Health Prob Civil. 2020, Volume 14, Issue 1
ISSN 2353-6942

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

PHYSICAL ACTIVITY IN PRIMARY AND SECONDARY PHYSIOPROPHYLAXIS

AKTYWNOŚĆ FIZYCZNA W FIZJOPROFILAKTYCE PIERWOTNEJ I WTÓRNEJ

Zofia Kubińska[1(A,B,E,F)], **Kamil Zaworski**[1(B,E,F)], **Igor Mysula**[1(B,E,F)], **Agata Pocztarska-Głos**[1(E,F)]

[1]Pope John Paul II State School of Higher Education in Biała Podlaska, Poland

Authors' contribution
Wkład autorów:
A. Study design/planning
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

Physioprophylaxis is a physiotherapeutic procedure consisting in counteracting, slowing down, inhibiting or removing adverse effects associated with an incorrect lifestyle, involutionary changes and disease processes. Physical activity (PA), health education, reduction of risk factors, and functional diagnostics are used to implement these goals. Physioprophylaxis makes it possible to avoid or stop the development of functional problems or disorders. It enables the prevention of civilization diseases, aging processes and disability by performing professional and daily activities ergonomically. Physioprophylaxis introduces PA and behaviors that strengthen the factors influencing health protection by preventing health threats. The lack of theoretical studies devoted to physioprophylaxis highlights the need to examine this topic. The purpose of this article is to describe an exemplary description (the author's) of primary and secondary physioprophylaxis using PA as an integral component of physical therapy, including its tasks. Primary physioprophylaxis strives to prevent the occurrence of diseases, and is directed towards healthy people. Secondary physioprophylaxis involves patients and is a selective process that prevents the recurrence of the disease being treated and also reduces other risks to health. Physioprophylaxis focusing on health threats in healthy people has been scientifically demonstrated to maintain and strengthen the current physiological and functional state. It is also a way to minimize the scope of adverse disorders associated with diseases for people with medical conditions achieved using PA.

Keywords: health, disease, primary prevention, secondary prevention, physical activity (PA), physiotherapy

Streszczenie

Fizjoprofilaktyka jest to postępowanie fizjoterapeutyczne polegające na przeciwdziałaniu, spowolnieniu, zahamowaniu lub wycofaniu się niekorzystnych skutków nieprawidłowego stylu życia, zmian inwolucyjnych oraz procesów chorobowych. W realizacji tych założeń stosowana jest aktywność fizyczna (AF), edukacja zdrowotna, redukcja czynników ryzyka oraz diagnostyka funkcjonalna. Fizjoprofilaktyka umożliwia uniknięcie lub zahamowanie rozwoju problemów funkcjonalnych lub schorzeń, zapobieganie chorobom cywilizacyjnym, procesom starzenia się i niepełnosprawności przez ergonomiczne wykonywanie czynności życiowych i zawodowych, AF i zachowania wzmacniające czynniki ochrony zdrowia ukierunkowane na zapobieganie zagrożeniom zdrowia. Brak teoretycznych opracowań fizjoprofilaktyki w literaturze przedmiotu zobowiązuje do podejmowania tego tematu. Celem pracy jest zaprezentowanie przykładowego (autorskiego) opisu fizjoprofilaktyki pierwotnej i wtórnej poprzez AF, jako integralnej składowej fizjoterapii z uwzględnieniem jej zadań. Profilaktyka pierwotna to uniwersalne działanie zapobiegające powstaniu choroby, a jej adresatami są ludzie zdrowi. Fizjoprofilaktyka wtórna obejmująca pacjentów jest procesem selektywnym, dzięki któremu zapobiega się nawrotowi leczonej choroby i pojawieniu się innych antyzdrowotnych konsekwencji, na przykład niepełnosprawności. Fizjoprofilaktyka zagrożeń zdrowia osób zdrowych poprzez AF jest potwierdzonym naukowo sposobem na utrzymanie i umacnianie dotychczasowego stanu morfologiczno-funkcjonalnego, a w stanie choroby na minimalizowanie zakresu niekorzystnych zaburzeń towarzyszących procesom chorobowym.

