Active Tourism for People with Disabilities

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Active tourism improves human health and well-being regardless of age or disabilities.Tourism is a form of physical and social activity performed outdoors. Tourism requires mobility and therefore supports physical activity. Movement improves human health regardless of the age or potential disabilities of individuals.

people with disabilities | a person with a disability | technological innovation

1. Introduction

According to the World Health Organization (WHO), there are 1 billion people with disabilities worldwide, representing 15% of the global population. Among them, 2 to 4% experience considerable problems with daily functioning. Additionally, it must be remembered that the number of people with disabilities is growing continuously, and as indicated by the WHO, this trend is associated, among other things, with population aging and the rapid increase in the prevalence of chronic diseases [1]. Compared to previous periods, people with disabilities also suffered much more from limitations in their functioning during the COVID-19 pandemic [2]. As has also been stressed by the WHO, in many regions around the world, health care for disabled patients is substandard and underfinanced, so there is a pressing need to expand the range of rehabilitation services [3] to ensure continuous rehabilitation and maintain positive effects of medical rehabilitation initiated at the beginning of treatment while patients are still in hospital [4].

According to the model proposed by professor Wiktor Dega, medical rehabilitation needs to be common, early, comprehensive, and continuous. In 1970, the WHO accepted and recommended the model developed by W. Dega [5]. The rehabilitation process meeting present-day requirements should comprise comprehensive activities, including medical and social rehabilitation maintained over an extended period [6][7]. Medical rehabilitation is provided inpatient or outpatient, whereas social rehabilitation includes environmental therapy (milieu therapy or community therapy) and occupational therapy. These two primary forms of rehabilitation include physical and psychological rehabilitation [8]. Both types of rehabilitation require further efforts to search for new procedures and techniques to enhance their effectiveness.

Numerous studies have shown that physical impairments are the most common cause of disabilities. For example, investigations made by Okoro et al. [9] show that in the U.S. population over age of 18, physical impairments were the most widespread type of disability (13.7%), followed by cognitive dysfunctions (10.8%), hearing (5.9%), and visual impairment (4.6%). The prevalence of hearing disabilities and mobility impairments was greater among the elderly, whereas the frequency of cognitive impairment was highest among the middle-aged (11.9%) and young

adults (10.6%), while it was lowest among older people (9.5%). It also results from a study by Courtney-Long [10] in which the most commonly reported types of limitations were mobility and cognitive disabilities. Further studies on the subject showed that among people who report severe impairments, 46% indicate motor disability, 39% impaired problem-solving or concentration capacity, 26% report hearing and 21% visual impairment, while 43% report more than one type of impairment [11]. The sources of the global prevalence of diseases and injuries worldwide point main causes of disability among people aged 10–49 years. These are injuries related to traffic accidents, communicable diseases (infectious diseases), and non-communicable diseases such as diabetes, arthritis, and depression. Cardiovascular disease was the top-ranked cause of disability in the 50–74-year and 75-year and older age groups [12][13]. Lifestyle choices and personal predispositions such as obesity, physical inactivity, and the use of stimulants such as tobacco, alcohol, and illicit drugs are also significant factors causing disability.

The group of people with motor disabilities is not homogeneous, and its diversity is derived from the character and underlying causes of these impairments. Generally, mobility impairments are caused by innate developmental defects, disease, unhealthy lifestyle (at present, it is frequently addiction to stimulants, obesity, and uncontrolled and extreme physical activity), and biomechanical overload in the case of manual workers. A disability may also be caused by various accidents, the risk of which increases with population aging [14], or it may be a consequence of military conflicts. It was also observed that starting from the age of 50+ or even 40+, procedures different from those typically applied in the case of young people are needed, aiming at rehabilitation after injury or disease and maintenance of psycho-physical health over a more extended period. Social disability (non-participation in various forms of life activity) is closely related to a lack of adaptation of the living environment to a given person's needs in terms of infrastructure and assistive technology (AT). Unfortunately, frequent causes of mobility problems are still related to inappropriately designed or used individual technical equipment [15][16]. Ignorance and disregard for the unique needs of persons with disabilities when formulating requirements imposed on equipment designed specifically for them, combined with the inadequate knowledge of specialists in this field, generally limit the potential for normal functioning of individuals with disabilities following the concept of independent living [17]. According to the UN Convention on the rights of people with disabilities, people are disabled due to external barriers rather than individual limitations [18]. Thus, eliminating these external barriers is an effective method of reducing disabilities.

