

PART II. PHYSICAL ACTIVITY OF SOCIAL AND PROFESSIONAL GROUPS
DZIAŁ II. AKTYWNOŚĆ FIZYCZNA GRUP SPOŁECZNYCH I ZAWODOWYCH

PHYSICAL ACTIVITY IN PROMOTING HEALTH OF THE ELDERLY

AKTYWNOŚĆ RUCHOWA W PROMOCJI ZDROWIA OSÓB STARSZYCH

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Wkład autorów:
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zaplanowanie badań
B. Data collection/entry
zebranie danych
C. Data analysis/statistics
dane – analiza i statystyki
D. Data interpretation
interpretacja danych
E. Preparation of manuscript
przygotowanie artykułu
F. Literature analysis/search
wyszukiwanie i analiza literatury
G. Funds collection
zebranie funduszy

Summary

Ageing, as a physiological process in human ontogenesis, is inevitable. However, it can assume a mild form. What can slow down involuntary processes within the limits of optimal human abilities and biological needs is physical activity. In addition, physical activity seems to be of great importance in the treatment and rehabilitation of various injuries and old-age diseases.

The primary objective of the paper is to show the health benefits of physical activity in involuntary processes; that is ageing of individual physiological systems and human motor skills. The work bases on available and current literature on the subject which forwards research in this field and draws on the sources relating to this particular issue. Many extensive studies indicate that physical activity is an essential element of health promotion and gerontological prophylaxis. General improvement of health due to physical activity refers to the improvement of cardiovascular and respiratory functions, prevention of degenerative changes in the spine, prevention of civilisation diseases, mental relaxation, pleasure, satisfaction, socialisation, escape from loneliness, counteracting boredom, everyday monotony, as well as spending much time in a valuable way. Properly selected and health stimulation training can enhance the general physical fitness, through better motor functions.

Along with an overall increase in life expectancy, there appears a greater need to develop research on the role of physical activity in the elderly. Physical activity in old age is a precious element of a healthy lifestyle, prevention and therapy in many diseases. It reinforces independence till old age, which is vital in coping with stress.

Keywords: physical activity, health promotion, elderly

Streszczenie

Starzenie się jest fizjologicznym procesem w ontogenezie człowieka. Proces ten jest nieunikniony, jednak można mu nadać łagodny charakter. Szczególnie ważne miejsce w spowalnianiu procesów inwolucyjnych zajmuje aktywność ruchowa mieszcząca się w granicach optymalnych możliwości człowieka i jego biologicznych potrzeb. Poza tym aktywność fizyczna posiada ogromne znaczenie w procesie leczenia i rehabilitacji różnych urazów i chorób wieku starczego.

Głównym celem pracy jest ukazanie walorów zdrowotnych aktywności ruchowej na tle procesów inwolucyjnych, tj. starzenia się poszczególnych układów fizjologicznych i zdolności motorycznych człowieka. Praca oparta jest na dostępnej i aktualnej literaturze przedmiotu, ukazującej badania z tego zakresu. Dokonano wyboru badań opierając się na źródłach podporządkowanych tematowi pracy. Wiele obszernych badań wskazuje na to, iż aktywność ruchowa stanowi ważny element promocji zdrowia i profilaktyki gerontologicznej. Ogólna poprawa stanu zdrowia za sprawą aktywności fizycznej dotyczy usprawnienia funkcji układu krążenia i oddychania, zapobiegania zmianom zwyrodnieniowym kręgosłupa, profilaktyki powstawania chorób cywilizacyjnych, odprężenia psychicznego, przyjemności, zadowolenia, socjalizacji, ucieczki przed samotnością, przeciwdziałania nudzie, monotonii dnia codziennego, wypełniania dużych ilości czasu w sposób wartościowy. Odpowiednio dobrany i stymulowany trening zdrowotny sprzyja poprawie ogólnej sprawności fizycznej, poprzez wyższą jakość wszystkich cech motorycznych.

Wraz z tendencją do przedłużania się długości życia zwiększają się potrzeby rozwoju badań naukowych nad rolą aktywności fizycznej osób w starszym wieku. Aktywność fizyczna w starszym wieku jest wyjątkowo cennym elementem zdrowego stylu życia, profilaktyki i terapii wielu chorób, przedłuża niezależność do późnej starości i jest ważnym czynnikiem radzenia sobie ze stresem.

