ARENA-JPA, ISSN 2285-830X
12, pp. 32-52, 2023

The Role And Impact Of Outdoor Walks, Combined With A Special Recreational Exercise Program, In Improving Lower Limb Strength And Motor Balance In 55-65 Year Olds

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Abstract

Sports participation is declining in most countries starting at age 12, with the tendency becoming considerably more noticeable as people get older. The most industrialized nations experience a demographic shift that leads to an older population due to declining birth rates and improvements in healthcare. The objective of this literature review is to analyse the existing data to discover the rates, current trends of sports participation, health problems and ways of preventing and improving it through exercise therapies of a recreational nature in the 55-65 age group in Albania and the world. 54 articles from Google Scholar, 16 articles from Crossref, 22 articles from PubMed, 14 papers from Research Gate, and 11 books (a total of 117 references) that were chosen for preliminary screening were evaluated using a methodical methodology. Upon through examination, 29 articles, or 25% of the total, satisfied the requirements to be regarded as legitimate for the subject at hand. The current condition of lower limb strength and balance in both the experimental and control groups will be determined through preliminary laboratory testing. Two instruments from the Sports University of Tirana biomechanics lab; the Leonardo Platform and the Isokinetic Dynamometer will be employed for the aforementioned measurements. We estimate that the study sample will consist of 60–90 working-age men and women who fall into the 55–65 age range. The systematic literature review and meta-analysis aims to define quantitative relationships of lower limb strength with balance improvement. Due to the accelerated aging process, the middle-aged population experiences a decline in strength, endurance, flexibility, and muscle mass (sarcopenia), which impairs coordination, stability, and balance.

Keywords: outdoor walks, special recreational exercises, lower limb strength, age group 55-65, balance, quality of life.

Introduction

People who lead sedentary (inactive) lifestyles are becoming more prevalent at the moment (Guthold et al., 2008). According to (Dumith et al. 2011), the average prevalence of inactivity among adults over 15 years old is 21.4% across 76 nations in the world. The World Health Organization listed physical inactivity as the fourth leading cause of early death. Like other nations, the Czech Republic is seeing an increase in obesity rates, a decline in physical activity, and an increase in inactivity (Ministry of Health of the Czech Republic, 2014a). In the Czech Republic, health insurance companies had to pay 700 million CZK (or 0.4% of total health care expenses) in 2008 for treatment brought on by inactivity (Marešova, 2014). Reversing the downward trend of physical inactivity is one of the goals of the global organizations headed by the World Health Organization, as is enhancing the health of the people in those nations. To promote a comprehensive approach to the promotion of physical activity, the World Health Organization, in particular, releases a number of studies and documents. These include national plans, strategies, and recommendations that help people modify their lifestyles through physical activity in support of health while also taking into account the environment, customs, and cultural specifics of a country (EU Working Groups "Sport & Health", 2008).

Research on the aging population is becoming more and more prevalent. The aging of the world's population is one of the main causes. The World Health Organization issues a warning, stating that the number of adults aged 60 and older may double by 2025. Elderly people who engage in regular physical activity might benefit not only from improved health but also from improved social and emotional well-being, longer periods of self-sufficiency, and lower health care expenses (Services, 2000). Either biological age or calendar age can be used to define old age. Physiological, mental, and social changes that take place throughout life are associated with biological age. Typically, the age range of 60 to 65 marks the transition from maturity to old age (Organization, 2009). However, 50 years old is the historical event that, according to (Vágnerová & Karlova, 2007), indisputably signaled the commencement of old age. The onset of aging results in perceived changes on the inside as well as the first visible changes on the outside. An older person starts to comprehend possible risks, current limitations in movement, cognition, reaction time, or adaptability to new settings, technologies, and societal changes throughout this period. Furthermore, it is linked to the onset of menopause in women over 50, a time when the follicular system vanishes and the level of estrogen drops below what is necessary for endometrial development. Women consequently experience climacteric syndrome (Pelclová, 2015).