Tourism is a form of physical and social activity performed outdoors. Tourism requires mobility and therefore supports physical activity. Movement improves human health regardless of the age or potential disabilities of individuals. Exercise associated with tourism, particularly when it is moderate, in combination with other factors that affect the human organism, has a beneficial influence on human physiology [19][20]. Physical activity serves as an impulse that stimulates the central nervous system, which also improves cognitive functions [21].

In addition, it increases the aerobic fitness of the organism and the efficiency of the circulatory system, while it also improves smooth muscle fitness, the function of abdominal organs, and the pelvis, which in turn prevents gait and balance disorders. Physical activity improves blood flow efficiency, reduces the risk of blood density and clotting in blood vessels, normalizes blood glucose levels, reduces the concentration of low-density lipoproteins (LDL), and

increases the concentration of high-density lipoproteins (HDL), which improves the immune system function, accelerates metabolism, promotes mental well-being, as well as enhances physical fitness [22]. These positive changes in the function of the human organism associated with physical activity may also be recorded by governmental bodies as a reduction in demand for rehabilitation among individuals with low physical activity.

Physical activity, in combination with rehabilitation training, promotes greater daily life fitness, i.e., capacity to perform various activities of daily living (ADLs) (np. functional mobility such as the ability to walk or use a wheelchair, get in and out of bed, and a chair; dressing, grooming, self-feeding) even at such extensive disabilities such as paraplegia or tetraplegia. Systematic rehabilitation training as part of rehabilitation was implemented in various countries many years ago when promoting the concept of the so-called active rehabilitation (in Sweden in 1976 and in Poland in 1988 [23]). The active rehabilitation movement has contributed to searching for new activity areas for people with disabilities.

2. Diagnosis of Needs: Challenges in the Field of Active Tourism for People with Disabilities

2.1. Tourism of People with Disabilities

According to the Polish Tourist and Sightseeing Society PTTK, the concept of tourism for people with disabilities is defined as: “intentional, purposeful physical activity adapted to individual needs, performed in various forms, closely related to sightseeing activity. It is a form of social rehabilitation for people with disabilities. This activity aims to maximize physical, mental, social, and occupational fitness as well as adaptation to normal life. Tourism for people with various disabilities is a recreation and a means of therapy and education” [24].

The presentation of specific information on travel for people with disabilities is impeded by a lack of available statistics [24], while studies on tourist preferences are performed rarely and to a limited extent, preventing reliable generalizations on the subject. According to the scarce data in the literature, it may be stated that, e.g., in Poland, people with disabilities around 15 years ago traveled more than three times less often compared to non-disabled individuals, while their participation in foreign travel was 14 times lower [25]. For example, the first specialist travel agency for people with disabilities was founded in Poland in 2009, and even today, this industry section is seriously underdeveloped.

The PTTK report shows that the share of people with disabilities in tourism is 1.8%. In comparison to able-bodied tourists, this number is extremely low. Among the various forms of active tourism of people with disabilities, mountain and lowland hiking predominates (64% share in the entire activity of people with disabilities), followed by cycling and kayaking (approx. 14%). Horse riding (4%), sailing (1.7%), motorsports (1.6%), skiing (0.3%), and diving (0.02%) are rarely practiced [24][25].