Słowa kluczowe: aktywność ruchowa, promocja zdrowia, osoby starsze

Tables: 0
Figures: 0
References: 30
Submitted: 2018 Feb 01
Accepted: 2018 Jun 07

Parnicka U. Physical activity in promoting health of the elderly. Health Prob Civil. 2018; 12(4): 265-271. <https://doi.org/10.5114/hpc.2018.77840>

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Introduction

The ageing of the population in developed and developing countries for over a dozen years has become an increasingly acute social problem. Therefore, issues related to ageing and old age have recently become particularly important. This problem is vital for many scientists in various fields, including physical education [1]. Research into older people not only helps to better understand the process itself but also contributes to the improvement of their quality of life. Currently, this social group is becoming more and more important given that, in the coming years, the elderly will grow in numbers [2].

Health promotion is usually defined as a process that allows for increased control over one's health, improve it and take responsibility for own health and life. With regard to the promotion of health in the elderly, the WHO has, inter alia, the following aims: prolonging the period of one's activity and independence, preventing and relieving psychophysical disorders, providing care that enables individual autonomy, giving up various forms of institutional care for the family, reducing stress in terminal diseases; delaying the necessity of turning to various types of medical and care services.

The implementation of the above is possible through actions aimed at ensuring equity in healthcare and reducing differences in the health-level of various social groups, adding a component of life satisfaction - providing opportunities to develop and use physical and mental potential of people related to knowledge, skills and motivation in order to create own health, enhancing one's health - reducing the incidence of diseases and disability, raising the level of psychosomatic fitness, improving well-being, strengthening and developing health potential, extending life expectancy by eliminating premature deaths [3].

Physical activity and physiological involutionary changes

The ageing process stands for involutionary changes taking place in the human body with progressing age. Ageing is often accompanied by degenerative changes, which include, among others, reduction of muscle strength and tension, weakening of the bones, weaker breathing, reduced mobility of the chest, weakening of aerobic and anaerobic capacity, prolonged reaction time and many other health problems [4]. Specialists believe that these involutionary changes can be slowed down by regular physical exercise and rational nutrition [5].

While implementing pro-health activities, physical activity simultaneously impacts all components of this process, including preservation and enhancement of health, self-recognition, development of positive personality traits, shaping physical fitness and efficiency, as well as mental rest, relaxation, seeking and establishing social contacts. Furthermore, any discussion on physical activity in the context of health promotion in the elderly involves the basic physiological phenomena that occur in the human body in the ageing process:

- Multidirectional biochemical changes visible in the body's ageing process such as the changing oxygen and protein metabolism [6];
- Changes in the composition of the body - reduction in muscle mass and body water, as well as changes in fat content and bone mass [7];
- Reduced capacity of the lungs, their maximum lung ventilation and maximum oxygen uptake. The chest expansion reduces, the capillary vessels disappear in the inter-bubble septum, which affects the deterioration of gas diffusion and causes inadequate oxygenation of the blood [8];
- Age-related changes appear in the circulatory system as a result of calcium deposits and cholesterol deposits in the inner part of blood vessels, which leads to numerous diseases of the elderly age [9];
- Age-related changes in the nervous tissue are a consequence of the reduction and disappearance of nerve cells. The reduction of sensitivity of all senses is most visible. There appears the so-called mental numbness characterised by slower learning, remembering, thinking, problem-solving skills and coping with stress [10];
- Age-related changes in the digestive system are characterised by the disappearance of some enzymes responsible for food digestion and a reduction in the secretion of gastric juices. The oral mucosa becomes thinner, drier, losing its elasticity. The intestinal peristalsis is released, which has an adverse effect on the process of food absorption and excretion of unnecessary metabolic products, the consequence of which are constipation and indigestion [11];
- Ageing of the renal-urinary system is manifested by a reduction in renal mass, which results in a decrease in blood flow. The number of active renal glomeruli is decreasing. As a result, kidneys are very sensitive even to short-term ischemia. Bladder capacity is reduced, the urine volume is increased and the urethra becomes shorter. All this causes urination disorders [12];

- Ageing of the reproductive system has its consequences in the cessation of reproductive functions. Menopause is characterised by a loss of function of ovarian follicles to respond to gonadotropic hormones, which decreases estrogen concentration. This causes hormonal changes affecting the entire body. In men, there is a decrease in testosterone levels, the process of spermatogenesis is less efficient and live sperm / capable of fertilisation is weakened. The prostate gland undergoes degenerative changes. It tends to increase and cause cancer [13].