Słowa kluczowe: zdrowie, choroba, profilaktyka pierwotna, profilaktyka wtórna, aktywność fizyczna (AF), fizjoterapia

Tables: 1
Figures: 1
References: 51
Submitted: 2019 Nov 8
Accepted: 2020 Jan 21

Kubińska Z, Zaworski K, Mysula I, Pocztarska-Głos A. Physical activity in primary and secondary physioprophylaxis. Health Prob Civil. 2020; 14(1): 34-42. https://doi.org/10.5114/hpc.2020.92522

Address for correspondence / Adres korespondencyjny: Kamil Zaworski, Pope John Paul II State School of Higher Education, Sidorska 95/97, 21-500 Biała Podlaska, Poland, e-mail: kamil_zaworski@wp.pl, phone: +48 83 344 99 00
ORCID: Zofia Kubińska https://orcid.org/0000-0002-9127-3439, Kamil Zaworski https://orcid.org/0000-0001-5604-1862, Igor Mysula https://orcid.org/0000-0001-5830-0186, Agata Pocztarska-Głos https://orcid.org/0000-0002-9834-0016

Introduction

Physioprophylaxis has been part of the educational, legal and professional world for several years. It is an integral component of physiotherapy, encourages theoretical studies on its tasks, types and means. According to the Polish Chamber of Physiotherapists [1], physioprophylaxis is a physiotherapeutic procedure consisting in counteracting, slowing down, inhibiting or removing the adverse effects of an incorrect lifestyle, involutionary changes and disease processes. The assumptions of physioprophylaxis are implemented, among others, by popularizing physical activity (PA), health education, reducing risk factors and functional diagnostics. Physioprophylaxis allows, to a large extent, to avoid or inhibit the development of functional problems or diseases. It also helps to prevent civilization diseases, the aging process and disability by doing professional and daily tasks ergonomically as well as behaviors that strengthen health protective factors aimed at preventing health threats [1-5]. It is a new and effective alternative in the health care system. Its purpose is to meet the constantly growing medical needs. For the time being, physioprophylaxis, as a health need and a medical service, is officially included only in the area of law, specialist education and the professional work of a physiotherapist [1, 6, 7, 8].

The aim of the study

The lack of theoretical studies on the subject of physioprophylaxis increases the need to deal with this subject, define and describe the concept of physioprophylaxis as a health competence (a factor protecting health). It also creates the need to present physioprophylaxis in the aspect of health threat prevention. The purpose of the following work is to present an exemplary (the author's) description of primary and secondary physioprophylaxis, which involves physical activity. Primary physioprophylaxis "introduces" healthy people to the field of physiotherapy, while secondary physioprophylaxis is a valuable complement to the process of medical rehabilitation. At the moment, one cannot find a definition of physioprophylaxis in encyclopedic or specialist studies, which is why demonstrative studies that generate scientific achievements become the source of discussion and serve as a didactic tool.

Physioprophylaxis through PA in childhood and youth

Systematic PA has a positive impact on the condition and functioning of the human body at any age. A special role in this process is played by the musculoskeletal, cardiovascular, respiratory and neurohormonal systems as well as the internal organs [9].

PA in childhood and youth is a health behavior that has a beneficial influence on health, its strengthening and maintenance, i.e. building potential health for life. Research confirms the impact of PA on the development of children and adolescents by accelerating the conversion of cartilage into bone, stimulating the growth processes, preventing defects in the musculoskeletal system [10] and many other diseases of the developmental age. PA supports the nutrition process of the joints and improves their elasticity, flexibility and endurance [9]. Systematic PA in childhood and youth strengthens the bone structure. In turn, good mineralization prevents osteoporosis [11]. It also has a positive effect on the development of muscle mass by stimulating physiological changes in the tissue, i.e. improving blood supply, elasticity and, as a consequence, the regular range of motion in the joints. PA is a source of stimuli for the nervous system and it shapes and corrects the functions of the nervous system. These functions are important in the acquisition of motor activities. PA is also the basis for creating and consolidating motor patterns. Regular training improves neuromuscular coordination, that is, intentional muscle involvement to perform a specific movement. Also, it makes it possible to make specific movements more efficiently at lower energy costs [10]. Systematic PA among children has a positive impact on the structure of the chest and the respiratory muscle function. It increases basic respiratory parameters, which means a better oxygen supply for body tissue and an improved physical fitness [9, 10]. Regular PA can slow down the natural rate of changes in the respiratory system, affecting the respiratory rhythm and improving the ventilation-perfusion ratio. Thus, it prevents respiratory muscle sarcopenia and improves chest mobility [12, 13].