Bauer indicated four factors that hinder the development of tourism for people with disabilities: intrapersonal, interpersonal, economic, physical, and attitudinal barriers [26]. Intrapersonal factors include physical, sensory,

psychological, and cognitive limitations to contemplating travel. Interpersonal barriers manifest in disturbed interactions with travel companions as well as strange transportation, accommodation, and other service providers. Problems related to the execution of the need for leisure time activities by people with motor disabilities also result from physical limitations, observed first of all in non-urbanized areas when these individuals participate in tourist activities (e.g., moving on trails, in open areas, in sandy terrain [27]) or, for example, in amateur practice of various sports disciplines. For many years, such forms of activity were very poorly developed [28] due to a lack of available technical means of transport in difficult terrain or no technical equipment dedicated to different sports disciplines being produced. Execution of amateur sports or tourism activities is directly associated with the gradual rehabilitation process for people with disabilities, constituting a framework for social rehabilitation. Additionally, adapting such equipment is even more complicated because, compared to the past, tourists' present-day behavior and needs have significantly changed [29]. Economic factors are significant. Travel and accommodation costs are usually higher for people with a disability. Not all transport methods are available, and suitable accommodation is usually only available in more expensive locations. Social attitudes produce attitudinal barriers for disabled tourists. Negative attitudes of other tourists or passengers are associated with the stereotype that the presence of disabled counterparts may disturb their otherwise carefree and ideal holiday environment.

2.2. Satisfying the Transport Needs of People with Disabilities

Transport is an indispensable element of every tourist enterprise. Individuals with mobility impairment are at risk of being discriminated against in terms of public transport accessibility, especially when the journey takes place in a new, unfamiliar area, and it is logistically complicated when, for example, it requires a transfer to another means of transport, e.g., from a railway to a road or an air transport. Discrimination refers not only to the lack of adaptation of specific means of transport to special needs but also to the complexity of regulations and detailed rules of transport use. The movement of disabled people within the entire public transport system is considerably hindered by the continuing need to search for information on the availability of adapted transport means and regulations concerning the transport of individuals with significant disabilities, moving in wheelchairs. Frequently the intention to travel on a train or airplane needs to be reported much earlier, as a result, it is difficult to make flexible travel plans or introduce impromptu changes to the itinerary. This hinders the accessibility of the public transport system as a whole. Passengers typically use the entire system rather than only one means of transport and when a section of the itinerary may not be covered or when finding information required when traveling is too time-consuming, they simply either decide not to travel or choose an individual means of transport (a car) [30].

For most people with disabilities, inaccessible transport harms their everyday life. Problems with accessibility, particularly in the case of public transport systems, may considerably reduce their employability and limit the potential for social inclusion of disabled people [30], while particularly hindering tourism of individuals with disabilities.

The needs related to mobility and transport for people with disabilities change with age [31]. Many social factors also affect the need for mobility [32]. The inclusive tourism sector appears to be one of the primary beneficiaries of

the population aging process due to lifestyle changes, increasingly focusing on leisure compared to past generations [29].

2.3. Present-Day Development of Rehabilitation Engineering Tools to Satisfy Needs Related to Active Tourism

Design in rehabilitation engineering [28][33] is the intended planning of using assistive engineering devices (assistive technology, AT) in the targeted rehabilitation processes of people with disabilities. The development of assistive technology means and rehabilitation engineering involves numerous concepts and technical solutions facilitating participation in a variety of new leisure time activities for individuals with mobility issues, which use considerably exceeds their typical usage [34]. These may include, e.g.,

