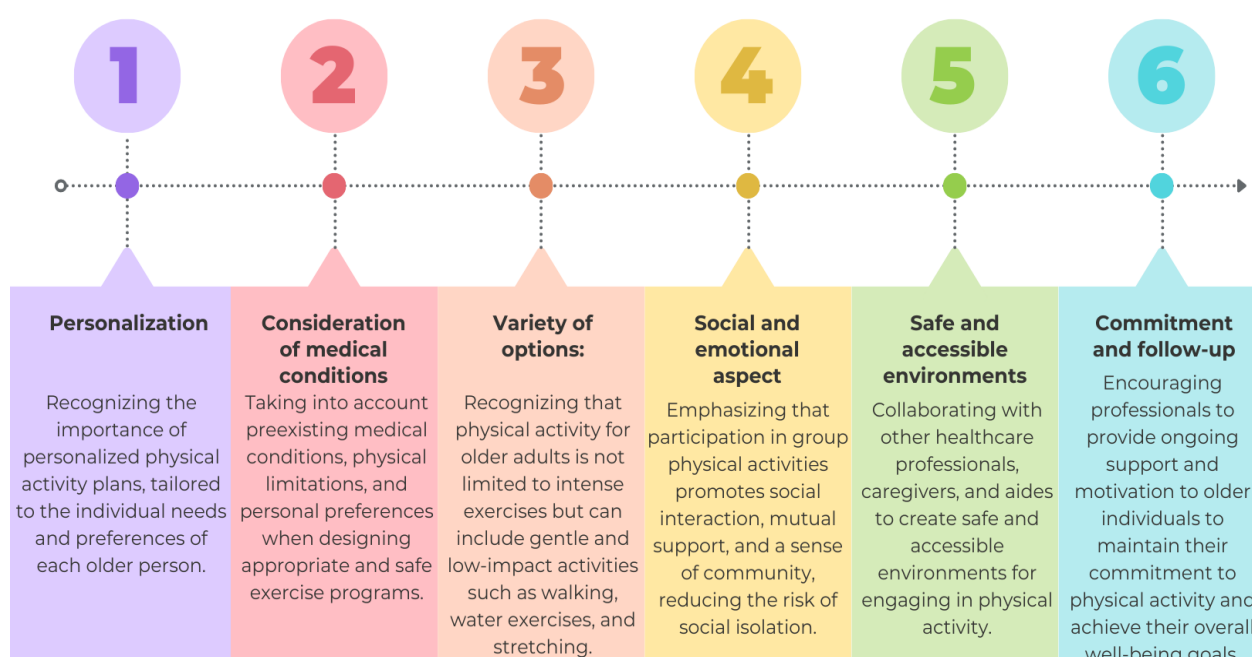
Source: <https://norwegianscitechnews.com/2018/09/does-weather-influence-older-adults-physical-activity/>

Introduction

This module focuses on creating a guideline for professionals who care for older adults. We will explore the essential aspects of designing programs to promote active and healthy aging in this specific population.

Personalized physical activity plans are fundamental for the well-being of older adults, as each individual has unique needs and preferences. Therefore, we need to consider various aspects (see the next graph).

6 KEY POINTS OF THE GUIDE



4.1 Definition of a questionnaire for the screening of physical activity before participation.

In this section, we will develop two comprehensive questionnaires specifically focused on the elderly population. The first one will assess each individual's sports history and previous physical activities (*sheet 1*), while the second questionnaire (*sheet 2*) will aim to understand the participant's current physical conditions. Understanding the past and present experiences of our beloved seniors with physical activity is essential, as it will allow us to tailor the program to their specific needs and circumstances.

The questionnaires will establish a solid foundation before the elderly engage in any physical activity, helping us to design tailored and safe sessions, considering their health conditions and limitations, to ensure an enriching and beneficial experience for their well-being.

4.2 Program design: Guidelines for physical activity in adulthood

According to the American College of Sports Medicine (ACSM, 2018), the specific characteristics of older adults must be considered when designing their exercise program, such as potential physical limitations, chronic medical conditions, and other factors that may require special considerations. Professionals and caregivers should consider specific factors, such as the most appropriate and safe types of physical activity, the recommended frequency, intensity, and gradual progression. This will help them design individualized exercise plans tailored to the needs of each older person.

- *Types of physical activity:* The combination of different types of exercise is crucial for promoting healthy aging. It is suggested to include resistance exercises, such as weightlifting or gym machine usage, to strengthen muscles and improve metabolic function. Flexibility and balance exercises, like stretching and tai chi, help maintain mobility and reduce the risk of falls, which is a common concern in older adults. Additionally, moderate-intensity aerobic activities, such as walking, swimming, or cycling, improve cardiovascular and pulmonary health.
- *Frequency:* The recommendation is to engage in moderate to vigorous physical activity for at least 150 minutes per week, spread across sessions of at least 10 minutes in duration. This can be achieved through various activities such as walking, dancing, playing sports, or exercising at home. Furthermore, it is suggested to include resistance exercises two or more days a week and flexibility and balance exercises at least two or three days a week.
- *Intensity:* The intensity of physical activity is an important factor to consider. Moderate intensity is when the heart rate and breathing increase but still allows for talking during the activity. High intensity is more vigorous and makes it difficult to talk during exercise. Older adults can benefit from both types of physical activity, but it is essential to adapt the intensity according to individual fitness levels and limitations.
- *Progression:* As older adults become more active and improve their physical condition, it is important to gradually increase the duration, intensity, or frequency of their activities. Gradual and safe progression helps prevent injuries and allows the body to effectively adapt to new physical demands.

It is crucial to highlight that before starting any physical activity program, especially for older adults or individuals with preexisting medical conditions, a health assessment and the approval and guidance of a qualified healthcare professional are essential. Additionally, it's important to consider that each older person may require specific adjustments and modifications based on their individual needs and conditions.

Regular and appropriate physical activity is an investment in the health and well-being of older adults. By incorporating these recommendations into the creation of personalized exercise programs, professionals and caregivers can significantly contribute to improving the quality of life and independence of our beloved older adults, allowing them to fully enjoy this stage of life and promoting active and healthy aging.

4.2.1 Guidelines for initial consultation + subject assessment tools.

During the initial consultation, the specialist will gather comprehensive information about the individual's physical and motor condition through a series of tests and assessments. One of the common tools used for this

purpose is the "*Senior Fitness Test*". This test was specifically designed for older adults and aims to evaluate their level of physical fitness and mobility.

The designed tests and assessments may include cardiovascular endurance, flexibility, strength, balance tests, etc. Please see the following annexes (Rikli, R.E., & Jones, C.J. (2013)- *Senior fitness test manual – Human Kinetics* - Translated by SONIA GARCÍA MERINO UNIVERSIDAD EUROPEA DE MADRID):

Annex 1 – “CHAIR STAND TEST (Sit-to-Stand Test)”- Rikli, R.E., & Jones, C.J. (2013)

Annex 2 – “CHAIR STAND TEST (Sit-to-Stand Test-Bicep Curls)”- Rikli, R.E., & Jones, C.J. (2013)

Annex 3 - “2-Minute Step Test (2-Minute Walk)” - Rikli, R.E., & Jones, C.J. (2013)

Annex 4 - “6-MINUTE WALK TEST (Six-Minute Walk Test)”- Rikli, R.E., & Jones, C.J. (2013)

Annex 5 - “CHAIR-SIT AND REACH TEST (Test of trunk flexion in a chair)”- Rikli, R.E., & Jones, C.J. (2013)

Annex 6 - “BACK SCRATCH TEST (Test of reaching hands behind the back)”- Rikli, R.E., & Jones, C.J. (2013)

Annex 7 - “FOOT UP-AND-GO TEST (Stand up, walk, and sit down test)”- Rikli, R.E., & Jones, C.J. (2013)

The specialist will use the results of these tests to gain a clear understanding of the individual's physical fitness level and overall health. With this information, a personalized exercise program can be created to suit the individual's specific abilities and needs.



As for the caregiver, during this preparation and evaluation phase, it is essential to collaborate with the physical instructor or physiotherapist to gather necessary information about the beneficiary. The caregiver can provide relevant information about the individual's health status and physical capabilities based on their daily experience. This may include details about any existing medical conditions, history of injuries, medications being taken, and any specific concerns regarding physical activity. Collaboration between the caregiver and the specialist is essential to obtain a complete and accurate picture of the individual's physical condition. This will allow the physical instructor or physiotherapist to design a personalized and safe exercise program tailored to the beneficiary's capabilities and specific needs.

Additionally, the caregiver can also be an important source of motivation and support throughout the process of physical activity and active aging. Being familiar with the beneficiary's daily routines, the caregiver can encourage and facilitate participation in recommended physical activities, ensuring that appropriate guidelines and recommendations are followed.

Assessment of Physical Fitness in Older Adults (SFT)

Senior Fitness Test Guidelines

The guidelines to carry out the “*Senior Fitness Test*” (SFT, Rikli & Jones, 2013) ensure a reliable, safe, and effective assessment for older adults. It is essential that examiners are familiar with the procedures of each test and gain ample experience in their application before conducting them with older individuals.

Before conducting the test battery, participants must complete a written consent form, where they are informed about the objectives and risks of the evaluation. Additionally, participants should be carefully selected, excluding those with medical contraindications for physical exercise or certain health conditions.

On the day before the assessment, participants are given instructions to prepare adequately, which includes avoiding strenuous physical activity, not consuming excessive alcohol, eating something light before the tests, and wearing comfortable and secure clothing and footwear. Furthermore, they are encouraged to inform the examiner about any relevant medical condition that may affect the development of the tests.

The necessary materials for conducting the tests should be ready and prepared in advance. This includes a set of items such as a chair, stopwatch, dumbbells of different weights, scales, adhesive tape, ropes or cords, measuring tape, cones, sticks, ruler, pedometer, pens, and identification tags.

By following these guidelines, professionals can effectively conduct the “*Senior Fitness Test*” (SFT), obtaining reliable results and providing a safe evaluation for older adults. This assessment helps determine the participants' level of physical fitness and functionality, enabling the design of personalized and appropriate exercise programs to enhance their well-being and quality of life in this special stage of their lives.

Beneficiary assessment tools

The order of the tests is as listed in the following sheet, but if we perform the 2-minute walk test, we should omit the 6-minute walk test. Alternatively, if we want to conduct both tests, the 6-minute walk test could be done on another day. The weight and height measurements can be taken at any time as they do not require any effort.

Important: Before starting the assessment, we must have a clear understanding of the emergency procedure to follow, as well as the location of the nearest phone or emergency contact number. In the event of an injury or accident, we must collect all relevant information regarding the incident.

Sheet 3 – “Registration form”

SENIOR FITNESS TEST			
Day:		<input type="checkbox"/> M <input type="checkbox"/> F Weight _____	Age: _____ Height: _____
Name and Surname:			
Tests	1 st try	2 nd try	Notes / Remarks
Sit-to-Stand Test			
Arm Curl Test			
2-Minute Walk Test			
Chair Trunk Flexion Test			
Back Scratch Test			
Stand-Walk-Sit Test <i>*6-Minute Walk Test. Skip the 2-minute walk test if this test is applied</i>			

Source: Rikli, R.E., & Jones, C.J. (2013)- Senior fitness test manual – Human Kinetics - Translated by SONIA GARCÍA MERINO, UNIVERSIDAD EUROPEA DE MADRID

Reference ranges

Reference values are an important tool for interpreting evaluation results and motivating participants. After completing the tests, many individuals want to know their score, understand its significance, and receive guidance on how to improve. These reference values are also valuable for enhancing the functional capacity of evaluated older adults.

Normative tables and reference criteria used in the SFT were developed from a national study that included over 7,000 independent older adults, aged 60 to 94 years, from 267 different locations in the United States. These tables display the normal range of scores, between the 25th and 75th percentile¹, based on gender and different age groups, ranging from 60 to 94 years. By comparing participants' scores to these reference values, we can gain a clear understanding of their performance in various areas evaluated by the SFT, such as muscular strength, flexibility, and aerobic capacity.

Reference values not only allow us to interpret results on an individual basis but also help us understand how older adults compare to their reference group and overall functional level. This, in turn, enables us to set realistic and personalized goals to improve their physical condition and functional capacity, promoting active and healthy aging.

¹ percentile: a statistical concept used to describe the relative position of a value or data point within a data set. It is represented as a number between 0 and 100 and indicates what percentage of the data is equal to or less than the given value.

NORMAL RANGE IN WOMEN							
Age range	60- 64	65- 69	70- 74	75 -79	80 – 84	85 – 89	90 – 94
Sit and Stand from a Chair (number of repetitions)	12 – 17	11 – 16	10 – 15	10 - 15	9- 14	8 - 13	4-11
Arm Flexions (number of repetitions)	13 – 19	12-18	12-17	11-17	10-16	10-15	8-13
Walk for 6 minutes (meters)	498-603	457-580	438-562	398-535	352-494	310-466	251-402
Walking for 2 minutes (steps)	75-107	73-107	68-101	58-100	60-90	55-85	44-72
Trunk Flexion in a chair (inches)	(-0.5) - (+5.0)	(-0.5) - (+4.5)	(-1.0) - (+4.0)	(-1.5) - (+3.5)	(-2.0) - (+3.0)	(-2.5) - (+2.5)	(-4.5) - (+1.0)
Hands behind back (inches)	(-3.0) - (+1.5)	(-3.5) - (+1.5)	(-4.0) - (+1.0)	(-5.0) - (+0.5)	(-5.5) - (+0.0)	(-7.0) – (-1.0)	(-8,0) - (-1.0)
Stand up, walk, and sit down (seconds)	6.0-4.4	6.4-4.8	7.1-4.9	7.4-5.2	8.7-5.7	9.6-6.2	11.5-7.3
NORMAL RANGE IN MEN							
Age range	60- 64	65- 69	70- 74	75 -79	80 – 84	85 – 89	90 – 94
Sit and Stand from a Chair (number of repetitions)	14-19	12-18	12-17	11 - 17	10- 15	8 - 14	7-12
Arm Flexions (number of repetitions)	16-22	15-21	14-21	13-19	13-19	11-17	10-14
Walk for 6 minutes (meters)	558-672	512-640	498-621	429-585	406-553	347-521	279-457
Walking for 2 minutes (steps)	87-115	86-116	80-110	73-109	71-103	59-91	52-86
Trunk Flexion in a chair (inches)	(-2.5) - (+4.0)	(-3.0) - (+3.0)	(-3.0) - (+3.0)	(-4.0) - (+2.0)	(-5.5) - (+1.5)	(-5.5) - (+0.5)	(-6.5) - (-0.5)
Hands behind back (inches)	(-6.5) - (+0.0)	(-7.5) - (-1.0)	(-8.0) - (-1.0)	(-9.0) - (-2.0)	(-9.5) - (-2.0)	(-9.5) - (-3.0)	(-10,5) - (-4.0)
Stand up, walk, and sit down (seconds)	5.6-3.8	5.9-4.3	6.2-4.4	7.2-4.6	7.6-5.2	8.9-5.5	10.0-6.2

Source: Rikli, R.E., & Jones, C.J. (2013)- Senior fitness test manual – Human Kinetics - Translated by SONIA GARCÍA MERINO UNIVERSIDAD EUROPEA DE MADRID

4.3 Monitoring of users (from a physical point of view, motor problems)

Once the participants have embarked on their journey in the active and healthy aging physical activity program, it is crucial to conduct periodic follow-ups to ensure effectiveness and progress. To achieve this, we will implement a follow-up questionnaire that will be administered after a specific period of time (e.g., after x months) from the start of their participation in the program. This questionnaire will allow us to assess their advancements, identify possible challenges, and make necessary adjustments to enhance the participant's experience.