PA plays a preventive and therapeutic role in the treatment of developmental disorders, i.e., ASD (pediatric autism, Asperger disease), the incidence of which is 17.6/10,000 children aged 0-18, and diabetes [14, 15]. The results of Szot's research showed that systematic PA in the case of children with autism affects the development of communicative intentionality in contacts with loved ones. It can also reduce the incidence of stereotypical and aggressive behaviors. According to the researcher, these changes stem from the decrease in mental tension as well as a large number of diverse stimuli that provide little opportunity to present stereotypical behaviors. Moreover, targeted home therapy positively affects the functioning of the recipients in the social

sphere, their self-service and gross motor skills [16]. Regardless of the type of diabetes, the physiological, social and emotional benefits of regular exercise and a physically active lifestyle are well documented. In the case of type 1 diabetes, effective treatment is based on individualized insulin therapy and the right diet. Regular exercise helps improve overall health and fitness and reduce risk factors for vascular complications. In the case of adolescents suffering from diabetes, systematic PA contributes to the improvement of blood lipid profile and increased insulin sensitivity, mainly in the skeletal muscles, which leads to a situation when the diabetic person needs the hormone less frequently [15].

PA is one of the recommended preventive factors in the European anti-obesity plan for 2014-2020 [17]. Childhood obesity prevention that combines balanced nutrition and PA leads to a much greater reduction in systolic and diastolic pressure than in the case of actions based only on proper nutrition or only PA. The conducted analyses revealed additional benefits of conducting obesity prevention programs based on a proper diet and PA [18].

The results of HBSC study involving 42 countries showed that PA among Polish children ranked them 12th in accordance with WHO requirements (60 minutes of moderate PA daily). These requirements are met by 27% of 11-year-old girls and 34% of 11-year-old boys, 19% of 13-year-old girls and 29% of 13-year-old boys. The numbers are even lower in the case of 15-year-olds: 16% and 18% [19].

Physioprophylaxis through PA in adulthood

Systematic PA among adults is a manifestation of acquired knowledge, skills, beliefs, attitudes and identified health needs as part of caring for their health. According to experts, a sedentary lifestyle contributes to an increase in the incidence of civilization diseases and premature aging. According to Eurobarometer, 59% of Europeans never do PA, and according to the Public Opinion Research Center (Centrum Badania Opinii Społecznej, CBOS), 58% of Poles never or almost never exercise, and 37% of them do not run, swim or cycle at all [17, 20]. The impact of PA on the health of adults is stressed in studies that point to the essence of the positive impact of PA on the prevention, treatment and rehabilitation in the case of cardiovascular diseases, atherosclerosis, hypertension, obesity, diabetes, osteoporosis, cancer, mental and neurogenic diseases as well as the quality of aging [21-24].

The important benefits that can be gained from regular PA include the ability to reduce the risk of cardiovascular conditions, lower resting blood pressure, improved lipid profile, obesity therapy as well as a beneficial effect on endothelial function, inflammatory processes, coagulation, and sex hormone levels [9, 10, 25]. The focus of US research has been the evaluation of the potential underlying the mechanisms thanks to which higher levels of PA are associated with a lower risk of cardiovascular events in the case of women aged 45+. Mora et al. identified potential underlying mechanisms through which even moderate PA levels (at least 600 kcal/week or the equivalent – over 2 hours of walking per week) contribute to a lower risk of clinically important cardiovascular events. Small changes in the known risk factors, especially those associated with inflammation, homeostasis and blood pressure, constitute a significant part of the benefits of PA in relation to the risk of developing a cardiovascular condition and therefore may have significant consequences for further prevention of these diseases [26].

The study of middle-aged men (41+) carried out over a period of 17 years clearly indicated a significant inverse relationship between the level of PA and cardiovascular risk. Energy expenditure above 1975 MET/min/week seemed to be a strong element that prevented the development of cardiovascular risk factors [21]. Scientists claimed that doing regular exercise as part of therapy is one of the measures that limit the overweight epidemic in the population of people after the age of 20 [27]. The goals of this therapy are to prevent civilization diseases, increase utilitarian physical fitness, and improve the well-being of adults. The effects of the therapy along with a health program last for a longer time and may result in the improvement of the condition of the whole society [28].