The 50–70 age range is considered a transitional period because during this time, people typically transition from being parents to being grandparents (Vágnerová & Karlova, 2007). They are also especially susceptible to the most significant socially conditioned change from being employed to being retired (Pelclová, 2015b). According to (Dumith et al., 2011b; Guthold et al., 2008b), the prevalence of inactivity and the rise in sedentary lifestyles are becoming major global challenges. According to a global analysis, women are more likely than men to be physically inactive as they age, and they are also more likely to live in industrialized nations (Hallal et al., 2012). According to research, two-thirds of adults in EU nations do not engage in enough physical activity (Sjöstróm et al., 2006). The World Health Organization notes in its assertions that 6% of the world's population dies from physical inactivity, which greatly raises the risk of unfavorable health conditions (Lee et al., 2012b). According to recent research, which is based on systematic literature review studies, there is a strong correlation between physical activity—which can be defined broadly (e.g., by energy expenditure) or more specifically—and health, depending on its intensity, duration, and frequency (Haskell et al., 2007). Physical activity has been demonstrated to lower the risk of osteoporosis, cardiovascular disease, stroke, high blood pressure, colon cancer, breast cancer, type II diabetes mellitus, and premature death in the adult and senior populations (Haskell et al., 2007 Miles, 2007; Nelson et al., 2007; Physical Activity Guidelines Advisory Committee, 2008; Sims et al., 2010; Warburton et al., 2010).

Active And Passive Aging, Health Problems And The Impact Of Physical Activity In Improving The Quality Of Life.

The World Health Organization released guidelines in 2002 stating that each person should engage in at least 30 minutes of physical activity daily. These suggestions were later expanded in accordance with the US CDC/ACSM guidelines (Haskell et al., 2007). The World Health Organization advised that individuals engage in at least 30 minutes of moderate physical activity five times a week or at least 20 minutes of intense physical exercise, divided into intervals of at least 10 minutes, three times a week. Adults should also make sure to engage in two or three times a week of activities that improve their muscle strength and endurance. Current WHO guidelines (World Health Organization, 2010) state that planned exercise, games, sports, housework, active transportation, leisure or recreational activities, and professional activities should all be included in an adult's and an elderly person's daily, family- and social-oriented physical activity.

Adults who walk are the ones who report exercising the most (Hulteen et al., 2017b). Walking is the almost ideal form of exercise because it requires little in the way of equipment or physical expertise and is socially acceptable to most people in most cultures (Morris & Hardman, 1997b). Walking has become a cornerstone of physical activity promotion for public health and a gateway through which inactive and less active individuals can initiate access to these benefits, given the relationship between physical activity and health and the disproportionate population health benefits derived from encouraging the most inactive persons to increase activity (Lee & Skerrett, 2001b). Adults should engage in at least 150 minutes of moderate-intensity physical exercise each week, according to current standards for physical activity (Gibson-Moore, 2019). As suggested, walking's health advantages vary depending on how intense it is (Shephard, 2001b). The single published meta-analysis of walking speed does not distinguish between indoor and outdoor contexts; hence, speed-based intensity recommendations are mostly based on laboratory studies (Bohannon & Andrews, 2011b). Clinically established gait speed thresholds have been applied as a summary measure of physical frailty (Woo, 2015b), as part of geriatric evaluation (Peel et al., 2012b), and to categorize walking independence (Graham et al., 2010b). Additionally, there are guidelines for walking, which is a natural, easy, and efficient way for people to move and the foundation of most regular forms of exercise (Schuna, 2012). Cadence and intensity have a strong correlation; a threshold value of > 100 steps/min has been determined for definitely defined moderate intensity (Tudor-Locke et al., 2018). In order to meet or surpass public health thresholds for moderate-intensity activity, walking at a chosen (normal) pace should be accompanied by an average speed of 1.31 m/s, a cadence of 116.65 steps/min, and an oxygen consumption of 11.97 mL/kg/min.

(Tudor-Locke & Bassett, 2004) proposed a basic PA classification system for healthy individuals based on the total number of steps taken in a day:

a. sedentary lifestyle (<5,000 steps/day),

b. low active (5000–7499 steps/day),

c. somewhat active (7500–9999 steps/day),

d. active (≥10000 steps/day), and

e. very active (>12500 steps/day).

This system follows the general recommendation of 10,000 steps per day.

The Relationship Between Recreational Physical Activity And The Quality Of Muscles In Men And Women Over The Age Of Fifty.