The follow-up questionnaire (*see sheet 4*) will be designed to gather relevant information about the physical and motor performance of older adults, as well as to obtain their perspective on the program experience. Some of the aspects we will address in the questionnaire include:

- *Physical Progress Evaluation:* We will collect data on improvements in muscular strength, flexibility, aerobic endurance, and other measures of physical fitness that are regularly assessed in the program. This will enable us to analyze the impact of physical activity on their functional capacity and overall well-being.
- *Identifying Challenges:* We will inquire about any obstacles or difficulties the participants may have encountered during the program, such as injuries or physical discomfort. With this information, we can take steps to address these issues and provide the necessary attention and support.
- *Participant Feedback:* We will value the participant's perspective on their experience in the program, including aspects such as satisfaction with the activities, social interaction, and any suggestions for improvements.
- *Use of WHO ICOPE Application:* We will implement the WHO ICOPE application to conduct an initial assessment of the participants at the beginning of the program. This tool will provide us with valuable information about their health status and functionality, which will help us tailor the program to their individual needs.



What is the Who ICOPE application?

The **WHO ICOPE Application** is a tool we will use at the beginning of the program to conduct a comprehensive initial assessment of the participants. This application has been developed by the World Health Organization (WHO) and is designed to provide a complete overview of each individual's health and functionality.

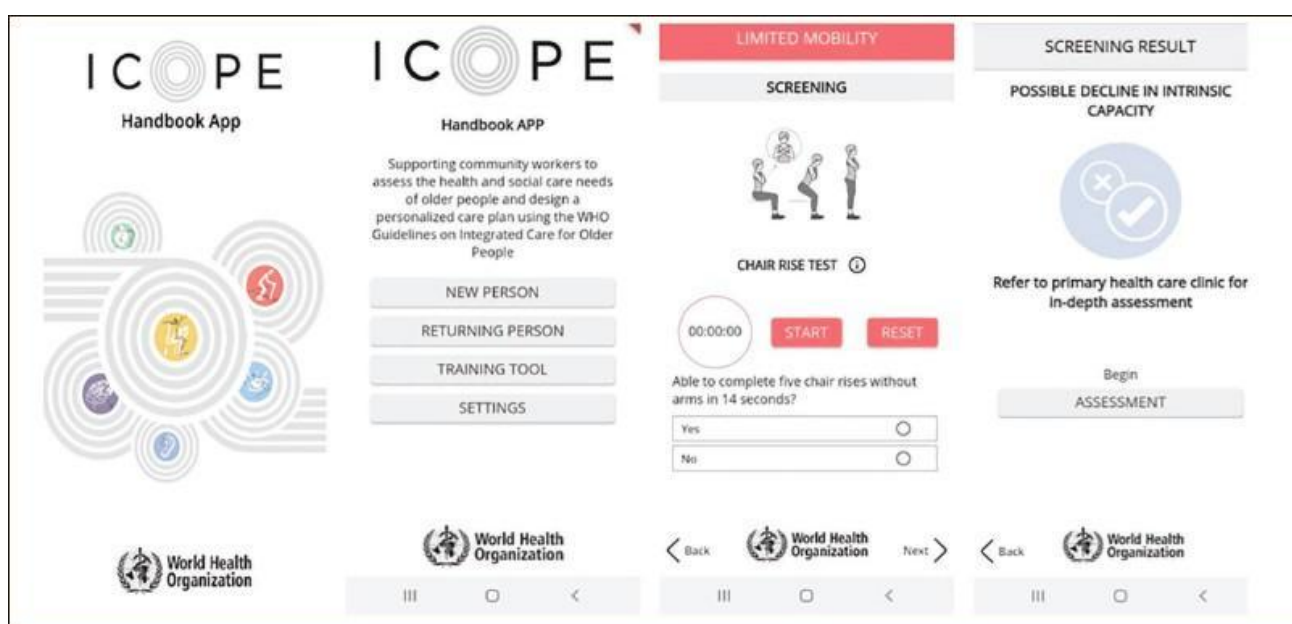
By implementing the **WHO ICOPE App**, we will be able to gather detailed information about various aspects of the participants' health, such as their functional capacity, mobility, mental health, quality of life, and potential risk factors. The application will enable us to identify any health or functionality issues that may affect their participation in the physical activity program at an early stage.

Based on the data collected through the WHO ICOPE Application, we will be able to customize the physical activity program for each participant. By understanding their specific needs and limitations, we will adapt exercise routines and proposed activities to ensure they are safe and beneficial for each individual.

Furthermore, the **WHO ICOPE App** will provide us with a solid foundation for measuring and tracking the participants' progress throughout the program. We will be able to conduct periodic evaluations to compare the initial results with the achievements made in terms of functional improvement and overall well-being. This will allow us to make necessary adjustments to the program and provide continuous support to help participants reach their physical activity and well-being goals.

How the WHO ICOPE App Works

The **WHO ICOPE App** functions as an assessment and monitoring tool that allows for the collection of information regarding the health status and functionality of participants in the physical activity program. Its aim is to identify potential health issues or functional limitations that may impact participants' engagement and progress.



Source: <https://link.springer.com/article/10.14283/jpad.2020.8>

The operation of the app is relatively straightforward and involves the following steps:

1. **Participant Registration:** Caregivers or healthcare professionals managing the physical activity program register each participant in the app. Basic information such as age, gender, and any relevant medical conditions is provided.
2. **Initial Assessment:** Once registered, participants complete an initial assessment within the app. This assessment may include questions about their functional capacity, mobility, mental health, quality of life, and possible risk factors. The app may include questionnaires, rating scales, and specific tests to measure various aspects of health.

3. *Result Analysis:* The app processes the data gathered in the initial assessment and generates a comprehensive report on the health status and functionality of each participant. The results are presented in a clear and understandable manner for caregivers and healthcare professionals.
4. *Program Personalization:* Based on the collected data, caregivers and healthcare professionals can personalize the physical activity program for each individual. Exercise routines and proposed activities will be adapted to ensure they are safe and suitable for each participant's specific needs and limitations.
5. *Tracking and Adjustments:* Throughout the program, periodic assessments can be conducted using the app to measure participants' progress. This enables adjustments to the program as needed and continuous support to help participants achieve their physical activity and well-being goals.

Source: <https://link.springer.com/article/10.14283/jpad.2020.8>

Priority conditions associated with declines in intrinsic capacity	Tests	Assess fully any domain with a checked circle
COGNITIVE DECLINE (Chapter 4)	1. Remember three words: flower, door, rice (for example) 2. Orientation in time and space: What is the full date today? Where are you now (home, clinic, etc)? 3. Recalls the three words?	<input type="radio"/> Wrong to either question or does not know <input type="radio"/> Cannot recall all three words
LIMITED MOBILITY (Chapter 5)	Chair rise test: Rise from chair five times without using arms. Did the person complete five chair rises within 14 seconds?	<input type="radio"/> No
MALNUTRITION (Chapter 6)	1. Weight loss: Have you unintentionally lost more than 3 kg over the last three months? 2. Appetite loss: Have you experienced loss of appetite?	<input type="radio"/> Yes <input type="radio"/> Yes
VISUAL IMPAIRMENT (Chapter 7)	Do you have any problems with your eyes: difficulties in seeing far, reading, eye diseases or currently under medical treatment (e.g. diabetes, high blood pressure)?	<input type="radio"/> Yes
HEARING LOSS (Chapter 8)	Hears whispers (whisper test) or Screening audiometry result is 35 dB or less or Passes automated app-based digits-in-noise test	<input type="radio"/> Fail
DEPRESSIVE SYMPTOMS (Chapter 9)	Over the past two weeks, have you been bothered by - feeling down, depressed or hopeless? - little interest or pleasure in doing things?	<input type="radio"/> Yes <input type="radio"/> Yes

Benefit from the use of mobile applications

Another proposal for designing physical activity sessions for older adults can significantly benefit from the use of mobile applications. These technological tools can play a crucial role in promoting participation, maintaining motivation, and combating sedentary behavior in this population.

Mobile applications specifically designed for physical activities can offer a variety of functions and features that make the program more engaging and effective. It is important to emphasize that while mobile apps can be a valuable tool, they do not replace the importance of human communication and personalized supervision. Caregivers, physical instructors, or physiotherapists continue to play an essential role in designing and monitoring physical activity sessions for older adults. Mobile applications should be considered as a complementary tool that can enrich the experience and promote greater adherence and enjoyment in the physical activity program.

BENEFITS OF APPLICATIONS



Planning and Tracking: Applications allow for the design of personalized exercise plans for each participant, taking into account their goals, fitness level, and limitations. Users can log their physical activities and track their progress, providing a clear insight into their achievements and advancements over time.



Reminders and Alerts: Mobile apps can send reminders and alerts to users to perform their physical activity sessions. These reminders can help maintain consistency and adherence to the program, preventing forgetfulness or neglect.



Exercise Diversity: Many apps offer a wide variety of exercises and physical activities, allowing participants to maintain diversity in their routine and avoid monotony. The variety of exercises also caters to different skill levels and individual preferences.



Health Monitoring: Some mobile applications include features to record and monitor health parameters, such as heart rate, blood pressure, or weight. This can help participants become more aware of their health and detect potential changes or issues.



Social Integration: Some apps offer social networking features or online communities where users can interact and share their achievements, experiences, and tips. The opportunity to connect with other older adults who are participating in the same program can provide a sense of community and mutual support.



Feedback and Rewards: Mobile apps can provide instant feedback on users' performance, offering recognition and virtual rewards for reaching specific goals or milestones. This can be especially motivating for older adults, who may feel more encouraged by receiving acknowledgment for their efforts.

Monitoring and Motivation:

Once older adults have joined the physical activity program, providing them with continuous monitoring and support is crucial. Maintaining their motivation and commitment is essential to achieving positive long-term results.

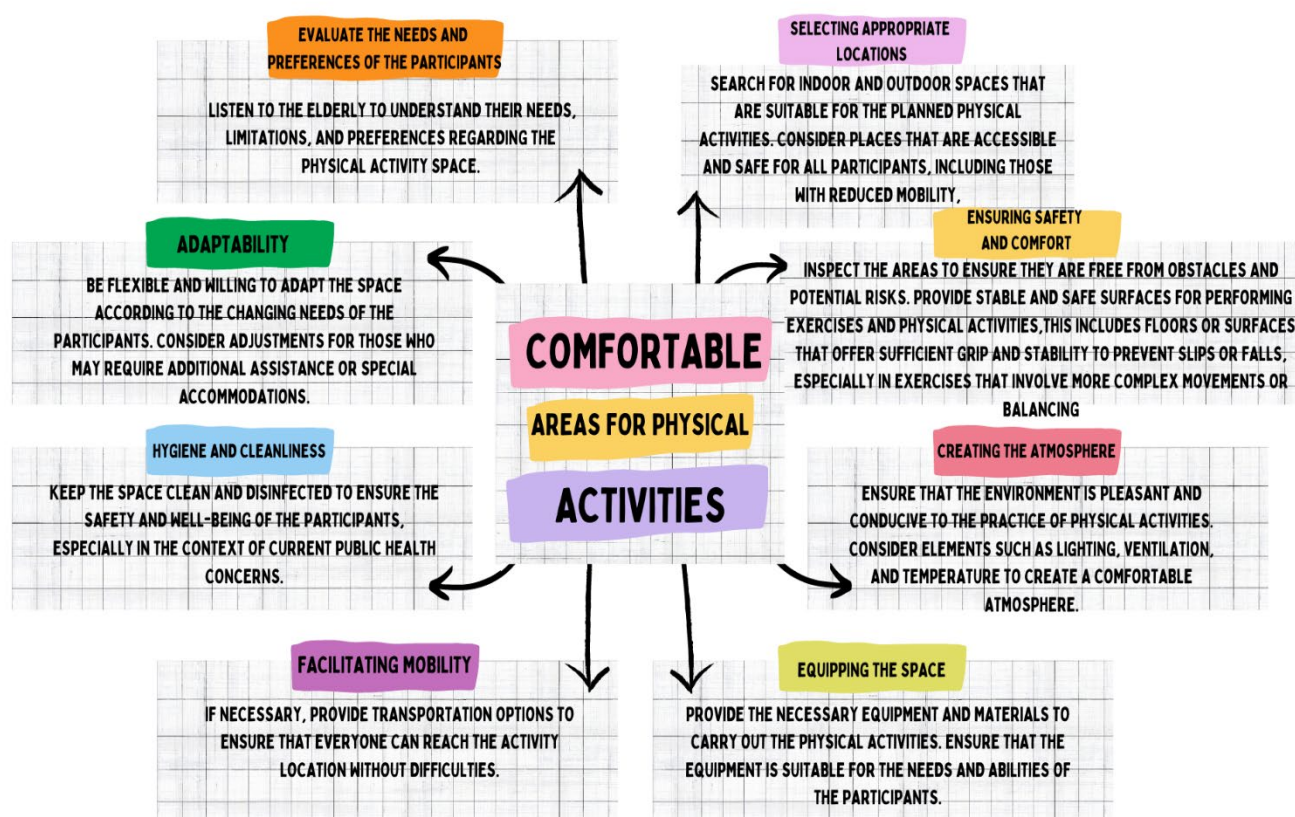
Using the reference tables and normative values provided by the SFT allows us to interpret the test results and set realistic goals for improving the physical fitness and functional capacity of older adults. By comparing their performance with other older adults of the same age and gender, we can highlight their achievements and show them the progress they have made.

In conclusion, by adapting physical activities for older adults based on their individual needs, we ensure that they can enjoy a safe and effective program that enhances their overall well-being. Providing them with a rewarding and beneficial experience in active and healthy aging is one of the most important goals when working with this special population. With a personalized approach and careful attention, older adults can maintain an active, healthy, and fulfilling life in this stage of life.

To ensure that we are properly following the guidelines and objectives set in the physical activity program, those responsible for the beneficiaries can conduct the *"Compliance Evaluation of Physical Activity Guidelines for Older Adults"* (refer to sheet 5).

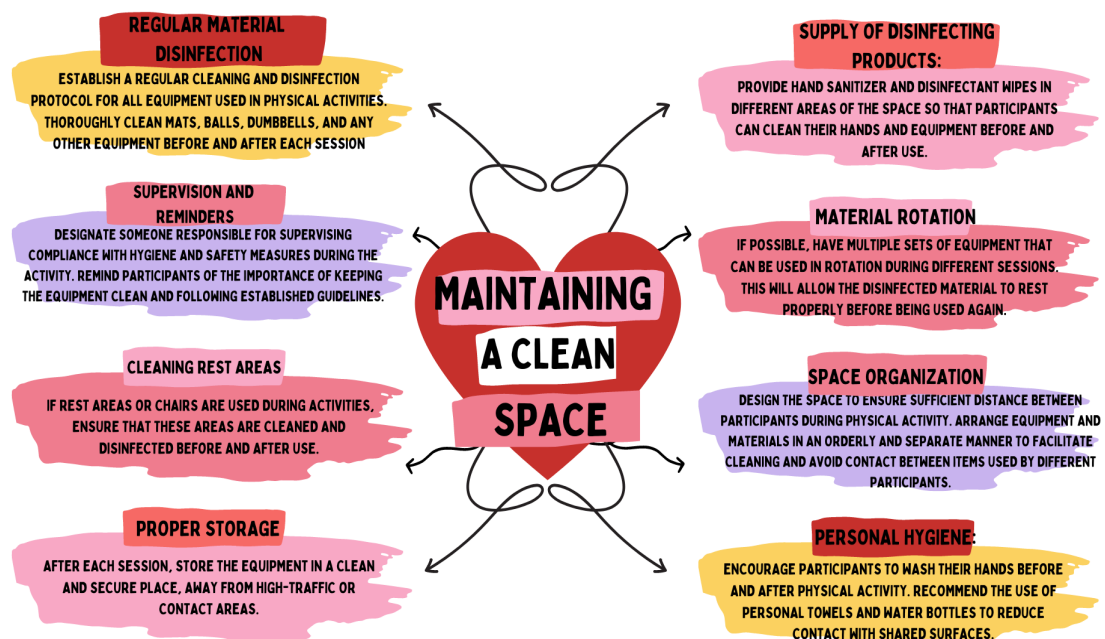
Appendix - Guidance on the accessibility of activities

Guidelines for Defining Comfortable Areas in Physical Activities



Maintaining a clean space

Another important aspect is to maintain a clean space with disinfected materials to ensure safety and comfort during the proposed physical activities. This is particularly relevant in the current public health context, where hygiene and cleanliness are essential to prevent the spread of diseases.