The goal of the exercise meant for the elderly is:

- maintaining the efficiency of all physiological systems (circulatory, respiratory, motor, digestive, nervous and other systems) as long as possible;
- maintaining physical fitness, allowing the person to perform basic, everyday life activities, such as dressing, cleaning, shopping, etc.;
- enabling mental relaxation, pleasure, satisfaction;
- socialisation - escaping from the loneliness of everyday life, willingness to be with people;
- managing the excess of free time in a valuable way;
- better functioning of sense organs, orientation in space, balance, coordination and imagination;
- managing emotional states;
- weight control, prevention of overweight and obesity;
- counteracting the development of atherosclerosis, diabetes, arterial hypertension, coronary artery disease and osteoporosis;
- increasing the activity of the immune system.

There is a social justification for increasing physical activity in older people, which is forwarded by the World Health Organization / WHO /. It recommends the following:

1. *Reducing the cost of social and health-care.* Lack of physical activity and sedentary lifestyle reduce one's independence and contribute to the occurrence of many chronic diseases. A physically active lifestyle can help delay the onset of physical weakness and illness, thus significantly reducing the cost of health and social care.
2. *Increasing the working capacity of elderly people.* A physically active lifestyle helps older people maintain functional independence and optimises the extent to which they are able to actively participate in society.
3. *Promoting a positive and active image in older people.* A society that promotes the physically active lifestyle in older people can better benefit from their wealth of possessed experience and knowledge.

Physical activity of the elderly - selected research

The area of research on ageing processes and the impact on these processes is a relatively young field. Gerontology, a science with a broad, multidisciplinary range, combines, among others, medicine, physiology, biology, psychology, pedagogy, economics and law. Out of it grew a field that is of great importance for shaping the future of old age, i.e. gerontological prophylaxis.

The prolongation of human life has caused that, both in the world and in Poland, issues related to the elderly have become the subject of numerous sciences drawing the attention of many researchers [14]. Many studies have been conducted into health and social aspects of ageing population in recent years [15]. Much research is directed at the prevention of premature functional failure, lowering the incidence and increasing the quality and length of human life. Further, much research is in particular focused on the impact of physical activity on the reduction of heart disease, obesity, hypertension, cancer, diabetes, osteoporosis, depression, falls and other injuries [16].

The motor skills of a human deteriorate very quickly over the years. Every decade in one's life significantly weakens all motor features, including muscle strength, motor coordination, etc. While observing over 6,000 people aged 55 to 75 years for a period of 7 years, W. Starosta [17] proved that, during this period of life, the motor coordination is significantly impaired, and after the age of 55, the sense balance systematically worsens the person's control over the maintenance of the position of the body. The above changes clearly indicate that the elderly become less and less physically fit, and consequently more susceptible to various diseases. Consequently, their dependence on others increases. Accordingly, gerontological prophylaxis is not only about reducing the risk of illnesses but also about improving the general physical condition of the older organism.

Numerous clinical and physiological studies have shown that physically active people slow down the natural process of physical fitness and efficiency loss, while in physically inactive persons it is much faster [18]. Research by E. Kozdroń [19] in a group of people over 65 participating in a 6-month recreational activity programme showed a significant improvement in the overall muscular strength, spinal flexibility and arm strength. In

turn, 5-year observations conducted by E. Cormeli et al. [20] in a large population of persons over 65 showed a significant impact of physical exercise on improving their physical performance, which is almost entirely dependent on the clinical condition of the circulatory system. Further, the literature on the subject described the beneficial effects of using strength exercises by older people. After a few weeks of such exercises, muscle strength increases, and so does their mass in the subsequent stages. An extensive review of forms of strength training used by various researchers and their influence on the muscular strength in the elderly can also be found in the studies by N. A. Ratamess et al. [21].

The most popular and health-oriented form of physical activity in older people is endurance training, whose effect has been confirmed by many studies in the field. Thanks to endurance exercises, the aerobic capacity increases and maintains until later in life at a similar level as in physically inactive persons, but younger by 30-40 years [22].

Epidemiological studies indicate that the lack of exercise, in addition to excessive carbohydrate intake, impairs its tolerance in the body, which in older age may lead to the occurrence of type II diabetes. This disorder consists in the reduced absorption of glucose by the tissues due to their reduced sensitivity to insulin/insulin resistance/, which leads to increased blood glucose/hyperglycemia/. Meanwhile, physical effort increases glucose uptake in working muscles, which leads to normalisation of blood levels [23].