Exercise, especially resistance training, is the most widely utilized method to increase muscle quality in the elderly (Tracy et al., 1999; Reeves et al., 2004; Cadore et al., 2012; Radaelli et al., 2013). Men and women's muscle quality has been shown to increase by 14–28% after nine to fourteen weeks of resistance exercise (Tracy et al., 1999; Reeves et al., 2004; Cadore et al., 2012; Radaelli et al., 2013). Furthermore, it was noted by Kennis et al. (2013) that a year of vibration therapy or fitness training improved muscle quality by +11 and +7%, respectively. According to Chastin et al. (2011), men's muscle quality was also linked to intervals of high activity and extended rest intervals.

There is currently a lot of interest in research that focuses on the physical activity of older people and looks into the physical correlates and variables that are relevant (Kohl et al., 2012). The population's aging is the primary cause. The World Health Organization issues a warning, stating that the number of adults aged 60 and older may double by 2025. Elderly people who engage in regular physical activity have the potential to improve not just their physical health but also their social and emotional well-being, extend their ability to live independently, and ultimately lower their health care costs.

Regarding the onset of aging, that is, the significant social transition from parent to grandparent, from work to retirement, and the significance of physical activity for the elderly, a longer period must be designed, encompassing the status prior to the change, the change period, and the status following the change. Therefore, we concentrated on people 55 years of age and older while discussing the problem of physical activity among the senior population. To ensure that the results are unaffected by harsh weather, research investigations focusing on physical activity are deliberately carried out in the spring and fall, when the average temperature is 10°C (measured four times in a 24-hour period) (Tucker & Gilliland, 2007).

The fundamental tenet of all international guidelines is the same: physical activity is a requirement for healthy aging.

- Physical activity has various health benefits for older people, including maintaining cognitive and physical function. According to the Department of Health (2011), physical activity has a positive impact on health, and any amount of it is preferable to none at all.
- Seniors should engage in some physical activity regardless of their age, weight, or conditions that may be affecting their health. By all means, older individuals should be active every day (Australian Government, Department of Health, 2014).
- As much physical activity as possible is recommended for the elderly (Ministry of Health, 2013).

- Elderly individuals should engage in physical activity to the degree that their illness and current state of health allow if they are unable to obtain the recommended level of PA due to a medical condition (World Health Organization, 2010).

When it comes to beginning physical exercise, older adults are recommended to follow the guidelines of progressively increasing their level of intensity and quantity until they meet the suggested minimum (Department of Health, Australian Government, 2014; Ministry of Health, 2013).

According to Dishman and Sallis (1994), the great majority of physical activity intervention studies conducted to date have concentrated on populations of younger adults. Our goal is to present a critical analysis of the research on interventions aimed at increasing older individuals' physical activity. We have concentrated our efforts on summarizing the highest quality studies that have targeted individuals aged 55 and over, in compliance with the most recent guidelines from the World Health Organization for promoting physical activity and fitness among the elderly ("Responses to Publication of the WHO Heidelberg Guidelines for Promoting Physical Activity Among Older Persons," 1997) as well as the recommendations made by the organization for other health (Higgs, 1991).

Exercise-Based Strategies For Sarcopenia Prevention And Treatment (Loss Of Muscle Mass And Strength).

In addition to low muscle mass and loss of physical functioning, the conceptual definition of sarcopenia has been operationalized into consensus-based diagnostic criteria (Cruz-Jentoft et al., 2010; A. Cruz-Jentoft et al., 2018; Fielding et al., 2011; Dent et al., 2018; Dam et al., 2014; Studenski et al., 2014). Sarcopenia in the elderly has grave and potentially fatal consequences: it affects mortality, morbidity, disability, and health care expenses (A. Cruz-Jentoft et al., 2018; Dent et al., 2018). The World Health Organization's International Statistical Classification of Diseases and Related Health Problems (Anker et al., 2016) has classified sarcopenia as a disease since 2016, highlighting the necessity of its treatment approaches.

It is currently acknowledged that one of the mainstays for the management and prevention of sarcopenia is physical activity (A. Cruz-Jentoft et al., 2018; Dent et al., 2018; Lauretani et al., 2014). However, in recent decades, there has been a greater focus on research in the fields of geriatrics and gerontology (the science of aging), which has resulted in the development of fundamentally new knowledge and information regarding:

- physical activities in relation to aging processes;
- methods to enhance successful aging; and

- appropriate geriatric practice.