The Importance of the Caregiver

Active caregiver participation in the follow-up process of physical activities for older adults plays a crucial role in the success of the program. After older adults have learned their exercise routines, the caregiver becomes a valuable support in ensuring they continue to participate and maintain their commitment to the program over time.

The caregiver can play different roles during physical activity sessions. First, they can be present during exercise practice to provide assistance and physical support, especially if participants have mobility limitations or require help with certain movements. The caregiver can offer careful and safe guidance to ensure activities are performed correctly and without the risk of injury. Also, the caregiver may help the beneficiary with the transportation (e.g, from his/her room to the gymnastic room, if they live in a residence)



In addition to physical support, the caregiver can also be a source of motivation and encouragement for older adults. Their active and positive involvement can stimulate participants to stay engaged with the program and overcome potential challenges or moments of discouragement. Their presence can provide emotional confidence and security to older adults, which is especially relevant for those who may feel unsure or doubtful about their physical abilities.

Another important aspect is communication between the caregiver and the physical instructor or physiotherapist. The caregiver can collaborate with the professional to report any changes in the older adult's health or specific needs. This constant and fluid communication ensures the program adapts properly to the participant's changing needs and adjustments are made as necessary. In situations where older adults may require additional assistance due to specific medical conditions or mobility limitations, the caregiver can be essential in ensuring physical activities are performed safely and effectively. Their presence and support allow participants to feel backed up and enjoy a positive and enriching experience during physical activity sessions.

In summary, active caregiver participation in the follow-up process of physical activities for older adults is crucial to maintain continuity and progress in the program. Their physical, emotional, and communication support with healthcare professionals ensures that older adults feel motivated, safe, and committed to regular exercise practice. The collaboration between the caregiver and health professionals/physical instructors creates a favorable environment for the activities.

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- Geriatrics Healthcare Professionals: <https://www.americangeriatrics.org/>
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MODULE 5

Endurance activities for older adults



Introduction

Endurance activity refers to the ability of an individual to perform large muscle, repetitive, moderate to vigorous exercise for an extended period (Battista et. al., 2018). The main goal is to increase heart rate and respiration to place an appropriate physiological stress on the cardiorespiratory system.

In other words, endurance training makes a person's heartbeat more rapidly and breathing rate increase to meet the demands of the body's movement. Over time, regular aerobic activity makes the cardiorespiratory system stronger and more fit (Piercy et. al., 2020).

Below, you will be able to see: (i) the specific benefits of cardiorespiratory endurance, (ii) what type of activities can be done, (iii) what duration and intensity, (iv) how to make the progression, (v) specific considerations for diseases of the older people, (vi) testing and a collection of different programs that have carried out throughout history.

5.1 Specific benefits

Resistance activities provide an improvement in cardiorespiratory fitness (CRF) which is associated with lower risks for poorer health and apparently healthy older adults with greater cardiorespiratory fitness at baseline have a lower risk of all-cause and cardiovascular diseases, mortality and morbidity (Ewing et. al., 2011).

For older adults, endurance exercise preserves bone mass and reduces the risk of falling and prevents falls-related injuries and declines in bone health and functional ability (Battista et. al., 2018). In addition, it decreases mortality from cardiovascular diseases, hypertension, incident site-specific cancers, type 2 diabetes, reduces symptoms of anxiety and depression, cognitive health, and sleep (WHO, 2020).

Physically active lifestyle enhances feelings of “energy”, well-being, quality of life, and cognitive function, and is associated with a lower risk of cognitive decline and dementia (Ewing et. al., 2011). Lower levels of CRF are associated with reduced life expectancy, increased healthcare costs and worse clinical outcomes (Smart et. al., 2022).

5.2 Type of physical activity (Modes)

Endurance activities can be classified into four groups, you can see in *Table 1* (Battista et. al., 2018).

Table 1. Classification of Cardiorespiratory Exercise and Activities

GROUP A	Endurance activities that require minimal skill or fitness to perform. (eg. Walking).
GROUP B	Activities that require minimal skill but are typically, in contrast with group A, performed at a more vigorous intensity (jogging or running)
GROUP C	Activities that have a high relationship between skill and energy expenditure (swimming and cross-country skiing)
GROUP D	Activities vigorous and intermittent (sports like basketball, soccer, tennis, and other racquet sports)

All these types of activities are conditioned by the state of health of each person.

Emphasizing the importance of performing outdoors activities are associated with higher levels of positive emotions in the older population. Furthermore, social companion is a strong predictor of the experience of pleasure

while performing an activity, despite the other predictors. Activities performed with someone else provided 6% more pleasure than activities performed alone. (Cabrita et. al., 2017)

5.3 Duration and frequency (minutes per week, minutes per session, how often, repetitions and sets)

For substantial health benefits, old adults should do at least 150 minutes (2 hours and 30 minutes or 75 minutes (1 hour and 15 minutes) a week of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous-intensity aerobic activity. Older adults may increase moderate- intensity aerobic physical activity to more than 300 minutes for additional health benefits (WHO, 2020).

If old people cannot reach so many minutes per day or week, they can do bouts of 10 minutes, 2 or 3 times a day, even once a day if they have just started (Nikitas et. al., 2020).

5.4 Intensity

The intensity is how hard a person works to do an activity. We can classify the intensity with 3 types according to the Talk test and Borg's scale, visible in *Table 2* (Battista et. al., 2018; Foster et. al., 2018; Williams et. al., 2017).

- **Light Intensity:** When you can sing or have a large conversation during the physical activity (2-3 on scale) -*Play petanque or take care of the children.*
- **Moderate intensity:** When you can talk but not sing during the physical activity (5-6 on scale) -*Brisk walking, swimming.*
- **Vigorous Intensity:** When you can't talk during the physical activity (7-8 on scale) -*Gardening, Nordic walking.*

A general rule of thumb is that 2 minutes of moderate-intensity activity counts the same as 1 minute of vigorous-intensity activity. For example, 30 minutes of moderate-intensity activity is roughly the same as 15 minutes of vigorous-intensity activity.

Table 2. Borg's Scale (Borg, 1982)

BORG 10	Perceived Effort	BORG 10
10	Maximal	10
9	Very, very severe	9
8		8
7	Very severe	7
6		6
5	Severe	5
4	Somewhat severe	4
3	Moderate	3
2	Slight	2
1	Very slight	1
0,5	Very, very slight (just noticeable)	0,5
0	Not exertion at all	0

5.5 Progression

In the field of health, the most important thing is to have appropriate progression, usually with weekly microcycles, where both volume (duration and/or frequency) and intensity are gradually increased, and then adjusting the desired intensity while gradually increasing it until participants are capable of exercising at moderate or vigorous intensity for the recommended minutes (Aguilar et. al., 2022).

In the long term, the exercise program can be structured into different stages:

Initial or conditioning stage (weeks 3-6): Progression of low-intensity and short-duration physical exercise. Prioritize learning and adherence to practise.

Improvement stage (weeks 6-28): Achieve 150' minutes of moderate physical activity per week. Introduce new modalities like Nordic walking or hiking with different unevenness.

Maintenance stage (from week 28 onwards): Achieve and maintain 300' minutes of physical exercise per week. Encourage autonomy in physical exercise beyond organized programs.

When and how much to increase all the components will depend on the user's initial fitness level, his progress, health status, and goals. In general, the terms beginner, intermediate and established are used to describe the fitness level but this method is somewhat subjective. The objective of the progression is that it should not be overly aggressive and should gradually increase (Battista et. al., 2018).

A progression example is shown in Table 3.

Table 3. Progression table for Old People

STATUS	TIME POINT	WARM UP	WORKOUT	COOL DOWN
BEGINNER	First 2 weeks	2' slow easy walking ¹ 5' Joint mobility ² Balance exercises ³	Light walking (level 2-3) 10' minutes a day for 2-3 day/week. Weekly 30'.	5' Stretching ⁴ Relaxation ⁵
	Progression	3-4' easy walking 5' Joint mobility Balance exercises	10' of light walking (level 2-3) for 3-4 days a week. Weekly 40'.	5' Stretching Relaxation
	Adherence	5' easy walking 5' joint mobility Balance exercises	2 periods of 10' walking (level 3-4) for 5 days. Weekly 100'	5' Stretching Relaxation
INTERMEDIATE	First week	5' easy walking Joint mobility Balance exercises	Add 10-15' of moderate walking (4-5) the most of the days.	5' Stretching Relaxation
	Progression	5-7' easy walking Joint mobility Balance exercises	Add minutes until you reach 30' per day and introduce new modalities like Nordic walking.	5' Stretching Relaxation
	Adherence	7-10' easy walking Joint mobility Balance exercises	30' of moderate walking and 10' of vigorous walking (introduce hiking with different unevenness). Weekly 150'.	5' Stretching Relaxation
ESTABLISHED	Continuation/maintenance	5-10' easy walking Joint mobility Balance exercises	Add minutes progressively to achieve 300' per week for additional health benefits.	5' Stretching Relaxation

¹Easy walking: Walk calmly at a low and gentle pace.

²Joint mobility: Arm rotation forward and backward, neck half circles, ankle rotation.

³Balance exercises: Heel-to-toe walk, one-leg stand, step up.

⁴Stretching: Hamstring stretch, overhead side stretch, standing quadriceps stretch (with or without support).

⁵Relaxation: Deep breaths, meditation, music etc.

5.6 Special considerations

According to the most common diseases of old people and those that require special considerations, *Table 4* has been prepared on what must be considered before doing cardiorespiratory fitness (Aguilar et. al., 2022; Pedersen et. al., 2015; ACSM, 2021)

Table 4. Considerations of cardiorespiratory fitness for the most common diseases for old people.

TYPE OF PATHOLOGY	CONSIDERATIONS
NEUROLOGICAL (dementia, parkinson, multiple sclerosis, stroke)	- Use walking or hiking poles to help with balance. - Break exercises into simple, easy-to-follow steps.
METABOLIC (obesity, metabolic syndrome, type 1&2 diabetes)	- Physical activity should be postponed in the case of a blood sugar level >17 until it has been corrected.

CARDIOVASCULAR (hypertension, coronary heart disease, heart failure, cerebral apoplexy)	<ul style="list-style-type: none"> - People with blood pressure >180/105 should not begin regular physical activity until after pharmacological treatment has been initiated. - Stop if >1.8 kg weight increase over 1–3 days
PULMONARY (asthma, cystic fibrosis, chronic obstructive pulmonary disease)	<ul style="list-style-type: none"> - Work should not be allowed if SaO₂ is <90%. - If the patient has an infection, a break in training is recommended until the patient has been asymptomatic for 1 day.
MUSCULO-SKELETAL (osteoarthritis, osteoporosis, back pain, rheumatoid arthritis, fibromyalgia)	<ul style="list-style-type: none"> - In cases of acute joint inflammation, the affected joint should rest until the drug treatment has taken effect. - Be active in warm water (water exercise or swimming) to take weight off of painful joints as you move
PSYCHIATRIC (depression, anxiety, stress, schizophrenia)	<ul style="list-style-type: none"> - The physical training program must be individualized and supervised. - Some psychotropic medications can cause dizziness, slower movement, and coordination problems.
CANCER	<ul style="list-style-type: none"> - It is advised that patients undergoing chemotherapy or radiotherapy with a leukocyte count below 0.5910(9)/L, haemoglobin below 6 mmol/L, thrombocyte count below 20910(9)/L, temperature above 38°C should not exercise.
URINARY INCONTINENCE	<ul style="list-style-type: none"> - Avoid high impact exercises. - Vary the work execution positions (sitting, standing, or lying in lateral decubitus).
HIV/AIDS	<ul style="list-style-type: none"> - Not exceed 90 minutes at maximum intensity. - Progress may be slow at first due to virus symptoms and drug side effects.
FALLS	<ul style="list-style-type: none"> - The exercises must have few repetitions with moderate resistance. - Avoid high impact exercises.

5.7 Assessing cardiorespiratory fitness

For testing the cardiorespiratory endurance of older adults, we have the **Senior Fitness Test** (Langhammer & Stanghelle, 2015) a practical and suitable set of tests for clinical use and is appropriate for healthy older people and those with dementia. Inside all this test we have to use only one:

The 6-minute Walk test: This test is measured in distance (m) and reflects aerobic endurance. The original version of the Senior Fitness Test required people to walk on a rectangular course for 6 minutes, but more recent versions use a straight line (Enright, 2003).

- The primary measurement is the total distance walked.
- Secondary measures can include fatigue and dyspnea, measured with a modified Borg or visual analog scale.
- During the test **do not walk with the user**, because even if you walk behind them, it will alter their pace.
- Do not use an oval or circular track.
- Count the laps and then calculate.
- Healthy subjects' 6MWT ranges from **400 to 700m**.

If a 6MWT is not feasible then it is acceptable to replace this test with the **2-minute Step test** or the **Usual-Pace Gait Speed**, a test that is used for people with frailty or sarcopenia.

5.8 Training program characteristics

We did a summary of the scientific literature on effective cardiorespiratory endurance programs for old people (shown in *Table 5*), explaining the type of activity, duration, and intensity (Roberts et. al., 2017).

Table 5. Summary of the scientific literature of cardiorespiratory endurance programs for old people

Type of activity	Activity examples	Duration of session	Frequency	Program duration
DANCING	Latin dance Cha-cha Two-steps	20-90 min	1-3 per week	2-6 months
WALKING	Walking at moderate pace Nordic walking	20-60 min	3 per week	12-16 weeks
STATIONARY CYCLING	Indoor cycle Recumbent	20-60 min	3 per weeks	3-6 months
AQUAFIT	AquaZumba AquaAerobics Aquaboxing	60 min	2-3 per week	2 - 6 months
GAMIFICATION	Wii fit Exergaming Oculus Quest	35 - 45 min	2-3 per week	6-10 weeks
GARDENING	Watering the garden Mowing	1h	1 per week	8 weeks

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MODULE 6

Strengthening activities for older adults



Introduction

Strengthening activities, or as it is commonly known as resistance training, is a popular and effective modality to improve muscle function, functional performance, and health parameters in a wide range of healthy and clinical populations (Lopez et. al., 2020). This method of conditioning involves the use of different modes of training with a wide range of resistive loads, from body weight to barbells (Stricker et. al., 2020).

Below, you will be able to see: (i) the specific benefits of strength activities, (ii) what types of activities to perform, (iii) duration and intensity, (iv) progression, (v) specific considerations for diseases of the old people, (vi) testing and a collection of different programs that have carried out throughout history.

6.1 Specific benefits

Resistance training is more effective in improving muscle strength and performance in older people than other lower-intensity exercises (Chen et. al., 2020). Higher levels of muscular strength are associated with significantly better cardiometabolic risk factor profiles, lower risk of all-cause mortality, fewer cardiovascular diseases events, lower risk of developing functional limitations, and nonfatal disease (Ewing et. al., 2011). Also, supervised resistance training may be a safe physical intervention in frail individuals to prevent functional capacity losses, dependence, falls incidence (Lopez et. al., 2018) and urinary incontinence (Bo, 2004).

Apart from greater strength, there is an impressive array of changes in health-related biomarkers that can be derived from regular participation in resistance training, including improvements in body composition, blood glucose levels, insulin sensitivity and blood pressure in persons with prehypertension or stage 1 hypertension. Additionally, strength activities may prevent and improve depression and anxiety, increase “energy” levels, and decrease fatigue (Ewing et. al., 2011).