- Golf carts (for people with disabilities of lower extremities, making it possible to stand upright and preventing the risk of a fall);
- Wheelchairs adapted to travel on the beach and in the forest, equipped with electric engines and stabilized using electronic gyroscopes with multiaxial suspension, moving on cross-country tires or caterpillar tracks;
- Wheelchairs for mountain tourism, with an adequately reinforced frame and wheels, a low seat, with an electric or hybrid engine—a combination of the strength of human muscles and an electric drive—, with widely spaced wheels, frequently with additional handles facilitating pushing, pulling or carrying by assisting individuals). An example of such a vehicle is a special wheelchair designed for a mountain trekking trip to the Himalayas for “Michał Woroch—Himalayas Challenge_2021” [35];
- Equipment designed to facilitate sliding into the water when diving (e.g., with a walking mechanism rather than a wheel drive—according to patent [34]), special stationary equipment to transport individuals with motor disabilities from the shore or river bank to the water, equipment facilitating transfer from a wheelchair to a boat, kayak, and others;
- Alternative drive systems for manual wheelchairs enhancing their functionality (manual drives for hand cycling [36], the cam-thread drive as in patent application [37], electric or hybrid electric-manual assistive attachments to assist in covering longer distances and elevations [38]);
- Wheelchairs and electric or combustion engine vehicles to travel over boggy terrain (with multiple wheel or caterpillar track systems) [39];
- Adapted powered hang gliders—ultralight trikes and adaptations of planes with hand controls;
- Adapted sports cars for disabled drivers;

- Adaptations of cabin cruisers and sports yachts, e.g., specialist seats [40] and steering wheels for wheelchair users [41].

At present, thanks to the application of specialist technical solutions, many forms of tourism may be practiced by people with almost all types and degrees of disabilities. An example in this respect may be given by Hilary Lister, disabled due to muscular dystrophy, who in 2009 singlehandedly sailed around the British Isles. This was made possible thanks to applying a unique steering system using the sailor's breath [42]. Another example is the 2018 trip through the North, Central, and South Americas (along a distance of over 65 thousand km) taken by Michał Woroch and Maciej Kamiński, who traveled in a sports utility vehicle with several adaptations for wheelchair users [43]. Still another example may be provided by the URI sailing yacht constructed in 1992, which may be used by unassisted wheelchair users [44]. For example, an innovative solution used there included specially designed access to the engine room of this yacht and the feasibility of inspections and minor repairs by wheelchair users.

Despite the dynamic development of assistive and rehabilitation technology solutions for various leisure time activities, it is still necessary to search for similar solutions assisting in tourism, including the use in the urbanized space [28]. These new solutions should include both individual technological solutions and infrastructure. They must provide new value or quality to achieve specific goals [45][46]. Researchers may observe a high demand for new specialist assistive technology designs in currently relatively inaccessible areas of tourism, recreation, and sports, while at the same time, it is necessary to improve the quality of existing solutions. Such innovations are major objectives for the EU [47]. Eliminating barriers through legislation, adaptation, universal design, and other actions is the key to equal opportunities for people with disabilities. In Poland, the government program Dostępność Plus (Accessibility Plus) realized in 2018–2025 aims to support actions for people with disabilities. A significant area for action is connected with increasing transport accessibility for people with disabilities and senior citizens. The amount of PLN 23.2 billion (approx. EUR 5.4 billion) is allocated for support measures within the entire national program, of which PLN 20 billion (approx. EUR 4.6 billion) are intended for works related to the accessibility of transport, while PLN 900 million (approx. EUR 200 million) are allocated to services, including also barrier-free tourism and recreation. Within the support framework for services, it is planned to improve the accessibility of recreation areas, e.g., beaches and waterside areas, green areas such as parks and gardens, outdoor gyms and inclusive playgrounds, forest parking lots, and tourist attractions there or in their vicinity. Moreover, it is also planned to implement adaptive actions in tourist infrastructure (accommodation, trails, rental of specialist equipment for people with disabilities) and to improve the accessibility of tourist facilities and services (including, e.g., infrastructure of tourist hostels, resorts, and sanatoria, educational facilities of the State Forests or national parks, educational trails/nature trails, and tourist trails). The following results of work related to services are expected in Poland: providing a minimum of 100 km of tourist trails for people with disabilities, a minimum of 10 mountain shelters accessible for people with disabilities, 100 barrier-free cultural objects, as well as the creation of a system improving individual mobility for people with disabilities.

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