Physioprophylaxis through PA among the elderly

The significance of PA in the life of the elderly consisting in weakening and delaying involutionary processes has contributed to the isolation of a special area of research, i.e. gerokinesiology and geronto-prophylaxis. According to researchers, physical activity can now be considered the common denominator of all preventive and rehabilitation activities, regardless of the well-being and fitness of the elderly. PA during this period of life can be seen as a drug used in the prevention and treatment of diseases significantly related to age (coronary artery disease, hypertension, obesity, hypercholesterolemia, diabetes, osteoporosis, depression, neurogenic changes). As an anti-involutionary factor, it helps to maintain the body's efficiency and endurance. It alleviates

the dysfunctional effect of age, such as cognitive impairment, dementia, susceptibility to infection and disability. It also improves lung function [12, 29, 30, 31, 32, 33]. Prączko and Kostka's study showed that the number of episodes and days when the elderly experience the symptoms of upper respiratory tract infection may decrease as the levels of PA increase [13]. Regular physical exercise (also resistance training) is recommended for seniors even over the age of 80-85. The benefits of strength training include health-promoting changes in the musculoskeletal system, which include slower development of sarcopenia, the prevention of osteoporosis, fractures and falls, and increased (functional) mobility to facilitate daily activities [34]. Research by Marchewka and colleagues demonstrated that the level of PA in the developmental period of life (before the age of 35) has a positive effect on the quality of life in the old age [35].

Systematic PA contributes to the disappearance of depression and anxiety symptoms, as well as improves mental performance and mental well-being by increasing the concentration of endorphins in the blood due to its preventive and therapeutic effect on mental health [30, 36]. PA also helps to maintain normal cognitive functions, reduces the risk of developing neurodegenerative diseases and alleviates the symptoms of diagnosed disorders, e.g. dementia and Alzheimer's. Improvements in mental and cognitive functions are directly associated with the discoveries related to exercise-induced neurogenesis [25, 37]. The results of the Central Statistical Office from 2016 implied that fewer people over the age of 60 do sport regularly and take part in recreational activities: (10.6%) women, (10.9%) men. 40.5% of all older people exercise for pleasure, and 31.7% do it due to medical recommendations [38].

Physioprophylaxis in the structure of physiotherapy

The ways of influencing health in individual and social terms include promoting health, restoring health and preventing diseases, i.e. the prevention of health risk factors, developmental disorders, lifestyle diseases, the aging process and disability. According to Demel, disease prevention is more difficult than treatment because it requires up-to-date knowledge about health, appropriate (professional) association of cause and effect relationships, imagination, experience, forward thinking, and a willingness to act when it is not necessary [39].

According to Mika and Kasprzak, physioprophylaxis is "a branch of physical medicine in which natural and artificially created physical factors are used to meet the needs of the system or to increase its resistance." The authors stated that this field was currently developing dynamically because of the growing technicization of life and the associated threat of civilization diseases (epidemics). They also pointed out that the reason for the occurrence of these diseases was the disturbance of the natural state of balance between the human body and its surroundings. These conditions led to exhaustion of the reserves of self-regulation of the system, caused disorders in the adaptation of the system to the environment in the form of neuroses, coronary artery disease, hypertension, gastric and duodenal ulcers, allergic diseases and other conditions [40].

The definition of physiotherapy according to WCPT (World Confederation of Physiotherapy) and the European Declaration of Standards in Physiotherapy (Europejska Deklaracja Standardów w Fizjoterapii) states that "... physiotherapy deals with detecting and restoring the potential of motor activities in the areas of health promotion, prevention, treatment and rehabilitation to the fullest possible extent." (Figure 1) [41].

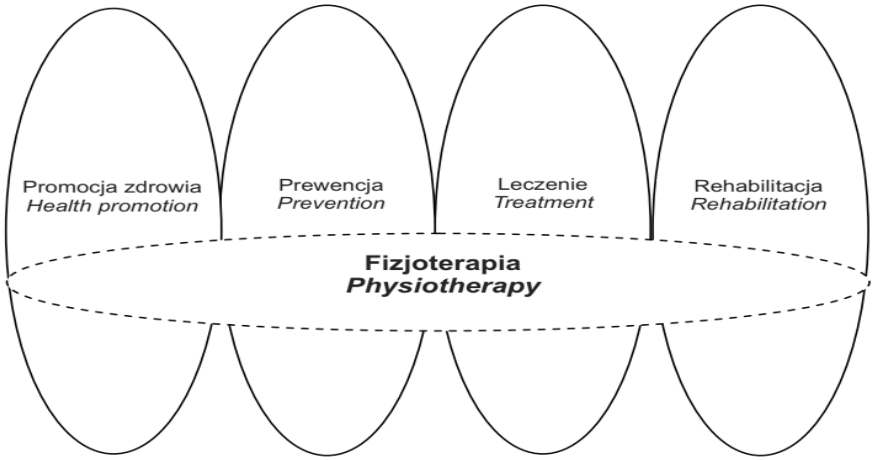

Figure 1. The place of physiotherapy in medicine as defined by WCPT [41]

Mikołajewska noticed that "the figure above shows that physiotherapy, as opposed to medical rehabilitation, also includes prophylaxis, which significantly expands the area of its application" [41].