Laboratory-based studies showed that 20 to 30 minutes of strength (resistance) training, 2 to 3 times per week, has positive effects on risk factors for cardiovascular disorders, cancer, diabetes, and osteoporosis. Furthermore, progressive strength (resistance) training is recommended for preventing sarcopenia and improve postural control (Mayer et. al., 2011).

6.2 Type of strength activities

Choosing the appropriate materials is essential to perform resistance activities in a safe manner to provide beneficial effects. The European Review of Aging and Physical Activity mentions that older people should choose the elastic band as much as possible, because they are more likely to suffer injuries with weight machines than young people (Chen et. al., 2021).

Resistance exercises as using weight machines, or hand-held weights, body-weight exercises (push-ups, pull-ups, planks, squats, lunges), digging, lifting, and carrying as part of gardening, carrying groceries, some yoga postures, and some forms of tai chi, are also strength activities that older people can do (Piercy et. al. 2020).

Single-joint exercises that isolate functionally important muscle groups such as the abdominals, lumbar extensors (lower back), calf muscles, hamstrings, quadriceps, biceps, etc., should also be included. To prevent

muscular imbalances, training opposing muscle groups (antagonists), such as the quadriceps and hamstrings, as well as the abdominals and lumbar extensors, is important (Ewing et. al., 2011).

6.3 Duration and frequency

Resistance training program should be performed for 2 or more days per week. Most individuals respond favorably (e.g., hypertrophy and strength gains) to two to four sets of resistance exercises per muscle group, but even a single set of exercise may significantly improve muscle strength and size, particularly in novice exercisers (Ewing et. al., 2011).

6.4 Intensity

The intensity of resistance training is how much weight or force is used relative to how much a person can lift. We can relate to the sets and repetitions components, which means how many times a person does the muscle-strengthening activity, like lifting a weight or doing a push-up (Piercy et. al., 2020).

Muscular strength can be measured in several ways. The 1-repetition maximum (1RM), which is used to find out the heaviest weight a person can lift just once. From here the % is calculated to work on the desired goal (Androulakis-Korakakis, 2020). However, this is not suitable for older individuals due to the high stress generated by the 1 RM test (Karabulut, 2010). Hence, it has been suggested to estimate it based on 6 or 10 RM (Fritzen et. al., 2020; Cruz-Jentoft et. al., 2019).

An indirect way to measure 1RM is to estimate the multiple 6 or 10 RM (Fritzen et. al., 2020)) or by the Rating of Perceived Exertion (RPE) (11). This method quantifies the training load by multiplying the whole training RPE based on the Borg Scale ratio scale (CR1-10) see the description in Module 5, *Table 2*.

The training frequency should range between 2 and 4 days per week and a low volume (60-80% of 1RM or 3-7 RPE) for major muscle groups. At this point, it should be personalized and gradually increase the intensity.

6.5 Progression

It is important to consider the level of each user and motor skills because it can be harmful to health. Below we explain the 3 types of levels:

BEGINNER: correct technique should be emphasized, and the resistance and volume should be kept low. A single set per exercise may be enough for beginners to achieve the stimulus needed from an exercise. (Battista et. al., 2018)

INTERMEDIATE: As the client progresses during the months of training, multisets should be used for each exercise session.

ADVANCED: Include highly technical exercises such as clean or snatch as well as other modalities such as plyometric exercises.

The examples of the progression are explained below, and summarized in Table 1.

Squat exercise

Beginner: Sitting in a chair (with or without armrest), with knees in 90°. It consists of getting up and sitting down from the chair.

Intermediate: Place a fitball on the back against the wall and bend the knees and hips to form 90° angle, and then extend the knees going up again.

Advanced: The same previous exercise but without support.

Plank exercise

Beginner: Standing position in front of a wall, with both forearms supported on the wall and keeping both feet away from the wall. The person should stand in that position for a few seconds for isometric contraction.

Intermediate: Same previous exercise but supporting both forearms to a fitball against the wall (unstable surface).

Advanced: Same position but on the floor, with or without knee support, minding to keep the back straight.

Chest press

Beginner: Sitting in a chair and holding a ball with both hands. The person extends the elbow, moving the ball away from the body, and then returning to the starting position.

Intermediate: Sitting in a chair, holding a resistance band with both hands and passing it behind the back. It consists in doing an elbow extension, pulling the band out in both directions, and then coming back to the start position.

Advanced: The same exercise but standing and holding the resistance band on a trellis, door or fence.

Row

Beginner: Sitting on a chair, holding a resistance band with both hands. Someone will hold the middle part of the band in front of the older adult. It consists of doing an elbow flexion, bringing the tips of the band closer to the body.

Intermediate: Same previous exercise but sitting on a fitball. This exercise can be done holding the resistance band with one or two hands.

Advanced: In a standing position, the person holds a dumbbell in one hand and leans on a chair with the other hand, lifting up the dumbbell whilst doing an elbow flexion.

Table 1. Example of progression in resistance training for older people.

EXERCISE	BEGINNER	INTERMEDIATE	ADVANCED	SETS	REPETITION S
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Squat (Quadriceps)	Sit-stand on a chair (with or without armrest)	Squat with fitball on the back	Squat without support	1-4	8-12
Plank (CORE)	Standing plank on the wall	Standing plank with a fitball on the wall/chair.	Forearm plank on the floor with or without supported knees	1-4	30"
Chest press (Pectoral)	Sitting chest press with ball	Sitting chest press with resistance band	Standing chest press with resistance band	1-4	8-12
Row (Back)	Seated row with resistance band (double-arm)	Seated row in a fitball with resistance band (single- or double-arm)	Standing single-arm dumbbell row	1-4	8-12

6.6 Special considerations

The most common diseases of old people require special considerations to perform training. The following table (*Table 2*) provides information on the aspects to be considered before doing resistance fitness (Pedersen et. al., 2015; Aguilar et. al., 2022; ACSM, 2021).

Table 2. Considerations in resistance training for old people with diseases.

TYPE OF PATHOLOGY	CONSIDERATIONS
NEUROLOGICAL (dementia, parkinson, multiple sclerosis, stroke)	<ul style="list-style-type: none"> - The exercises must be done on a soft surface, balance pad or disc to help balance. - Specific work of the affected side (strength + proprioceptive and tactile sensitivity).
METABOLIC (obesity, metabolic syndrome, type 1&2 diabetes)	<ul style="list-style-type: none"> - Strength exercises can reduce the hypoglycemic effect associated with aerobic exercise when included in the same session. - It is advisable to start exercising larger muscle groups.
CARDIOVASCULAR (hypertension, coronary heart disease, heart failure, cerebral apoplexy)	<ul style="list-style-type: none"> - If the heart rate is abnormally high on a given day, or has an unusual number of "skipped beats" or if the person is extra tired, it's best not to exercise. - Workout with machines or body weight.
PULMONARY (asthma, cystic fibrosis, chronic obstructive pulmonary disease)	<ul style="list-style-type: none"> - Avoid blockage of breathing (Valsalva maneuver). - For the upper limbs, the arms should not be raised above 90 or flexed, if this increases dyspnea.
MUSCULO-SKELETAL (osteoarthritis, osteoporosis, back pain, rheumatic arthritis, fibromyalgia)	<ul style="list-style-type: none"> - Avoid impact and excessive load on the affected area. - Avoid maximal strength exercises especially in standing.
PSYCHIATRIC (depression, anxiety, stress, schizophrenia)	<ul style="list-style-type: none"> - It must be started gradually with untrained people. - Exercise should be started at low intensities to facilitate tolerance to the program.
CANCER	<ul style="list-style-type: none"> - Prioritize the work of the abdominal and paravertebral areas. - It must be started with slow movements, aiming at a correct execution.
URINARY INCONTINENCE	<ul style="list-style-type: none"> - Vary the execution positions (sitting, standing, or lying in lateral decubitus). - Pelvic floor muscle exercises should be done with digital palpation or vaginal cones.

HIV/AIDS	<ul style="list-style-type: none"> - Avoid doing lots of vigorous exercise. If the exercise is too high of an intensity, tiredness will come soon. - Progress may be slow at first due to virus symptoms and drug side effects.
FALLS	<ul style="list-style-type: none"> - The exercises must have few repetitions with moderate resistance. - Caution with muscle strength exercises in the frail older people.

6.7 Assessing resistance fitness

To assess resistance fitness for old people, the **Senior Fitness Test** (Langhammer & Stanghelle, 2015) is a practical and suitable set of tests for clinical use and is appropriate for healthy old people and those with dementia. This test consists of a battery of tests that collect the largest number of fitness components associated with functional independence. The following tests are adapted from Senior Fitness Test:

- **The Chair Stand Test.** This requires people to repeatedly stand up from and sit down on a chair for 30 seconds. The number of stands is recorded. This reflects lower body strength.
- **The Biceps Curl Test.** This requires people to repeatedly lift a 2 kg weight (for women) or an 3.5 kg weight (for men) for 30 seconds. The number of lifts is recorded. This reflects upper body strength.

6.8 Training programs characteristics

A summary of the scientific literature on effective resistance fitness programs for old people, explaining the type of activity, duration, and intensity is shown below in *Table 3* (Roberts et. al., 2017; Grgic et. al., 2020; Kemmler et. al., 2020).

Table 3. Summary of scientific literature of resistance fitness

Type of activity	Duration of session	Frequency	Program duration
RESISTANCE TRAINING	30-60 min	2-3 per weeks	6 weeks - 7 months
FUNCTIONAL TRAINING/STRENGTH TRAINING	60 min	3 per week	12 weeks
CORE INSTABILITY TRAINING	60 min	2 per week	9 weeks
LOWER BODY TRAINING	1-4 sets	2-3 per week	10-16 weeks

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MODULE 7

Neuromotor activities for older adults



Introduction

The neuromuscular system connects the nervous system (represented by the brain, spinal cord and nerves of the extremities) with sensory receptors and all muscles involved in gross or fine motor activities.

The stages of neurological ageing (eg mild cognitive impairment related with the ageing process, Alzheimer disease) are hardly detected when they occur slowly over many years, the caregivers or the family most frequently can report these changes (Alfalahi, H., 2023) because they can recognize the difficulties that replace the abilities that the old adults subject had. Progressive motor decline can be observed, both in the fine and gross motor spheres. Loss of dexterity and fine motor impairment is also called kinetic limb apraxia (Quencer, K., Okun, M. S., 2007). Conditions that produce neurological degeneration never have identical symptom profiles (Henry J. D. 2021) because the rate of degeneration is different from case to case. Should not forget that this pathology is accompanied by a progressive change in personality, called a behavioural and psychiatric syndrome (von Gunten, A., 2009).

“A program of regular exercise that includes cardiorespiratory, resistance, flexibility and neuromotor exercise training beyond activities of daily living to improve and maintain physical fitness and health is essential for most adults.” (ACSM, 2011).

Neuromotor exercise training incorporates various motor skills, including balance, coordination, gait, agility, and proprioceptive training. Forte R. (2019) considers that in this type of training, exercises that will stimulate motor fitness components should be included in the program.

Balance and strength are essential for the old adults above other biomotor training goals (Porcari et al., 2015). Without these two things, old adult people experience deficiencies or difficulties in carrying out basic daily activities. Independence can be lost progressively due to physiologic sarcopenia associated with the ageing process.

As a result of physiological changes with ageing, locomotor abilities decline, balance deteriorates, and the risk of falling increases increasing the mortality rate. Studies report different rates of incidence, mortality or medical problems associated with falling. In a prospective analyse conducted in 22 Western European-countries, Haagsma et al. (2020) report an incidence of 5667 cases per 100 000 individuals in the category 70-74 years respect to 47 239 cases per 100 000 older over 95 years. For the old adults persons living in community, Wapp et al. (2022) underline the association between the previous falls and fear of falling to prediction new incidents. Sometimes the medical explanation for this incident can't be found (Rafanelli et al., 2022) but the risk for a new incident appears higher if an older adult experience already four fallings (Wapp et al. 2022).

The neuromotor activities include several abilities:

- The ability of spatial-temporal orientation is determined by the situation of different parts of the body in space with respect to a fixed or moving point.
- The ability to combine and couple movements, is the ability to coordinate and combine partial or total movements of some subjects towards a specific goal.
- Kinesthetics differentiation ability is the ability to discriminate and interpret the sensations of motor skills in order to achieve better movement coordination. It manifests itself through greater precision and economy in the required movements.
- The motor reaction capacity consists in the action of initiating a movement in a shorter time from the production of the signal or the appearance of a new circumstance, or an unforeseen factor.

- Rhythmic capacity is defined as an ability to organise time and space through movement. It also captures and acquires a rhythm based on an external source thus reproducing the movement.
- The ability to balance is the ability to maintain the desired position in both static and dynamic movement, being directly interconnected with the central nervous system. This capacity is of great importance starting positions in the motor actions performed, an unbalanced starting position will be difficult to achieve in order to have efficient and precise actions. Good balance also serves the purpose of fall prevention, with well-developed balance being a prerequisite for postural control, which is essential to perform complex movements.

7.1 Specific benefits

Adapted balance training and strength training minimise the risk of falling (Cress et al., 2004; Seco et al., 2013; Eckstrom et al., 2020) especially if we deal with a subject having multiple risk factors and physiological and pathological changes associated with the aging process.

Resistance training (RT) can prevent and even reverse the effects of physiological sarcopenia (Hassan, B. H., 2016).

Keating, C. J. (2021) reviewed the results of studies that examined the impact of a RT program in older adults on gait and/or balance and concluded that it has a positive effect: it particularly improves straight-line walking speed. From their point of view RT is an appropriate training method to improve balance, muscle strength, which impacts on autonomy and independence in ADL activities.

It seems that exercises have some positive effects on cognition depending on the effort intensity. Moderate intensity can stimulate the afferent interoceptive system and the proprioceptive somatosensory system, increasing also the release of catecholamines (Dunsky A 2023) in a rhythmic way that can ease cognitive tasks. If subjects do exercise with a great intensity, the phasic release of catecholamines will be attenuated and could lead to undesired inhibition of cognition (McMorris, T. 2021).

The combination of balance and coordination in exercises

Other studies have suggested that exercise with the objective to increase coordination also improves cognitive functions and balance and definitively the quality of life. Rogge et al. (2017) found that healthy adults exercising the balance for 12 weeks can have a good impact on memory and spatial cognition.

When using an unstable platform for training balance during 2 weeks, Mouthon and Taube (2019) found improvements in postural control probably due to cortical plasticity and adaptation of inhibitory behaviour for the acquisition of a balance task following the balance training intervention.

The benefits of dynamic balance exercises:

- Rebalancing the body at any movement to avoid falls and physical damage,
- Improvement of posture and fluidity of movements (improve reactivity and speed of adaptation to positions changes for example),
- Positive impact on muscle strength and fine and gross skills,

- Increase of motor performance by re-education of the centre of gravity, stability during activities,
- -improvement of overall health.

7.2 Duration and frequency (minutes per week, minutes per session, how often, repetitions and sets).

The duration of interventions that reported significant changes in studies across age groups varied widely from 6 to 32 weeks, with 12 weeks being the most common (Keating 2021). Monteiro (2022) followed the evolution after a longer period of 32 weeks of multicomponent training programs with "warm-up, aerobic training, strength training and relaxation with the objectives like increasing muscle strength and functional fitness".

The conclusion of this study carried out on 91 old adults females, aged between 60 and 81, is that this type of complex program is very suitable. (Monteiro 2022). Recently, Rodrigues et al., (2022) reviewing the RT in relation with factors like sarcopenia or falls propose like principle for recommendation 2-3 sets of 1 to 2 exercise for each major muscular group, with 5 to 8 repetitions. They propose to quantify the intensity of training to 50-80% of 1RM, with a 2 or 3 time frequency weekly. the necessary individualised progression should be according older adult functionality.