Sarcopenia is a significant public health concern among older people in geriatric research and clinical settings (Beaudart et al., 2014). According to Morley (2008), the prevalence of sarcopenia rises with age, from 5–13% in those 60–70 years old to 11–50% in people 80 years of age and beyond. According to a systematic review of the literature, the prevalence of sarcopenia varies by gender and by setting: in the community, nursing homes, and hospitals, it is 12.9%, 26.3%, and 29.7% for men and 11.2%, 33.7%, and 23.0% for women (Chen Z et al., 2021). A conservative estimate puts the current prevalence of sarcopenia at around 50 million, with a projected 40-year increase to 200 million cases (A. J. Cruz-Jentoft et al., 2010).

The best intervention for sarcopenia is physical exercise; no specific medications have been licensed for the treatment of sarcopenia (Iolascon et al., 2014; Montero-Fernández & Serra-Rexach, 2013; Cruz-Jentoft & Sayer, 2019). Physical activity as the main treatment for sarcopenia is generally recommended by evidence-based clinical practice guidelines (Dent et al., 2018).

The Impact Of Recreational Exercise Programs On Improving Lower Limb Strength And, Consequently, Balance Among 55-65 Years Old.

The neuromuscular and cardiorespiratory systems' age-related physiological changes have a major impact on an individual's capacity to maintain their independence and health well into old age. The ability to do daily chores is especially dependent on the development of muscle power in the lower body (Reid & Fielding, 2012b; Bean et al., 2010; Foldvari et al., 2000). Functional limitation manifests as decreased muscular ability (Hairi et al., 2010). Moreover, a lower degree of cardiorespiratory fitness (VO_2max) is linked to a higher risk of morbidity and mortality (Kodama et al., 2009).

Exercise is a potential strategy to counteract the detrimental effects of aging because strength and endurance training can result in considerable increases in fitness in older individuals (C. Liu & Latham, 2009; Huang et al., 2004). Due to the distinct physiological responses caused by the two exercise modalities, older persons should participate in both strength and endurance training to maximize potential health and fitness advantages (Chodzko-Zajko et al., 2009).

Even so, people must devote a significant amount of time to participating in particular endurance and strength training activities—a critical factor to take into account given that time constraints remain a barrier to exercise in a population where adherence to recommended exercise regimens is still low (Jefferis et al., 2014; Cohen-Mansfield et al., 2003). This is why prospective exercisers may find interest in training regimens that incorporate the benefits of strength and endurance training into a single session.

To enhance muscular power, agility, jump performance, and quick force production, plyometric exercises were initially employed in sports training (Marković & Newton, 2007; Miller et al., 2006). But older folks can also benefit from plyometrics in the same ways. The goal of high-velocity training, according to Ramírez-Campillo et al. (2016) and Ramírez-Campillo et al. (2018), is to enhance older women's functional performance and health-related quality of life. These improvements in functional performance and health-related quality of life may be attributed to increased rapid force generation, which decreases more quickly than maximal force (Izquierdo et al., 1999).

Its fall may play a significant role in accidents and injuries to the elderly during falls as well as in their loss of independence (Rubenstein, 2006b; Aagaard et al., 2010). Rapid force production is essential in daily life when one must quickly correct balance after a fall (Pijnappels et al., 2005; LaRoche et al., 2010). Moreover, balance is favourably correlated with lower extremity muscle strength and agility, per Muehlbauer et al. (2015).Thus, improved balance is probably linked to stronger legs and increased agility, which may lower the risk of fractures and other fall-related injuries.

Improving Balance Through Strength Training In The Elderly

A steady reduction in total muscle strength is linked to aging. A sluggish lifestyle and an elevated risk of falls are the results of lower limb weakness. Testing if lower limb strengthening activities increase lower limb strength and balance function in older people is one of the study's objectives. Human muscle strength, or a person's ability to generate force, peaks in the second and third decades of life and gradually declines until roughly age 50, at which point it starts to decline at a rate of 1.4% to 2.5% annually, with losses accelerating beyond age 65 (Ej et al., 1997; Macaluso & De Vito, 2003).