According to the provision in the Act on the profession of physiotherapists, the preventive dimension of physiotherapy is now officially called ***physioprophylaxis.***

Examples of physioprophylaxis types

According to Sieroń, modern physiotherapy can be divided into pro-health physiotherapy, primary preventive physiotherapy, in-treatment physiotherapy, recovery physiotherapy and secondary preventive physiotherapy since it includes healthy people. Preventive physiotherapy is primarily devoted to people at the risk of developing metabolic syndrome and cardiovascular diseases as well as people at the risk of suffering from the reduction of the functions of the muscular system. Secondary preventive physiotherapy involves patients with a medical history, especially coronary artery disease and diabetes [42].

It should be remembered that the source and subject literature dealing with the topic of preventing health threats contains such terms as primary, secondary, tertiary and quaternary prevention. Primary prophylaxis aims to prevent diseases, its recipients are healthy people, while secondary prophylaxis involves patients and is a process that prevents the recurrence of the currently treated disease and the appearance of other anti-health consequences, e.g. disability. Another example of the use of different terminology connected to prevention is contained in the current, still valid, edition of the National Health Program (Narodowy Program Zdrowia). In the description of the implementation of the tasks included in the sixth operational objective, the document talks about universal prevention, selective prevention and indicative prevention [43].

In the resolution of May 2019, the Polish Chamber of Physiotherapists developed, adopted, and published the definition of physioprophylaxis (the definition is included in the introduction). The resolution also specified and described the types of physioprophylaxis [1]. These types are described below:

- ***Early physioprophylaxis***, physiotherapeutic procedures aiming to popularize physical activity as a factor to reduce social, economic and cultural life patterns, which in turn contribute to increasing the likelihood of an illness and/or health problems. Impact level: universal (targeted at the entire population).
- ***Primary physioprophylaxis***, physiotherapeutic treatment whose goal is to prevent the development of diseases and/or reduce the likelihood of health problems through early diagnosis, control and the prevention of internal and external risk factors. Impact level: selective (targeted at high-risk groups).
- ***Secondary physioprophylaxis***, physiotherapeutic procedures involving supplementing treatment by implementing PA adapted to a particular condition in order to stop the development of negative effects of the disease and/or health problems. Impact level: selective.
- ***Phase-III physioprophylaxis*** (tertiary), physiotherapeutic procedures aiming at preventing the effects of a past/ongoing disease/health problem and preventing their recurrence, as well as minimizing secondary damage, complications and/or compensation. Impact level: selective [1].

The knowledge and ability to put this definition and the types of physioprophylaxis into practice will apply to both students of physiotherapy and professionally active physiotherapists. However, only scientific literature makes it possible to understand the legitimacy of using various concepts to define preventive actions.

Our original approach to physioprophylaxis

The concept of primary and secondary prophylaxis (or prevention) exists in the Polish outpatient and hospital medicine. It seems that this practical division may also apply to physioprophylaxis regarding health threats.

The authors of this study have used this simple and transparent division, which is also a perfect introduction to this new field, to help understand the concept and structure of physioprophylaxis seen as a competence and a health service devoted to health threats.

The table below presents an original approach to primary and secondary physioprophylaxis in physiotherapy, including its tasks, PA types and selected scientific sources (Table 1).