Exercise protocol variables need to be controlled and/or modified according to the subject particularities (pain level, sensorial difficulties, cardiac changes, motivation, cognitive status, etc.) and level of functionality.

Because interventions have tended to focus on increased planned, structured activities, they tend to use the term 'exercise' rather than physical activity.

7.3 Intensity (absolute intensity (MET'S) and relative intensity

The training routine to increase neuromotor activities can be recommended to be applied 2 times/week.

Intensity is always correlated with resting level, but is also correlated to the individual particularities. For one-person, low intensity exercise may be light walking, for another person it may be light running – it depends on the individual fitness status.

Rest = 1 MET (The metabolic rate at which the body consumes 3.5 ml of oxygen per kg of weight per minute). The intensity can be classified as low, moderate and vigorous:

- Low intensity < 2.9 MET. It can be observed when you exercise without rapid breathing. A normal conversation can be carried out during exercise. The heart is not stressed too much. – *Standing on a chair, moving the ball easily from one hand to another.*

- Moderate intensity 3 – 6 MET. Exercises that cause sweating and strain. Breathing becomes faster and sweating begins. The conversation becomes difficult to sustain and the heart and the cardiovascular system are stressed.
- Vigorous intensity > 6.9 MET. Strenuous exercise that makes the person feel breathless and sweaty. Impossible to speak. Forcing the body until it secretes lactic acid. Extremely tiring. The body moves to the next level of strength and fitness.

A general rule of thumb is that 2 minutes of moderate-intensity activity counts the same as 1 minute of vigorous-intensity activity. For example, 30 minutes of moderate-intensity activity is roughly the same as 15 minutes of vigorous-intensity activity.

Progress at an adequate intensity can be established by the subject, if he/she feels to intensify the efforts and vary the activities this is recommended after at least 4-6 weeks of practice.

Adaptation can be made according to the profile of the participants (if too easy: no functional benefit; if too difficult: discouragement, risk of injury) it is recommended to use support when performing exercises in upright position, as also in lifting heavier objects, if the subject demonstrates good practice and low risk of falling.

Supervision by the support person will encourage the correct execution of exercises. If the exercises are performed in a group, music can be used (like an element of distributive attention) in order to increase the neuronal input/output solicitation. Or a dual task model approach can be apply and can increase motivation. For example stepping over an object while lifting an arm over the head, or passing an object (small, bigger or heavier when the level of progression occur), walking with different rhythm (slow, faster) and singing or repeating a poem or a certain phrase, changing the rhythm while counting (for example counting 5 steps with a cruise speed with an object passing from hand to hand and then the next 7 step with a higher speed, and then another 5 steps with the object in the right hand and left hand on the left shoulder). The direction of walking can be change according to the environment (avoiding obstacles like a chair in the room, a tree in the garden), walking in tandem, heel to toe while is doing a arithmetic exercise or describe a receipt, tell the colours of the rainbow, the names of the European countries, the cities of the country. More examples in Varela-Vásquez et al. (2020) article that treat the subject of dual tasking or "*double cognitive-motor task*" and present the results from different studies.

Like any set of exercises, those for the old adults also begin with warming up the body to avoid possible injuries. Then the program can begin with light intensity movements for short periods of time. Obviously, with time both the intensity and the duration of the programs can be increased, but the beginning must be easy and feasible.

The warm-up is very important at the beginning of the program, as well as the cool-down at the end of the exercise. Through low-intensity, repetitive and controlled movements, the body cools down properly after training and injury and muscle soreness can be prevented. It is important that training does not stop suddenly, but gradually reduces the intensity, so that the movement cycle is complete: from inactive, to slightly active, until active and back.

7.4 Assessment

- “Six minute walk test” or the 6 minute walk test – described in the previous modules;
- “Get-up and Go test” – described in the previous modules;

- “Stops walking when talking” – described in the previous modules.

It was also proposed to appreciate gait stops when subjects are talking. This test named "Stops walking when talking" (SWWT) (Lundin-Olsson et al., 1997) is based on a dual task model. During the walk, the coach notes if the subjects stop walking when a conversation begins.

- maintaining balance for 5 seconds on one leg;
- The WOMAC scale (Western Ontario MacMaster University) allows the assessment of the clinical-functional status in patients with rheumatic diseases of a degenerative type, with localization at the level of important load-bearing joints - hip and knee, ensuring monitoring during various studies, along with other evaluation scales (for example, the visual analogue scale for pain, the scale for anxiety and depression, pain and disturbance of the mental state being intricate elements of the degenerative rheumatic pathology). This score is important; the risk factor for falls and gait changes is the arthritis of the joints of the lower limbs. It includes elements for assessing pain and morning stiffness - two of the defining symptoms of osteoarthritis, being designed as a particularly useful tool for assessing the quality of life in the adult population with degenerative rheumatic pain. Final score is between 0 – 96 points, where 0 = optimal functional status and 96 = minimum functional status.
- The Falls Efficacy Scale-International (FES-I) is a list of items (scored from 1 = maximum confidence to 4 = total lack of confidence to perform the activity) that identifies the scale of a person's fear of falling (Yardley, L. 2005). The scale assesses the degree of self-confidence and worry for doing frequent daily activities.

The subject will describe the fear level of falling in activities like cleaning the house, shopping, or meals preparation, getting up from the chair, walking in different medium or surfaces, participation to different events.

The "Falls Efficacy Scale International" (FES) is recommended by the *World Falls Guidelines* and is available in multiple languages at <https://sites.manchester.ac.uk/fes-i/>. FES is a list of questions that show good reliability assessing the level of self-confidence for frequent daily activities. Can help to identify subjects who avoid activities due to fear of falling, may be useful in assessing the contribution of the fear of falling to functional decline in the old adults.

7.5 Sample training programs (easy and medium level). Warm-up, conditioning, and cool-down.

Objectives:

- development of muscle tone;
- development of joint mobility and muscle elasticity;
- improving the coordination and control capacity;
- educating the correct body attitude.

Effects:

- cardiovascular and respiratory adaptation to effort.

The fundamental exercise part lasts 30-40 minutes. Remember to control clothing and shoes to avoid accidents. If proper shoes are not available subject can wear socks or perform bare foots. Consumption of liquids for hydration is important before exercise and whenever necessary. The speed and accuracy of movements execution is important when the next level.

Warming up takes 5-10 minutes.

Objectives:

- progressive increase of HR and respiratory frequency;
- preparing muscles and joints for effort;
- achieving a mental state favourable to the effort;

Effects:

- increase in muscle and especially central temperature
- increases blood flow
- increases the speed of contraction

Exercises for a simple program: walking exercises with arm movement, exercises in a chair - passing an object from one hand to another, passing an object around a segment of the body (two movements or task are performed in the same time)

Examples:

- Walking in a straight line (the edge of a carpet can be used);
- Movement of arms, legs, head or trunk (bending, turning)
- Unbuttoning clothes while walking
- Juggling a balloon
- Throwing and catching a ball – to the wall or to the therapist/partner
- Hitting a balloon from sitting on a chair, from orthostatic with support (a piece of furniture, wall) and saying a prayer/poem/counting
- Carrying a glass of water, a tray with several glasses of water or different round instable objects like a large ball.

Exercises for a medium program - dynamic exercises performed on the spot or with little movement (variants of walking - walking with alternately raising the knees up, running variants, aerobic or dance steps with different arm movements that involve coordination);

Example: - Stepping over obstacles (with different sizes, highs or forms – like books);

Exercises for vigorous program - exercises of a dynamic nature performed while moving, with the introduction of portable objects or with a partner (variants of walking - walking with alternately lifting the knees up and the opposite arm, aerobic or dance steps with different arm movements that involve coordination, with a partner that can set the uneven rhythm like 3 steps fast walking, 5 steps slow walking etc. See also Varela-Vásquez et al. 2020, Varela-Vásquez et al. 2022);

Examples:

- Walking in a zigzag line, right hand over the shoulder, left arm above the head;

- Rolling a ping-pong ball (a round object that require coordination and attention) on a tray while sitting or standing, difficulty can be added if is required to describe the object
- Stand-up position with eyes closed, support on both legs, hands resting on a solid object, support with one hand, hands on hips

Recommendations:

- The motor task can be carried out actively, with background music or with the TV on to stimulate attention as well
- The exercises should be within the tolerance to effort. Any symptoms like: dizziness blur view, headache, acute sharp pain, change of cardiac rhythm, ear drums pulses or phosphenes, cramps, feeling of overheated, new unknown symptoms or signs can be consider an alarm and the progression or exercises should be stop and the situation must be reassessed,
- The exercises must be above the threshold that will lead to changes in cardiac output and maximum VO₂;
- At first work is done from high positions (following the training of cardio-respiratory and muscular endurance) and then on the ground (used for the development of local muscular endurance and strength and mobility);
- The exercises should be below the level of effort that leads to the appearance of undesired clinical signs;

Cool-down lasts 5-10 minutes:

Objectives:

- the return of cardio-respiratory indices to resting values;
- preventing the appearance of unpleasant signs;
- developing the capacity for self-relaxation.

Means:

- stretching and relaxation exercises;
- relaxation of the segments through rocking movements;
- breathing exercises.

Recommendations:

- the effort from the fundamental part must not be stopped suddenly;
- at the end of the lesson, the old adults must have a good mood, not be exhausted and come back with pleasure for a new training lesson.

Variations like the objects used is a plus factor because it challenge the sensorial nervous system and decrease the monotony, is a "new task" and the challenge is on!

7.6 Sample training programs (easy and medium level). Warm-up, conditioning, and cool-down.

A summary of the scientific literature on effective neuromotor activities to train balance programs for old people, explaining the type of activity, duration, and intensity is shown below in *Table 7.7*

- The next step of progression is achieved when all the exercises can be performed without difficulty, when subject find it easy
- If the subject has a favourite exercise, at the end of the program he can repeat it
- If the subject has any difficulty (is scared to perform) with an exercise, this exercise will be performed last or it will be replaced
- The execution rhythm is decided by the subject, is important to obtain quality movement without pain and accidents over quantity, especially in the beginning in order to increase adherence to exercises, pause after each types of exercises if necessary.

	TIME POINT	Warm-up	Conditioning	Cool-down
BEGINNER Standing when perform \pm support (wall, a chair or table)	First 2 weeks	10' Upper and lower limb joint mobility exercises with the subject seated on a chair or on the mattress/bed	-knee raise alternative, (hold counting to 4) bilateral- alternative x2 sets - side leg raise (hand on support) counting to 6 bilateral- alternatively x2 sets - standing leg kickback (hold counting to 3) – alternatively - torso circle arms along the body, (hold counting to 3) bilateral x 3 sets - walking on the spot 10-15 steps x 2 sets	5' Stretching on the chair or bed/mattress Breathing exercises and relaxation in seated position
	Progression	7' Joint mobility 2x 1' of walking on the spot raising as high as possible, progressively, the lower limb 1' pause between the executions	-knee raise alternatively, counting to 4 bilateral- alternatively x2 sets - side leg raise (hand on support) counting to 6 bilateral- alternatively x2 sets - standing leg kickback (hold counting to 3) – alternatively - torso circle arms along the body, (hold counting to 3) bilateral x 3 sets - hip circles hand on support counting to 6 bilateral x2 sets - walking on the spot 10-15 steps x 2 sets	5' Stretching on the chair or upright position Breathing exercises and relaxation in seated position.
	Adherence	7' Joint mobility 2x 1' of walking on the spot raising as high as possible, progressively, the lower limb 1' pause between the executions	-knee raise alternative, counting to 4 bilateral- alternatively x2 sets - hip circles hand on support counting to 6 bilateral x2 sets - side leg raise (hand on support) counting to 6 bilateral- alternatively x2 sets -standing leg kickback counting to 5 –alternatively -torso circle arms along the body, (hold counting to 3) bilateral x 3 sets	5' Stretching on the chair or upright position Breathing exercises and relaxation in seated position.



			-front arms swings (or lifts) (hold counting to 6) bilateral/ alternatively x2 sets -lateral arms swings (or lifts) bilateral/alternatively (hold counting to 6) x2 sets -walking on the spot 10-15 steps x 2 sets -2' walking on a zigzag pattern holding different objects in hands	
INTERMEDIATE Standing ± support (wall, a chair or table)	First 2 weeks	7' Joint mobility from a chair/bed 2x 1' of walking on the spot raising as high as possible, progressively, the lower limb 2x 1' of upper balance from upright position 1' pause between the executions	-knee raise alternatively counting to 4 bilateral- alternatively x 2 sets -ankles circles alternatively – 4-6 times bilateral - alternatively x1 set - heel standing (± hand on support) bilateral counting to 3 – 8 times -side leg raise (hand on support) counting to 6 bilateral- alternatively x 2 sets - standing leg kickback counting to 5 –alternatively - walking on the spot high knee 10 -15 steps x 2 sets -walking on a zigzag pattern -2'	5' Stretching Breathing exercises Relaxation
	Progression	7' Joint mobility from upright position 2x 1' of walking on the spot raising as high as possible, progressively, the lower limb 2x 1' of upper balance from upright position 1' pause between the executions	-knee raise alternatively counting to 4 bilateral- alternatively x 2 sets -ankles circles alternatively – 4-6 times bilateral - alternatively x1 set - heel standing (± hand on support) bilateral counting to 3 – 8 times -side leg raise (hand on support) counting to 6 bilateral- alternatively x 2 sets - standing leg kickback counting to 5 –alternatively - lateral arms swings (or lifts) bilateral/alternatively counting to 6 bilateral x 2 sets -side shoulders taps bilateral x 2 sets - walking on the spot 10 steps x 2 sets, last set eyes closed - walking on the spot 10 steps with small/light object in hands (tennis ball, paper glass), changing the object between two hands x 2 sets, last set eyes closed -walking on a zigzag pattern -4'	5' Stretching Breathing exercises Relaxation
	Adherence	5' Joint mobility 2x 1' of walking on the spot raising as high as possible, progressively, the lower limb 2x 1' of upper balance from upright position Rhythm of execution decided by the subject 1' pause between the executions	-knee raise alternatively counting to 4 bilateral- alternatively x 2 sets -ankles circles alternatively – 4-6 times bilateral - alternatively x1 set - heel standing (± hand on support) bilateral counting to 3 – 8 times -side leg raise (hand on support) counting to 6 bilateral- alternatively x 2 sets - standing leg kickback counting to 5 –alternatively - lateral arms swings (or lifts) bilateral/alternatively counting to 6 bilateral x 2 sets -side shoulders taps bilateral x 2 sets - walking on the spot 10 steps x 2 sets, last set eyes closed - walking on the spot 10 steps with small/light object in hands (tennis ball, paper glass), changing	5' Stretching Breathing exercises Relaxation