Functional constraints in day-to-day living are linked to reduced lower limb strength (Foldvari et al., 2000). Furthermore, muscle weakness has been linked to a higher incidence of hip fractures (Langlois et al., 1998), falls (Fukagawa et al., 1995), and unfavourable physiological alterations such as osteoporosis (Sinaki et al., 1986). In order to improve muscular mass, strength, and eventually independence in daily living tasks, strength training is now highly advised for older persons ("American College of Sports Medicine Position Stand. Exercise and Physical Activity for Older Adults.," 1998b). Various approaches can be taken to strength training based on the physiological, functional, or performance objectives.

Elderly people can gain physiological benefits from strength training, according to several studies (Izquierdo et al., 2001; Häkkinen et al., 2001). The results demonstrate that walking for 20 minutes, doing postural control exercises, including basic Tai Chi movements, and doing a combined exercise three times a week that included knee extension and sitting leg press machine exercises could all improve balance function (Earles et al., 2001). Improved balance, enhanced fatigue resistance of the gluteus mediums muscle, or a higher tolerance to instability are some explanations for increases in balance mass.

Methods

The current condition of lower limb strength and balance in both the experimental and control groups will be determined through preliminary laboratory testing. Two instruments from the Sports University of Tirana biomechanics lab; the Leonardo Platform and the Isokinetic Dynamometer will be employed for the aforementioned measurements. We estimate that the study sample will consist of 60–90 working-age men and women who fall into the 55–65 age range. This is the age range in which these issues first surfaced, and they are typically associated with significant issues related to both physical and mental health. The 12-week exercise intervention program will include scheduled walking (step count, pace, and kind of relief), with the goal of increasing from 5000 to 10,000 steps by the conclusion of the 12th week. There will be three walking sessions per week, for a total of thirty-six sessions, along with unique recreational activities (primarily for strengthening the muscles of the lower limbs and balance). The experimental group will be invited to ascend the mountain over the course of the 12th weekend, with the difficulty and length of the ascent being progressively increased. We think that this stage of our exercise intervention will be seen as group therapy as well as having physical benefits (particularly for balance), since individuals need to socialize and bond with one another during a period when individualism is becoming more and more pronounced.

Discussions

This study's findings will offer fresh, up-to-date information on the advantages of a unique training regimen for enhancing lower limb strength and balance parameters in 55–65-year-olds who are generally in good health but lead sedentary lifestyles. This age group, doctors, health managers in the primary health care system, and policymakers should pay more attention to this age group, as if they do not start through sports and physical activity to prevent major health problems that deepen with passive aging, they will face health situations that may require tomorrow, possibly even surgical intervention by doctors and the private or state hospital system. These insights and the positive results anticipated at the end of this study will be helpful and serve as alarm bells.

Conclusion

The systematic literature review and meta-analysis aims to define quantitative relationships of lower limb strength with balance improvement. WHO defines healthy aging as "the process of developing and maintaining functional ability that enables well-being in older age". Due to the accelerated aging process, the middle-aged population experiences a decline in strength, endurance, flexibility, and muscle mass (sarcopenia), which impairs coordination, stability, and balance. These consequences have an impact on general functional status and, consequently, quality of life. Functional status provides a more global and functional perspective of the health conditions of this age group and, therefore, is increasingly used as an outcome in clinical studies. Functional mobility is the physiological ability of people to move independently and safely in a variety of environments to perform functional activities or tasks and to participate in activities of daily living (ADL) at home, work and in the community. It includes movements such as standing, bending, walking and climbing, which are the building blocks of ADLs, and therefore, these are essential to an individual's independent life and global health status. Our research will show the need for more studies that combine lower limb strength and balance training with specialized programs that have methodically structured recreational content, as well as scientific evidence and recommendations on the relationship between lower limb strength improvement and balance for practitioners and therapists to increase the efficacy of their strength and balance improvement protocols. A major accomplishment for the Albanian science of physical activity for health would be the anticipated significant improvement in lower limb strength and balance from 18 to 28%. This would not only improve the quality of life for the elderly and young but also significantly lower the costs of the national health system, which has borne a heavy burden from health issues and their consequences, primarily in the last 20 years.

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