Table 1. Primary and secondary physioprophylaxis in physiotherapy through PA (an original approach)

Types of physiotherapy	Types of physioprophylaxis	The tasks of physioprophylaxis	Physical activity (PA) – types, forms (sources)
Promotional physiotherapy	**Primary physioprophylaxis universal**	Improving knowledge about the impact of movement on health. Conscious development of physical fitness and physical efficiency, creating health potential. Maintaining the level of physical fitness and physical efficiency.	PA as an important health behavior in life. Dynamic recreational PA (physical games and activities, fitness), physical aerobic exercises (aerobics, walking, Nordic walking, running, swimming, cycling), resistance training – strength exercises, healing exercises, stretching exercises – flexibility, breathing, relaxation. Developmental PA, generally improving our physical health according to WHO recommendations, EU guidelines, experts of medical societies.
Preventive physiotherapy		The prevention of identified external and internal health threats (risk factors, the variability of body parameters) using adapted, systematic, moderate physical activity. Minimizing identified risk factors.	PA focusing on identified health threats (hereditary diseases, pain, control of body parameters). Corrective, breathing, therapeutic – active, passive exercises, physical, aerobic, resistance, general development, general fitness, relaxation, PA according to WHO recommendations, EU guidelines, experts of medical societies [10, 25, 37].
Therapeutic physiotherapy	**Secondary physioprophylaxis selective**	The treatment of developmental disorders, civilization and occupational diseases as well as aging processes. PA should not exceed individual tolerance.	Therapeutic exercises – active, passive, (kinesiotherapy with local and general goals), neurophysiological methods, PA according to the recommendations of a physiotherapist, WHO and EU guidelines, experts of medical and scientific societies [15, 16, 33, 34, 37, 46, 47, 48, 49].
Physiotherapeutic rehabilitation		Maintaining functional fitness and physical efficiency after undergoing treatment (surgery). The prevention of complications, negative consequences of medical conditions, surgeries, accidents. The stabilization, adaptation and confirmation of disability.	Functional and adjusted PA [50], therapeutic exercises – passive, active [51], kinesiotherapy with local and general goals according to the recommendations of a physiotherapist, experts of medical [21] and scientific [49] societies.

Conclusions

The original presentation of physioprophylaxis presented in this study is based on the simplest and most transparent division of physioprophylaxis into primary and secondary physioprophylaxis and implemented

through PA. This division is a perfect introduction to this new educational, scientific and professional topic. It also facilitates understanding the concept and structure of physioprophylaxis as a competence and a (medical) health service devoted to health threats. Finally, it shows the need to learn other preventive terms and structures which are conditioned by specific specificities and assumed goals and which appear in the works from the field of health sciences.

Physioprophylaxis combines physiotherapy with the promotion of well-being in the case of a healthy person and the medical rehabilitation of patients to the greatest possible extent. In the first case, it has a universal scope and is determined by the individual level of knowledge about health. However, in relation to the patient, it is selective and requires professional and educational actions to be taken by a physiotherapist. These actions help to maintain, strengthen and regain health and functional fitness. They also prevent the recurrence of diseases, the appearance of negative consequences and disability. Physioprophylaxis minimizes identified health risk factors that are conditioned by health status, disease, undergone surgeries, the stage of ontogenesis, professional specifics, environmental conditions, lifestyle and health policy.

As far as healthy people are concerned, physioprophylaxis aims to maintain and strengthen the current morphological and functional state through PA as well as minimize the extent of adverse disorders associated with disease (postoperative) processes in the case of individuals suffering from various conditions. The therapeutic value of PA is the effect of restoring normal body functions, and if impossible, shaping compensation and adaptation mechanisms.

A physiotherapist is obliged under the law to take preventive (physioprophylactic) actions, i.e. to disseminate health-promoting behaviors and shape and maintain the fitness and endurance of people of all ages in order to prevent disability. PA, which is recommended in physioprophylaxis, requires a personalized approach, i.e. an approach adjusted to age, individual needs, functional possibilities as well as the state of health and the medical condition [1, 6, 7].

According to Maciej Krawczyk, "it is difficult to find a health area in which physiotherapy would not be useful, ... this is true for almost all the medical fields, however, many doctors and decision-makers are not yet aware of this fact... and some of them do not have full knowledge about the possibilities of modern physiotherapy" [44]. Elsewhere, the president of the Polish Chamber of Physiotherapists said that they "want the NFZ (the National Health Fund) and MZ (the Health Ministry) to pay for physioprophylaxis. Although ministers and professors from all the fields of medicine realize that prevention is the most important and the cheapest solution in medicine, no one takes any action" [45].

Without seeing the bigger picture, without appreciating the potential of the profession of a physiotherapist by decision-makers who are responsible for public health, without providing funds to pay for the solutions that physiotherapists and patients expect and need, physiotherapy will continue to function at a minimum and will be limited to commercial services. Finally, when it comes to physioprophylaxis which deals with health threats through PA, or other health protective factors, it will still remain nothing more than just a theoretical conversation topic for a very small group of people.

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