			<p>the object between two hands x 2 sets, last set eyes closed</p> <ul style="list-style-type: none"> - walking on the spot high knee 10 -15 steps x 2 sets -walking on a zigzag pattern -4' 	
ESTABLISHED	First 2 weeks	<p>5' Joint mobility from upright position</p> <p>2x 1' of walking on the spot raising as high as possible, progressively, the lower limb</p> <p>2x 1' of upper balance from upright position</p> <p>1' pause between the executions</p>	<ul style="list-style-type: none"> -knee raise alternatively counting to 4 bilateral- alternatively x 2 sets -ankles circles alternatively – 4-6 times bilateral – alternatively x2 sets - heel standing (± hand on support) bilateral counting to 4 – 8 times -side leg raise (hand on support) counting to 6 bilateral- alternatively x 2 sets - standing leg kickback counting to 5 –alternative - torso circle arms along the body holding 0,5kg dumbbells, hold counting to 6-8 bilateral x 4 sets - lateral bending with hand along the body holding 0,5kg dumbbells bilateral x4 times –alternative - lateral arms swings (or lifts) ± holding 0,5kg dumbbells bilateral/alternatively counting to 6 bilateral x 2 sets - walking on the spot 10 steps x 2 sets, last set eyes closed -walking on a zigzag pattern -4' 	<p>5' Stretching</p> <p>Breathing exercises</p> <p>Relaxation</p>
	Progression		<ul style="list-style-type: none"> -knee raise alternatively counting to 4 bilateral- alternatively x 2 sets -ankles circles alternatively – 4-6 times bilateral - alternative x2 sets -hip circles (± hand on support) counting to 6 - bilateral x 2 sets - heel standing (± hand on support) bilateral counting to 4 – 8 times -side leg raise (hand on support) counting to 6 bilateral- alternatively x 2 sets - standing leg kickback counting to 5 –alternatively - torso circle arms along the body holding 0,5kg dumbbells, hold counting to 6-8 bilateral x 4 sets - lateral bending with hand along the body holding 0,5kg dumbbells bilateral x4 times –alternatively - front arms swings (or lifts) ± holding 0,5kg dumbbells bilateral/alternatively counting to 8 bilateral x 2 sets - lateral arms swings (or lifts) ± holding 0,5kg dumbbells bilateral/alternatively counting to 6 bilateral x 2 sets - walking on the spot 10 steps x 2 sets, last set eyes closed - walking around the room 10 steps with small/light object in hands (tennis ball, paper glass), changing the object between two hands - walking on the spot high knee 10 - 15 steps x 2 sets last set eyes closed -walking on a zigzag pattern -4' 	<p>5' Stretching</p> <p>Breathing exercises</p> <p>Relaxation</p>
	Adherence		<ul style="list-style-type: none"> -knee raise alternative counting to 4 bilateral- alternatively x 2 sets 	<p>5' Stretching</p>

			-ankles circles alternatively – 4-6 times bilateral - alternatively x2 sets -hip circles (\pm hand on support) counting to 6 - bilateral x 2 sets - heel standing (\pm hand on support) bilateral counting to 4 – 8 times -side leg raise (\pm hand on support) counting to 6 bilateral- alternatively x 2 sets - standing leg kickback counting to 5 –alternatively - torso circle arms along the body holding 0,5kg dumbbells, hold counting to 6-8 bilateral x 4 sets - lateral bending with hand along the body holding 0,5kg dumbbells bilateral x4 times –alternatively - front arms swings (or lifts) \pm holding 0,5kg dumbbells bilateral/alternatively counting to 8 bilateral x 2 sets - lateral arms swings (or lifts) \pm holding 0,5kg dumbbells bilateral/alternatively counting to 6 bilateral x 2 sets -side shoulders taps bilateral x 2 sets - walking on the spot 10 steps x 2 sets, last set eyes closed - walking around the room 10 steps with small/light object in hands (tennis ball, paper glass), changing the object between two hands - walking on the spot high knee 10 - 15 steps x 2 sets last set eyes closed - 3'walking high knee around the room with small/light object in hands (tennis ball, paper glass), changing the object between two hands -walking on a zigzag pattern -4'	Breathing exercises Relaxation
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MODULE 8

Flexibility/stretching and mindfulness activities for older adults



Introduction

Adults aged 50 - 65 years old experience various kinds of decreased physiological function, including muscle function, cardiovascular, cognitive. Also, the rate of regenerative mechanisms is more noticeable, and this process is known like aging (Hernandez-Segura et al., 2018).

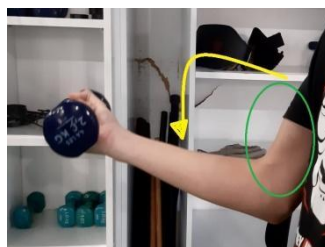
Then the balance and mobility factors also decrease when they reach that age. Based on these considerations, various kinds of movements are needed following the old adults needs. It certainly cannot be equated with the usual movements carried out by people who are productive in the golden age. Another aspect of old adults' development is about moral commitment (Rismayanth et al., 2022).

The old adults experience a variety of decreased physiological functions, including muscle and cardiovascular function. Muscle strength and power in performing isometric, concentric, and eccentric movements decrease from 40 years, and significant decreases occur after the age of 65-70 years (Porcari et al., 2015). The body's ability to balance and mobility also decreases when the old adults age (Messier et al., 1997; Porcari et al., 2015; Yamada & Demura, 2009).

Giving some examples, the improvements in leg strength, mobility, and postural stability after eccentric exercise were greater than concentric exercise in 17 healthy older adults (Katsura et al., 2019). A similar result was found for improving power, jump and stair climbing performance in the response to plyometric exercise (Van Roie et al., 2020). The review of Kulkarni and colleagues (2022) also suggests that eccentric exercise could be an effective intervention for geriatric function improvement. To the best of our knowledge, there still remains unclear the findings on flexibility as a result of eccentric exercise in older adults.



No movement



Eccentric movement



Concentric movement

concentric= muscle is shortening/contracted under load, eccentric= muscle is lengthen/relaxing under load, both phases are part of an exercise with muscle contraction.

The flexibility in movement for the old adults is one of the supporting factors for motion progress (Rismayanth et al., 2022). Low flexibility can interfere with the quality of daily activities and can increase the sedentary behaviour.

Mindfulness represents the exercise of conscious and focusing thinking on the living moment and on feelings, body symptoms; it can be achieved by meditation, respiration or yoga practice. Paying attention on the feelings, body symptoms during movements and activities help to eliminate the focus from thoughts that produce multiple and negative emotions that can increase stress, anxiety, decrease rational thinking or motivation, alter sleep qualities. Through self-awareness (breathing, symptoms, thoughts, feelings) the subject can calm down, think rationally and logically and, in the second phase, find the best, healthier and safer solutions to various problems that may have an emotional impact. Through mindfulness the subject practice meditation, mental exercises. The connection between mind and body is restructured.

The definition of mindfulness: *"a mental state achieved by focusing one's awareness on the present moment, while calmly acknowledging and accepting one's feelings, thoughts, and bodily sensations, used as a therapeutic technique."*

The mental processes are modulated by life experiences, in elderly the cognitions mechanisms can be modify and a mindfulness technique the subject pay attention to what is occurring, action consequences and the best reasoning and decisions.

This is a human ability to function fully in the present, with a high degree of awareness in all the life and body areas.

Some mindfulness activities for older people can be mindful breathing exercises, gentle yoga or tai chi, nature walks, meditation, mindful art, journaling, and mindful listening to music or poetry. There are potential benefits of mind-body techniques on cognitive function because the techniques involve an active component of attention or mindfulness (Oken 2006).

Mindfulness-based Chronic Pain Care programs for older subjects with chronic pain appear to be practical, feasible and acceptable approaches to pain management (Foulk, M 2023) Foulk, M et al. (2023) proposed eight weekly 150-minute sessions that resulted in improvements in activity level, increased pain tolerance, and decreased anxiety levels.

Yoga techniques can produce improvements in physical abilities and functionality (balance, flexibility) as well as well-being. More recent studies have identified the association of yoga or aerobic exercise with improved verbal fluency in comparisons that may promote cognitive function in older adults (Welford 2023).

Older adults with reduced mobility may have difficulty in performing balance exercises due to their limited locomotor ability, but exercises with reduced demands on balance or coordination such as stretching and breathing exercise may provide similar benefits to older adults.

Physical activities like yoga or stretching also have other benefits excluding the improving motion and flexibility, for older adults can be a coping mechanism for stress.

8.1 Specific benefits

Decrease the risk of injuries because it can improve flexibility and increase muscle blood flow. The joints range of motion can be increase so the gait is improved, increasing the level of participation as also the motivation, the risk for injuries decreases. This type of activity can enable muscles to work most effectively without soreness and improves the ability to do daily activities.

Exercises that increase flexibility reduce pain, allow maintenance of the spine in a healthy, correct position, and helps establish safe movements. Muscular contracture causes the imbalance of movements at the level of the spine, which could cause damage to these structures. Gentle stretching increases flexibility relieves pain and reduces the risk of injury.

8.2 Duration and frequency (minutes per week, minutes per session, how often, repetitions and sets)

Joint mobility exercises with the subject seated on a chair or on the mattress/bed in a comfortable position.

In the long term, the exercise program can be structured into different stages:

Initial or conditioning stage (weeks 3-6): Progression of low-intensity and short-duration physical exercise. Prioritize learning and adherence to practice.

Improvement stage (weeks 6-28): Achieve 150' minutes of moderate physical activity per week. Introduce new modalities like Nordic walking or hiking with different unevenness.

Maintenance stage (from week 28 onwards): Achieve and maintain 300' minutes of physical exercise per week. Encourage autonomy in physical exercise beyond organised programs.

When and how much to increase all the components will depend on the client's initial fitness level, his progress, health status, and goals. In general, the terms beginner, intermediate and established are used to describe the fitness level but this method is somewhat subjective. The objective of the progression can be established in cooperation with the older subject. Progress at an adequate intensity can be established by the subject, if he/she feels to intensify the efforts and vary the activities this is recommended after at least 4-6 weeks of practice.

Adaptation is made according to the profile of the participants (if too easy: no functional benefit; if too difficult: discouragement, risk of injury). It is recommended to use support when performing exercises in the upright position and also to lift heavier objects if the subject demonstrates a good practice and risk to fall are small.

Supervision will encourage the correct execution of exercises. If the exercises are performed in a group, music can be used to increase the neuronal input/output.

A progression example is shown in the Table 8.1 below.

8.3 Intensity (absolute intensity (MET'S) and relative intensity (1-10))

The intensity is how hard a person works to do an activity. We can classify the intensity with 3 types according to the Talk test and Borg's scale (see in Table 2 from module 5).

A general rule of thumb is that 2 minutes of moderate-intensity activity counts the same as 1 minute of vigorous-intensity activity. For example, 30 minutes of moderate-intensity activity is roughly the same as 15 minutes of vigorous-intensity activity. In practice, to asses' intensity of exercise can be easily made according to Borg scale or the BORG Scale for Rating Perceived Exertion or Modified dyspnea scale (10 points scale). *For safety, especially for older adults, the exercise intensity and duration should be adjust until a score of 1-2, when effort is*

increase the score should not go over 4. Subject can be instructed to rate his breathing difficulty before exercise according to this chart. Also a Visual analog scale can be used to ease the questions for the older adult.

	Subject perception of the activity intensity (breathing variations)
1	Very light - doesn't feel exercising
2-3	Light – feel something easy to carry on, can breathe and talk
4-6	Moderate – breath heavily, but can have a conversation
7-8	Somewhat difficult – short of breath, speak one sentence at a time
9	Very difficult - can barely breath, can say only few words
10	Maximum effort - completely out of breath, can't talk

8.4 Assessment

Joint flexibility is most often measured with goniometers and dynamometers to track the variations in the range of motion of a joint. In the absence of devices to measure this, there are a series of tests that can be used successfully in gyms. Tests that could identify dysfunction in functionality are recommended (example **Functional Movement Screen – FMS battery**)

Stand and reach test - to measure the anteroposterior mobility - from standing on a bench, the subject flexes the trunk forward and the distance between the fingers and the bench is measured. Avoid bending the knees. (Figure 8.1.)

Adapted sit and reach test (from chair). (Figure 8.2.) help to measure the lower body mobility (lower spine and hips). First protocol for the test: a heel on the floor, ankle at 90°, the knee extended the subject (exhaling) reach to the foot, trying to touch with the fingers the top of the foot. The subject score is 0 if the finger reach the shoe, the score is negative if the hand can't reach (figure 8.2.), a positive score is obtain if the top of the foot is touch with the palm of the hand.



Figure 8.1. Stand and reach test (for spine mobility)



Figure 8.2. Adapted sit and reach test (from chair).

In the second protocol (Figure 8.3.) the test is performed with the subject is sitting, spine on floor, feet 30 cm apart, knees flat, a measuring stick between legs, the hands overlapped reach forward as far as possible on the measuring stick. The best length achieved after three attempts is recorded.

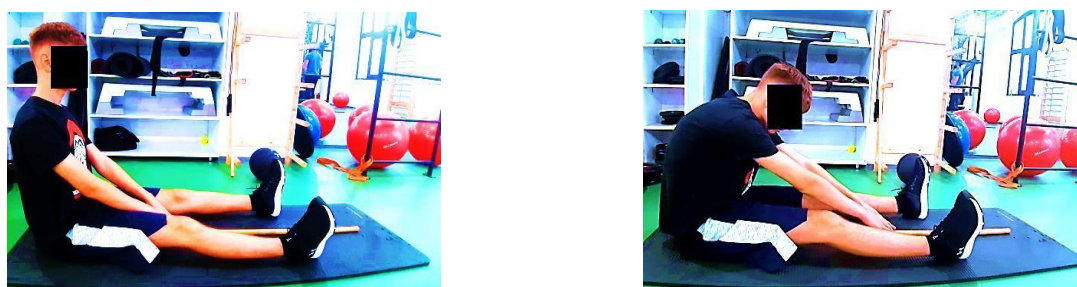


Figure 8.3. Sit and reach test (for hip hamstrings and low back mobility)

8.5 Sample training programs (easy and medium level). Warm-up, conditioning, and cool-down.

A summary of the scientific literature on effective resistance fitness programs for old people, explaining the type of activity, duration, and intensity is shown below in *Table 8.1*.

Table 8.1. Sample training programs (easy and medium level). Warm-up, conditioning, and cool-down.

	TIME POINT	Warm-up	Conditioning	Cool-down
BEGINNER	First 2 weeks	Subject seated on a chair or on the mattress/bed 5' Upper and lower limb joint: wrist, ankles bilateral, knee extension alternative, neck twists alternative, finger walking upright both hands alternative and bilateral	10' x 2 session Yoga chair exercises Mountain Pose Eagle Arms Sun salutations - Hands Up Side stretch pose -bilateral Low lunge (knee hug) –bilateral	5' Stretching on the chair or bed/mattress 5' Diaphragmatic mindful breathing, focus attention on the inhale and exhale
	Progression	Subject seated on a chair or on the mattress/bed 5' Upper and lower limb joint: wrist, ankles bilateral, knee extension alternative, neck twists alternative, finger walking upright both hands alternative and bilateral	10' x 2 session Yoga chair exercises Mountain Pose Eagle Arms Sun salutations - Hands Up Side stretch pose -bilateral Cactus arms Low lunge (knee hug) –bilateral	5' Stretching on the chair or bed/mattress 5' Diaphragmatic mindful breathing, focus attention on the inhale and exhale
	Adherence	Subject seated on a chair or on the mattress/bed 5' Upper and lower limb joint: wrist, ankles bilateral, knee extension alternative, neck twists alternative, finger walking upright both hands alternative and bilateral	15' x 2 session Yoga chair exercises Mountain Pose Eagle Arms Sun salutations - Hands Up Neck rolls (lateral) Side stretch pose -bilateral Cactus arms Low lunge (knee hug) –bilateral	5' Stretching on the chair or bed/mattress 5' Diaphragmatic mindful breathing, focus attention on the inhale and exhale
INTERMEDIATE	First 2 weeks	Subject seated on a chair or on the mattress/bed 5' Upper and lower limb joint: wrist, ankles bilateral, knee extension alternative, neck twists alternative, finger walking upright both hands alternative	15' Yoga chair exercises Mountain Pose Eagle Arms Sun salutations- Hands Up Neck rolls (forward, backward, lateral) Shoulders circles palms on shoulders Side stretch pose –bilateral Cactus arms Low lunge (knee hug) –bilateral	5' Stretching on the chair or bed/mattress 5' Diaphragmatic mindful breathing, focus attention on the inhale and exhale
	Progression	Subject seated on a chair or on the mattress/bed	15' Yoga chair exercises Mountain Pose	5' Stretching on the chair or bed/mattress