Regular physical exercise is not only a potential factor in improving physical fitness, but also positively affecting the mental fitness of the elderly. P. Lampinen et al. [24] showed that mental fitness and well-being in the elderly are closely related to physical activity. The authors claim that regular physical exercise is a potential factor preventing ageing and favourably affecting the well-being of the elderly.

One can find numerous evidences confirming the salutary effect of physical activity on the health potential of the elderly in the literature on the subject [25]. In turn, A. Gębska-Kuczerawska [26] in her research on a group of people over 65 showed that the physically active enjoy a better psychophysical condition, are less burdened with cardiovascular diseases, and also use hospital care less frequently.

Numerous multicentre studies on the elderly population conducted in various cultural backgrounds, be it Greek, Brazilian or Italian, confirmed that an active, healthy lifestyle associated with physical exercise and proper nutrition are a prerequisite for good physical and mental health, being the most critical factor for successful ageing [27].

Forms of physical activity for elderly people

The most commonly used forms of physical recreation for the elderly having protective effects include walking and marches, rehabilitation gymnastics, games and motion games, Nordic walking, music classes, swimming and gymnastics in the water.

Walks, marches

The most accessible and popular forms of personal recreation are daily walks, which can be followed through the year irrespective of the season or weather. They mean not only being active, but also getting the best benefit from air and sun. As a common form of physical recreation, walking has many advantages:

- it can be done any time;
- it can be done everywhere (in the neighbourhood, a local park, around the city, etc.);
- it is an activity done in the open air;
- it is rarely harmful;
- it is not exhausting, requires less effort than most forms of physical activity;
- it does not require a costly outfit or cause additional costs;
- it is utilitarian and can become part of other activities.

A slightly more intense form of walking are marches, which are recommended by specialists as generally available, safe, moderate and healthy physical exercises. Treated as an affordable form of aerobic exercise, they improve the way the heart and cardiovascular system work [28].

Rehabilitation gymnastics

Gymnastics is the most common form in organised physical recreation programmes for the elderly. It also occupies a leading position in individual activity. Gymnastics can be considered as one of the most versatile and most accessible forms of movement. It can be followed in various conditions (sports hall, hall, open air, beach, etc.), using various accessories (tapes, weights, sticks, etc.) and attractive props (e.g. music). Its essence makes it

also an element of other forms of movement, for example, a part of warm-up or support exercises. It provides an opportunity to adapt each exercise to exercisers' abilities.

Rehabilitation gymnastics is a versatile and attractive form of activity that enables achieving the following effects:

- making joints flexible and strengthening the whole body movement apparatus;
- improving the respiratory function - reducing respiratory frequency in favour of deeper breathing;
- strengthening abdominal muscles and bringing beneficial effects to internal organs (e.g. stomach, intestines, liver);
- preventing constipation and haemorrhoids;
- improving motor coordination;
- improving the mobility of the chest wall;
- strengthening of the myocardium, extending small arteries and capillaries, improving blood supply conditions of individual tissues and organs;
- increasing and improving metabolism;
- improving psychophysical well-being, i.e. self-confidence, satisfaction with interpersonal contacts, decreasing emotional tension;
- making the individual more active and emotional [29].

Motion games and activities

Motion games and games should be regarded as an element that complements the process of improving the body's capabilities. Combining gymnastic activities with games and motion games brings excellent effects.

Games and motion games are a form of activities affecting the comprehensive human development and fulfil both the educational and recreational role. Their social character allows for forgetting about one's problems, ailments and loneliness. The fun movement conducted in a friendly atmosphere allows for eliminating stress and making friends.

Fun and games in a peer group, in addition to the pro-health values of physical activity, also satisfy other needs that are not met in the family, such as the need to talk, exchange experiences, integrate, provide a sense of belonging, acceptance, etc. Motion games and activities should be treated as an element complementing the process of improving older people's health and life. Due to their versatility, the ease of performance and the fun and entertainment element, they are ideal for use in various conditions (hall, outside, etc.) as a variety of all recreational activities. The unlimited movement opportunities, emotional commitment and contentment are elements that mobilise the strength to do better exercise.

Outdoor classes - Nordic walking

Outdoor forms of recreation, primarily due to their cognitive and economic health benefits, are very popular in older people.