ESTABLISHED		5' Upper and lower limb joint: wrist, ankles bilateral, knee extension alternative, neck twists alternative, finger walking upright both hands alternative ± bilateral	Eagle Arms Sun salutations - Hands Up Neck rolls (forward, backward, lateral) Shoulders circles palms on shoulders Side stretch pose –bilateral Cactus arms Low lunge (knee hug) –bilateral Half forward fold	5' Diaphragmatic mindful breathing, focus attention on the inhale and exhale
	Adherence	Subject seated on a chair or on the mattress/bed 5' Upper and lower limb joint: wrist, ankles bilateral, knee extension alternative, neck twists alternative, finger walking upright both hands alternative and bilateral	15' x 2 set - Yoga chair exercises Mountain Pose Eagle Arms Sun salutations - Hands Up Neck rolls (forward, backward, lateral) Camel pose -Chest opener Shoulders circles palms on shoulders Side stretch pose –bilateral Cactus arms Low lunge (knee hug) –bilateral Half forward fold	5' Stretching on the chair or bed/mattress 5' Diaphragmatic mindful breathing, focus attention on the inhale and exhale
	First 2 weeks	Subject seated on a chair or on the mattress/bed 5' Upper and lower limb joint: wrist, ankles bilateral, knee extension alternative, neck twists alternative, finger walking upright both hands alternative and bilateral	15' x 2 set - Yoga chair exercises Mountain Pose Eagle Arms Sun salutations - Hands Up Neck rolls (forward, backward, lateral) Cat pose, Cow pose Shoulders circles palms on shoulders Side stretch pose –bilateral Seated spinal twist Cactus arms Low lunge (knee hug) –bilateral Half forward fold	5' Stretching on the chair or bed/mattress 5' Diaphragmatic mindful breathing, focus attention on the inhale and exhale
ESTABLISHED	Progression	Subject seated on a chair 5' Upper and lower limb joint: wrist, ankles bilateral, knee extension alternative, neck twists alternative, finger walking upright both hands alternative and bilateral	15' x 2 set - Yoga chair exercises Mountain Pose Eagle Arms Sun salutations - Hands Up Neck rolls (forward, backward, lateral) Cat pose, Cow pose Camel pose -Chest opener Shoulders circles palms on shoulders Side stretch pose –bilateral Seated spinal twist Cactus arms Low lunge (knee hug) –bilateral Half forward fold	5' Stretching on the chair or bed/mattress 5' Diaphragmatic mindful breathing, focus attention on the inhale and exhale
	Adherence	Subject seated on a chair 5' Upper and lower limb joint: wrist, ankles bilateral, knee extension alternative, neck twists alternative, finger walking upright both hands alternative and bilateral	20' x 2 set - Yoga chair exercises Mountain Pose Eagle Arms Sun salutations - Hands Up Neck rolls (forward, backward, lateral) Cat pose, Cow pose Camel pose -Chest opener Shoulders circles palms on shoulders Side stretch pose –bilateral Seated spinal twist Cactus arms Low lunge (knee hug) –bilateral King Arthur's Pose Half forward fold Seated Warrior	5' Stretching on the chair or bed/mattress 5' Diaphragmatic mindful breathing, focus attention on the inhale and exhale

Alternative to yoga session:

- dancing session,
- walking on a pattern (zigzag, hand upright position) saying a poem/prayer or with breathing control

Also it can be recommended to have some session where the subject learn how to manage in case of falling (how to get up), how to get up from the bed with spine control.

Keeping a journal or a mindfulness colouring journal can help to release stress.

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MODULE 9

Personal trainer mode: exercises and relaxing activities for comfort and mental tone

EXERCISE

FOR MENTAL HEALTH

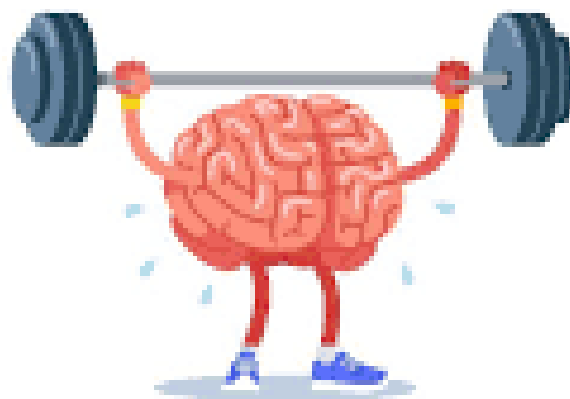


Image relate to the module

Introduction

Promoting active aging and maintaining mental well-being is essential for older adults. This personal trainer module focuses on providing exercises and relaxing activities that enhance comfort and mental tone. It offers guidance on implementing these activities in both domestic and specialized institutional settings, with a particular emphasis on emotional and social-relational well-being.

Keywords: personal trainer, older adults, active aging, relaxation activities, mental well-being, social-relational well-being

As the population ages worldwide, there is an increasing need to prioritize the physical and mental well-being of older adults. Engaging in regular exercises and relaxation activities can contribute to their overall comfort and mental tone. This personal trainer module aims to provide comprehensive guidance for caregiver and trainers working with the elderly, focusing on exercises and activities that promote active aging and enhance well-being.

Purpose and Scope

The purpose of this module is to equip Caregiver and trainers with the necessary knowledge and skills to create a comfortable and engaging environment for older adults. It covers activities for both domestic settings and specialized institutions, addressing the unique considerations and challenges of each. The module emphasizes emotional and social-relational well-being alongside physical fitness, recognizing the holistic nature of well-being in older adults.

Methodology

The content of this module is based on a comprehensive review of relevant research, best practices, and expert opinions in the field of gerontology and personal training. The information provided is supported by evidence-based strategies and practical examples. The module encourages a person-centered approach, considering individual needs, preferences, and limitations of older adults

9.1 Activities for older people and promoting active ageing

This guide will not only present a wide array of activities but will also emphasize the importance of personalized approaches. Every individual has a unique set of interests, physical abilities, and preferences. By tailoring activities to individual circumstances, older individuals can discover the joy of pursuing passions, staying connected with others, and embracing the present moment.

In the following sections, we will explore activities that cater to different dimensions of active aging. From physical exercises that promote strength and balance to creative pursuits that foster self-expression, the journey of active aging is rich with possibilities. Let's embark on this exploration of activities that can unlock the full potential of later life, turning each day into an opportunity for growth and fulfilment.

Active aging and maintaining mental well-being are essential for older adults to lead fulfilling lives. Caregivers and trainers have a vital role in promoting these aspects by implementing exercises and activities that enhance comfort and mental tone.

This module highlights the importance of a holistic approach to wellness, recognizing the interconnectedness of physical, emotional, and social well-being. By integrating exercises, relaxation activities, and social engagement, caregiver and trainers can contribute to the overall well-being

*Regular physical activity has been consistently linked to better physical and mental health in older adults. Research by Warburton et al. (2007) indicates that physical activity can significantly reduce the risk of chronic diseases such as cardiovascular diseases, diabetes, and certain cancers among older individuals.

9.1.1 Domestic atmosphere – how to organize the space for relaxing activities?

Domestic Atmosphere: Organizing Space for Relaxing Activities

Creating a conducive environment is essential for promoting relaxation and engagement in older adults within their homes. Caregivers and trainers can play a crucial role in organizing the physical space to enhance comfort and promote active aging. This section explores various strategies, including ensuring comfortable seating arrangements, creating a dedicated reading nook, setting up hobby or craft areas, designing tranquil spaces, and incorporating nature-inspired elements.

9.1.2 How to implement it in specialized institutions?

Specialized Institutions: Designing Spaces for Active Aging

In specialized institutions, such as senior centers or retirement communities, caregivers and trainers can collaborate with facility managers to create spaces that support active aging. This section discusses the importance of designing activity rooms for various engagements, incorporating sensory rooms for relaxation and stimulation, utilizing multi-purpose spaces for flexibility, establishing reminiscence areas for memory and connection, and providing outdoor spaces for fresh air and physical activity.

Planning Implementation for Domestic and Institutional Settings

Implementing activities for comfort and mental tone requires careful planning and consideration. Caregivers and trainers should take into account the specific needs and preferences of older adults, as well as any health conditions or limitations. This section provides practical guidance on assessing individual needs, collaborating with healthcare professionals and activity coordinators, and adapting the environment to ensure inclusivity and safety.

Effective Implementation of Activities for Comfort and Mental Tone

Successful implementation requires careful planning, individualized approaches, and collaboration with healthcare professionals and activity coordinators. Caregivers and trainers should adapt the environment, consider specific needs and limitations, and provide a range of activities that cater to the emotional, cognitive, and social-relational well-being of older adults.

9.2 Emotional mental-cognitive well-being

9.2.1 Relaxation activities/exercises

To promote emotional well-being and relaxation, caregivers and trainers can introduce various activities and exercises. This section covers techniques such as deep breathing exercises, progressive muscle relaxation, guided imagery and visualization, mindfulness and meditation practices, and engaging in soothing sensory experiences.

Examples:

Here are some examples of relaxation activities/exercises that caregiver and trainers can incorporate to promote emotional well-being and relaxation in older adults:

- **Progressive Muscle Relaxation:** Guide older adults through a progressive muscle relaxation exercise. Starting from the head and moving down to the toes, have them tense and then release each muscle group, focusing on the sensation of relaxation as the tension is released. **(Materials used: stress Balls, Resistance Bands, Foam Rollers, Biofeedback Devices, AbMat, Yoga mat etc.)**
- **Mindfulness and Meditation Practices:** Introduce older adults to mindfulness and meditation techniques. Guide them to focus on the present moment, observing their thoughts and sensations without judgment. Teach them simple meditation techniques, such as focusing on breath or repeating a calming mantra.
- **Guided Imagery and Visualization:** Lead older adults through a guided imagery exercise where they imagine themselves in a peaceful and calming setting, such as a beach or a garden. Encourage them to use their senses to fully immerse themselves in the visualization, promoting relaxation and reducing stress.
- **Music Therapy:** Incorporate music therapy into relaxation sessions by playing calming and soothing music. Encourage older adults to engage with the music by listening attentively, singing along, or even playing simple instruments like a hand drum or a chime. Music has a powerful effect on mood and can promote relaxation and emotional well-being.

Remember to adapt these activities to the individual needs and abilities of the older adults you are working with. Offer options and modifications to ensure their comfort and safety during the relaxation exercises.



9.2.2 Attention and concentration activities – for concentration, memory capacity etc.

Maintaining cognitive function and mental acuity is crucial for older adults. Caregivers and trainers can incorporate activities that enhance attention and concentration skills. This includes puzzles, brain teasers, memory games, and focused attention exercises to keep the mind sharp and engaged.

EXAMPLES:

- **Word Games:** Engage older adults in word games that require concentration and focus. Examples include crossword puzzles, word search puzzles, anagrams, and word association games. These activities stimulate the mind, improve vocabulary, and enhance cognitive skills.
- **Memory Exercises:** Conduct memory exercises that challenge older adults' ability to recall information. For instance, you can present a list of items or numbers and have them try to memorize and recite them in the correct order. You can also use memory cards or matching games to exercise their visual memory.
- **Concentration Games:** Play concentration or memory card games with older adults. This involves flipping cards and trying to match pairs, requiring focused attention and visual memory. You can use themed cards that resonate with their interests or create personalized memory games using family photos.
- **Attention-Building Exercises:** Engage older adults in activities specifically designed to enhance attention and focus. For example, ask them to count backward from 100 in increments of three or challenge them to find specific objects in a picture within a time limit. These exercises strengthen attention and mental agility.



9.2.3 Exercises for abstract thinking and verbal comprehension

Engaging in activities that stimulate abstract thinking and verbal comprehension can support cognitive well-being. Caregivers and trainers can introduce word association games, riddles, logic puzzles, and encourage meaningful conversations to enhance cognitive flexibility and communication skills.

EXAMPLES:

- **Concept Mapping:** Guide older adults in creating concept maps to visually represent the relationships between different ideas or concepts. This exercise promotes abstract thinking by encouraging them to identify connections, hierarchies, and associations among various elements.

- **Analyzing Proverbs and Idioms:** Introduce older adults to proverbs and idioms from different cultures and ask them to explain the underlying meaning or message. This exercise requires abstract thinking and verbal comprehension to decipher the metaphorical or symbolic nature of these expressions.
- **Riddles and Brain Teasers:** Present older adults with riddles or brain teasers that require abstract thinking and verbal comprehension to solve. These challenges encourage them to think critically, analyze information, and make connections between different concepts
- **Analogies:** Provide older adults with analogies and ask them to complete the missing word or identify the relationship between the given words. Analogies require abstract thinking and verbal reasoning to recognize patterns and draw logical conclusions.
- **Abstract Writing Prompts:** Provide older adults with abstract writing prompts, such as describing a dream, imagining a hypothetical scenario, or reflecting on an intangible concept like happiness. This exercise encourages them to think abstractly and express their thoughts in written form.
- **Debate and Discussion:** Engage older adults in debates or group discussions on thought-provoking topics. Encourage them to express their opinions, provide arguments, and engage in critical thinking. This exercise enhances abstract thinking by exploring different perspectives and challenging assumptions.



9.2.4 Tasks for sorting and classifying information

Sorting and classifying tasks can help older adults improve their organizational skills and cognitive abilities. Caregivers and trainers can incorporate activities that involve sorting objects, organizing photos or documents, and participating in classification games to promote cognitive functioning.

EXAMPLES:

- **Sorting Objects by Category:** Provide a collection of objects or pictures and ask older adults to sort them into different categories based on shared characteristics. For example, they can sort different types of fruits, household items, or animals into separate groups.
- **Classifying Words:** Give older adults a list of words and ask them to classify them into different categories based on their meaning or attributes. For instance, they can categorize words into nouns, verbs, adjectives, or group them based on common themes like food, colors, or occupations.
- **Organizing Photos or Documents:** Provide older adults with a stack of photos or documents and ask them to organize them into different folders or albums based on specific criteria. This task requires them to categorize and classify information based on personal preferences or logical groupings.

- **Sorting by Size, Shape, or Color:** Present a collection of objects with varying sizes, shapes, or colors and ask older adults to sort them into separate groups based on these attributes. This activity promotes visual discrimination and logical thinking.
- **Arranging a Timeline:** Provide older adults with a set of historical events or personal milestones and ask them to arrange them in chronological order. This task encourages them to sort and classify information based on time sequences, enhancing their understanding of temporal relationships.
- **Categorizing Clothing or Accessories:** Provide older adults with a collection of clothing items or accessories and ask them to categorize them based on their type (e.g., shirts, pants, shoes) or the occasion they are suitable for (e.g., formal, casual, sports).



9.2.5 Problem solving activities at different levels of difficulty

Challenging problem-solving activities can stimulate critical thinking and problem-solving skills. Caregivers and trainers can introduce puzzles, logic problems, and real-life scenarios that require decision-making to encourage older adults to think analytically and find creative solutions.

Examples:

Level 1: Easy

Sudoku: Provide older adults with beginner-level Sudoku puzzles. These puzzles involve filling a grid with numbers so that each row, column, and region contains all the digits from 1 to 9. Sudoku helps develop logical thinking and problem-solving skills.

Crossword Puzzles: Offer older adults crossword puzzles with simple clues and a smaller grid size. Crossword puzzles challenge their vocabulary, memory, and problem-solving abilities as they fill in the correct words based on the given clues.

Jigsaw Puzzles: Introduce older adults to jigsaw puzzles with fewer pieces and distinct patterns or images. As they piece the puzzle together, they enhance their visual-spatial skills and problem-solving abilities.

Level 2: Moderate

Logic Grid Puzzles: Provide older adults with logic grid puzzles that require them to deduce information based on a set of clues. These puzzles challenge their analytical thinking and deductive reasoning as they use logic to determine the correct solution.

Cryptograms: Offer older adults cryptograms where letters are substituted with numbers or symbols. They must decode the message by analyzing letter frequency, word patterns, and context clues. This activity enhances problem-solving and language skills.

Tangrams: Provide older adults with a set of tangram puzzles. Tangrams consist of geometric shapes that need to be arranged to form specific objects or patterns. This activity promotes spatial reasoning and creative problem-solving.

Level 3: Challenging

Chess or Checkers: Encourage older adults to play strategic board games like chess or checkers. These games require planning, critical thinking, and problem-solving as they anticipate moves and develop strategies to outmanoeuvre their opponents.

Bridge or Sudoku Variations: Introduce older adults to bridge, a card game that involves bidding, communication, and problem-solving to win tricks. Additionally, offer variations of Sudoku puzzles, such as irregular grids or larger grid sizes, to challenge their problem-solving abilities.

Strategy-based Video Games: For those who are comfortable with technology, suggest strategy-based video games that require decision-making and problem-solving skills. Games like chess, strategy simulations, or puzzle-solving adventures can engage their cognitive abilities.

Level 4: Advanced

Rubik's Cube: Introduce older adults to the Rubik's Cube and challenge them to solve it. This puzzle requires complex problem-solving, spatial reasoning, and logical thinking as they manipulate the cube's colours to align each side.

Cryptic Crosswords: Offer older adults cryptic crossword puzzles that involve challenging wordplay and double meanings. These puzzles test their ability to decipher cryptic clues and solve the crossword based on lateral thinking and creative problem-solving.

Strategy Board Games: Engage older adults in complex strategy board games such as Settlers of Catan, Risk, or Carcassonne. These games require long-term planning, resource management, negotiation skills, and critical thinking to outwit opponents and achieve victory.



9.2.6 Activities that favor curiosity and creativity

Fostering curiosity and creativity contributes to mental stimulation and overall well-being. Caregivers and trainers can engage older adults in art projects, writing exercises, storytelling, and exploring new hobbies or interests to stimulate their imaginations and encourage self-expression.

EXAMPLES:

- **Puzzle Challenges:** Provide older adults with challenging puzzles, such as logic puzzles, jigsaw



puzzles, or brain teasers. These activities stimulate curiosity, problem-solving, and creative thinking as they seek to find solutions or complete the puzzles.

- **Artistic Expression:** Encourage older adults to engage in various forms of artistic expression, such as painting, drawing, sculpting, or pottery. Provide them with art supplies and let them explore their creativity through different mediums and techniques.
- **Creative Writing:** Promote creative writing by encouraging older adults to write stories, poems, or personal narratives. Offer prompts or themes to inspire their imagination and provide a platform for self-expression and storytelling.
- **Photography:** Encourage older adults to explore photography as a means of creative expression. Provide them with cameras or smartphones and encourage them to capture images that pique their curiosity or represent their unique perspective.
- **Music Appreciation:** Organize music appreciation sessions where older adults can listen to different genres of music and discuss their emotional responses and interpretations. Encourage them to share their favorite songs or memories associated with music.

9.2.7 Development of skills necessary for assertive communication.

Effective communication skills are vital for maintaining healthy relationships and social engagement. Caregivers and trainers can facilitate the development of assertive communication skills by engaging older adults in role-playing scenarios, practicing active listening, and promoting open and respectful conversations.

EXAMPLES:

- **Role-Playing Scenarios:** Create role-playing scenarios where older adults can practice assertive communication in different situations. For example, they can practice assertively expressing their needs or boundaries with family members, healthcare providers, or service providers.
- **Assertiveness Training Exercises:** Conduct assertiveness training exercises where older adults can learn and practice specific techniques for assertive communication. This can include exercises such as "I" statements, expressing feelings and needs clearly, and using assertive body language.
- **Group Discussions:** Facilitate group discussions on assertive communication topics, allowing older adults to share their experiences, challenges, and strategies. Encourage them to listen actively, express their opinions, and assertively communicate their thoughts and feelings within the group setting.
- **Conflict Resolution Workshops:** Organize workshops or seminars focused on conflict resolution skills. Provide older adults with strategies for handling conflicts assertively, such as active listening, finding common ground, and expressing their needs without aggression or passivity.
- **Public Speaking Exercises:** Offer public speaking exercises where older adults can practice assertive communication in front of an audience. This can include delivering presentations, sharing personal stories, or participating in group discussions with confidence and clarity.



- **Assertiveness in Caregiving Relationships:** Focus on assertive communication within caregiving relationships, both as a caregiver and as someone receiving care. Provide guidance on expressing needs, setting boundaries, and communicating effectively with compassion and respect

9.3 Social-relational well-being (Help to counteract feelings of loneliness)

Countering Feelings of Loneliness

Loneliness can have a detrimental impact on mental well-being. Caregivers and trainers can help counteract feelings of loneliness by promoting social interactions, fostering meaningful relationships, and connecting older adults with community resources and support networks.

Group Activities for Social Interaction

Engaging in group activities encourages social interaction and creates a sense of community. Caregivers and trainers can organize group exercise classes, book clubs, hobby groups, game nights, and community volunteering activities to promote social engagement and well-being.

Intergenerational Programs and Volunteering

Bringing different generations together fosters social connections and mutual learning. Caregivers and trainers can facilitate intergenerational programs and volunteering opportunities, such as mentoring, tutoring, and participating in community service projects, to create meaningful connections and promote social involvement.

Encouraging Meaningful Relationships and Connections

Building and maintaining meaningful relationships is crucial for social well-being. Caregivers and trainers can facilitate activities that encourage older adults to share their life experiences, engage in storytelling, participate in support groups, or seek counseling services to foster connections and provide a sense of belonging.

Incorporating Technology for Social Engagement

Technology can play a significant role in promoting social engagement among older adults. Caregivers and trainers can help older adults connect with loved ones through video calls, participate in virtual social groups, engage in online learning and courses, and access resources and support networks.

Cognitive Engagement and Brain Health:

Engaging in mentally stimulating activities has been associated with cognitive preservation in older adults. The Advanced Cognitive Training for Independent and Vital Elderly (ACTIVE) study demonstrated that cognitive training interventions can improve cognitive abilities and maintain them over time.

Social Interaction and Emotional Well-being:

Social engagement is linked to reduced feelings of loneliness and depression in older individuals. A study by Holt-Lunstad et al. (2010) emphasized that social connections are associated with a 50% increased likelihood of survival over a certain period, highlighting the profound impact of social interactions on health.

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Annexes

Annex 1 – “CHAIR STAND TEST (Sit-to-Stand Test)”

CHAIR STAND TEST (Sit-to-Stand Test)	
Objective	To assess lower body strength
Procedure	<ol style="list-style-type: none"> The participant starts seated in the middle of the chair with a straight back, feet flat on the floor, and arms crossed over the chest. From this position and at the signal of "go," the participant must stand up completely and return to the starting position (see Figure 2) as many times as possible in 30 seconds. We need to demonstrate the exercise first slowly, so the participant sees the correct execution, and then at a faster pace, so they understand that the goal is to do it as quickly as possible with safety limits. Before starting the test, the participant will perform the exercise one or two times to ensure they do it correctly.
Scoring	<p>Total number of times the participant "stands up and sits down" on the chair for 30 seconds.</p> <p>If the participant completes half or more of the movement (standing up and sitting down) at the end of the exercise, it will be counted as complete.</p> <p>It is performed only once.</p>
Safety rules	<ul style="list-style-type: none"> The chair's backrest should be supported against a wall or held stably by someone. Observe if the participant has any balance issues. Stop the test immediately if the participant feels pain.

Annex 2 – “CHAIR STAND TEST (Sit-to-Stand Test-Bicep Curls)”

ARM CURL TEST (Bicep Curls)	
Objective	To assess upper body strength
Procedure	<ol style="list-style-type: none"> The participant starts seated in the chair with a straight back, feet flat on the floor, and the dominant side of the body close to the edge of the chair.

	<ol style="list-style-type: none"> Take the weight with the dominant side and position it perpendicular to the floor, with the palm facing the body and the arm extended. From this position, we will lift the weight by gradually rotating the wrist (supination) until completing the bicep curl movement, with the palm facing upwards. The arm will return to the starting position by performing a full arm extension while rotating the wrist towards the body. At the signal of "go," the participant will perform this movement as many times as possible in 30 seconds. First, we will perform it slowly so that the participant sees the correct execution of the exercise, and then faster to demonstrate the pace of execution. For proper execution, we should only move the forearm and keep the arm stable (keeping the elbow close to the body can help maintain this position).
Scoring	<p>Total number of times the arm is flexed and extended for 30 seconds.</p> <p>If the participant completes half or more of the movement (bicep curl), it will be counted as complete. It is performed only once.</p>
Safety rules	<ul style="list-style-type: none"> Stop the test if the participant feels pain

Annex 3 - "2-Minute Step Test (2-Minute Walk)"

2-Minute Step Test (2-Minute Walk)	
Objective	Evaluation of aerobic endurance
Preparation	Before starting the test, we will measure the height at which the participant's knee needs to be raised by placing a string from the iliac crest to the midpoint of the kneecap. Then, we will fold it in half, marking a point on the mid-thigh, which will indicate the height of the knee during the march. To visualize the step height, we will transfer the mark from the thigh to the wall so that the participant can have a reference
Procedure	<ol style="list-style-type: none"> At the signal "go," the participant begins to march in place as many times as possible for 2 minutes. Although both knees should reach the indicated height, we will count the number of times the right knee reaches the set height. If the participant does not reach this mark, we will ask them to reduce the pace to ensure the validity of the test without stopping the time.
Scoring	The score corresponds to the total number of complete steps (right-left) the participant is able to perform in 2 minutes, which will be the number of times the right knee reaches the set height. Only one attempt will be made on the day of the test (the day before, all participants will practice the test).
Safety rules	<ul style="list-style-type: none"> Participants with balance issues should position themselves close to a wall or chair for support in case of balance loss. The examiner will monitor all participants for signs of excessive effort. At the end of the test, participants will walk slowly for one minute.

Annex 4 - "6-MINUTE WALK TEST (Six-Minute Walk Test)"

6-MINUTE WALK TEST (Six-Minute Walk Test)	
Objective	Evaluation of aerobic endurance
Preparation	Before starting the test, we will set up a rectangular circuit with the following measurements: 18.8 m by 4.57 m, with cones marking each end of the circuit and lines every 4.57 m.
Procedure	<ol style="list-style-type: none"> The test will be performed once all other assessments are completed. Participants will start one by one, with a 10-second interval between each. At the signal "go," the participant will walk as fast as possible for 6 minutes following the marked circuit. To count the number of laps completed, the examiner will give the participant a stick for each lap or mark it on the record sheet (IIII II). At 3 and 2 minutes remaining, participants will be informed of the time left to finish the test to regulate their pace.

	6. After 6 minutes, the participant will step to the right and stand on the nearest mark, keeping their legs moving by slowly raising them alternately.
Scoring	Scoring will be recorded when all participants have completed the test. Each stick or mark on the record sheet represents one lap (45.7 m.) To calculate the total distance covered, multiply the number of laps by 45.7 m. Participants will have a single attempt on the day of the test, but the day before, they will practice the test to determine their pacing.
Safety rules	<ul style="list-style-type: none"> • Select a smooth, non-slip surface area. • Place chairs along the circuit but outside the walking area (of the test). • Participants showing signs of excessive exertion will have the test interrupted

Annex 5 - “CHAIR-SIT AND REACH TEST (Test of trunk flexion in a chair)”

CHAIR-SIT AND REACH TEST (Test of trunk flexion in a chair)	
Objective	Evaluate the flexibility of the lower body (mainly hamstrings)
Procedure	<ol style="list-style-type: none"> 1. The participant will sit on the edge of the chair (the fold between the upper leg and the glutes should rest on the front edge of the seat). 2. One leg will be bent with the foot resting on the floor, while the other leg will be extended as straight as possible in front of the hip. 3. With arms extended and hands together with middle fingers matched, the participant will slowly flex at the hip, attempting to reach or go beyond their toes. 4. If the extended leg starts to flex, the participant will return to the starting position until the leg is fully extended again. 5. The participant will maintain the position for at least 2 seconds. 6. The participant will try the test with both legs to see which one is better (only the final test will be performed with the better leg). The participant will warm up briefly by attempting the test a couple of times with the preferred leg.
Scoring	<p>The participant will perform two attempts with the preferred leg, and the examiner will record both results by circling the better one on the data sheet.</p> <p>The distance is measured from the fingertips to the top of the shoe.</p> <p>Touching the tip of the shoe will score "Zero."</p> <p>If the fingertips do not reach the foot, the distance is measured in negative values (-).</p> <p>If the fingertips go beyond the foot, the distance is recorded in positive values (+).</p>
Safety rules	<ul style="list-style-type: none"> • The participant will sit on the edge of the chair (the fold between the upper leg and the glutes should rest on the front edge of the seat). • One leg will be bent with the foot resting on the floor, while the other leg will be extended as straight as possible in front of the hip. • With arms extended and hands together with middle fingers matched, the participant will slowly flex at the hip, attempting to reach or go beyond their toes. • If the extended leg begins to flex, the participant will return to the starting position.

Annex 6 - “BACK SCRATCH TEST (Test of reaching hands behind the back)

BACK SCRATCH TEST (Test of reaching hands behind the back)	
Objective	To evaluate the flexibility of the upper body (mainly shoulders)
Procedure	<ol style="list-style-type: none"> 1. The participant will stand with their preferred hand on the same shoulder, palm facing down, and fingers extended. From this position, they will reach their hand towards the middle of their back as far as possible, keeping the elbow up. 2. The other arm will be placed behind the back, reaching around the waist with the palm facing up, trying to touch the middle fingers of both hands. 3. The participant should practice the test to determine which side is better. They may perform it twice before starting the test. 4. Ensure that the middle fingers of one hand are oriented towards the other as best as possible.

	<p>5. The examiner may guide the participant's fingers (without moving their hands) for proper alignment.</p> <p>6. Participants are not allowed to grasp and pull their fingers.</p>
Scoring	<p>The participant will make two attempts with the better side before starting the test, and the best one will be circled on the recording sheet.</p> <p>The distance between the tips of the middle fingers of both hands is measured.</p> <p>If the fingers only touch, it will score "Zero."</p> <p>If the fingers of the hands do not touch, the distance will be measured as negative values (-).</p> <p>If the fingers of the hands overlap, the distance will be recorded as positive values (+).</p> <p>Always measure the distance from the tip of one hand's fingers to the other, regardless of alignment behind the back.</p>
Safety rules	<ul style="list-style-type: none"> • Stop the test if the participant feels pain. • Remind participants to keep breathing while performing the stretch and avoid sudden movements

Annex 7 - "FOOT UP-AND-GO TEST (Stand up, walk, and sit down test)"

FOOT UP-AND-GO TEST (Stand up, walk, and sit down test)	
Objective	To assess agility and dynamic balance
Preparation	Place a chair against the wall and a cone at 8 feet (2.44 meters) measured from the back of the cone to the front edge of the chair.
Procedure	<ol style="list-style-type: none"> 1. The participant will sit in the middle of the chair with a straight back, feet flat on the floor, and hands on their thighs. One foot will be slightly forward compared to the other, and the torso will be slightly leaning forward. 2. At the signal "go," the participant will stand up and walk as quickly as possible around the cone and sit back down. 3. The time will start counting from the moment "go" is said, even if the participant hasn't started moving yet. 4. The time will stop when the participant is seated back in the chair.
Scoring	<p>The examiner will demonstrate the test to the participant, and the participant will perform it once as a practice.</p> <p>The test will be performed two times, and the examiner will record the best score by marking it with a circle.</p>
Safety rules	<ul style="list-style-type: none"> • The examiner will position themselves between the cone and the chair to assist the participant in case they lose balance. In weaker individuals, we must assess if they can stand up and sit down safely.

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Innovative cross-sectoral training kit for professionals working with elders
(caregivers and physical instructors)

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