They are one of the most pro-health forms of physical activity of this age group. Benefits of outdoor activities are unquestionable, and the possibility of using the natural environment (forest, water, terrain, climate, nature monuments) is the way by which health-related goals of physical activity can be most easily achieved. An essential element of the outdoor activity is also the hardening of the body, which is possible due to different atmospheric conditions, such as temperature, sun, humidity, wind or rain or snow.

Recently, one of the forms of physical activity followed in the outdoors is Nordic walking, popularly referred to as a walk with sticks. While walking with sticks, the load on the knees and spine is reduced, which is crucial especially in overweight people. In addition, the undoubted benefit of this form of physical recreation for the elderly is increasing the balance and stability of the body. The dosing of physical loads is individual for each person, and there are no contraindications to engaging in this physical activity.

While walking with sticks, we relieve joints and spine, improve physical condition and well-being. Nordic walking is an intense workout of legs, buttocks, hips, back, arms and shoulders. It ideally supports weight reduction. It also reduces the risk of osteoporosis, improves cardiovascular and respiratory fitness, prevents diabetes and lowers cholesterol. Further, it is an ideal remedy for depression, and it reduces the level of stress hormones and strengthens the immune system. Involving almost 90% of the whole body's muscles, Nordic walking consumes approx. 400 kcal/hour. compared to 280 kcal. during a normal walk. Energy consumption increases when using poles by 20% compared to an ordinary walk without sticks and the heart rate is 5-17 beats per minute higher.

Nordic walking is a great aerobic workout for the cardiovascular and respiratory systems. Pumping (i.e. opening the hand while pushing the stick back and closing it when returning) greatly improves blood circulation in the upper half of the body. Nordic walking also stands for relaxation and renewing the nervous system. Being in the open air in the natural environment and kind people is a remedy for nerves and a rest for the mind. Physical effort removes stress hormones from the body (cortisol and adrenaline) and increases the level of happiness hormones (endorphins). Training in forests by the sea or the mountains is an excellent solution to regain lost life energy and achieve better mental balance [30].

Other forms of activity for older people

Morning or evening gymnastics are other forms of physical activity suitable for the elderly. It is a highly individualised form of the movement whose intensity and range of exercises should depend on the specific abilities of the person.

During the morning gymnastics, one should involve bigger muscle groups, stimulate individual physiological systems and, consequently, allow the body to perform everyday activities.

The next form is dance and dance games - recently more and more popular in older recipients. It is not about a social dance, but a group dance, e.g. the so-called "five o'clock dances" in sanatorium and holiday centres, dance in a circle, dancing with chairs or dances from other parts of the world. All forms of dance are proper if they bring positive emotions both emotional, connected with establishing contacts with other people, and those resulting from physical effort. Dance is usually accompanied by music, which enhances mood and atmosphere and provides various emotional experiences.

Also, swimming is quite an attractive form of physical activity for the elderly. The water environment creates specific conditions that help relieve joints, increase their mobility and muscle strength and reduce pain in joints. An attractive form of activities in the water can be various types of exercises, in which non-swimmers can also participate. Recently, an example of such activities is quite popular aqua aerobics. Every move in the water causes resistance, which results in higher body efficiency than in a similar exercise in the gym. At the same time, muscles, thanks to the aquatic environment and body weight, have better conditions for loosening and being massaged by water. Water classes are especially recommended for people with degenerative diseases and back pain in rheumatic diseases and in obese people. Relaxation can be experienced even by those with severe movement limitations.

Many older people do Pilates exercises to improve the own body. It is a system of exercises of the whole body consisting in combining precisely performed exercises with breathing with calm (what is significant is the quality of movement, not the number of repetitions). Their essence is stretching, tightening and loosening muscles. This system is aimed at improving the flexibility, strength, balance and awareness of one's body. Many people willingly engage in working in the gardens and on plots. This type of utilitarian effort is quite versatile and has a positive effect on the whole body. Supplemented with gymnastic exercises, which are corrective and flexible, it plays a positive role model in the physical recreation of the elderly.

Finally, there are quite popular, traditional and individual forms of physical activity for grandparents/grandmothers - taking care of grandchildren. Being excluded from professional life, the elderly (often widowed) often regard this "grandfathering" as the only bright side of life, which allows for thinking about the future and strengthens the emotional bond with grandchildren. The joy of spending time with a grandchild manifests itself in the play, which often takes the form of a movement. In joint games with children, grandparents/grandmothers become partners involving both the mental and physical health.

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