Physical Activity and Its Determinants Among Senior Residents of Podlasie, A Green Region of Poland, Based on the National PolSenior Study

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Research

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Abstract

Background: Physical activity (PA) is essential at all stages of life, and particularly so in the later years. The aim of the present work was to evaluate the PA of seniors, aged 65 years and older, living in the area of the Podlaskie voivodeship (Podlasie), Poland.

Methods: The study was performed as part of the national PolSenior project, whose aim was to evaluate various aspects of aging in Poland. The physical activity of a group of 186 randomly-selected people aged 65 years and above, 94 men and 92 women, was evaluated by questionnaire. The analysis included participants who took part in physical activity at least several times a week.

Results: Although all participants reported a decline in PA with age, the men remained physically active for longer. Among the respondents, 68.3% of women and 62.7% of men took short walks around the house as the main form of exercise, with working on the allotment or garden being another frequent activity; however, this was more common among men (53.9%) than women (34.7%). In addition, men were nearly twice as likely to take part in cycling (31.5%) than women (13.1%). The greatest motivation for physical activity given by the respondents was health, as noted by 73.8% of the men and 77.7% of the women.

Conclusion: The physical activity (PA) of seniors in Podlasie is unsatisfactory and does not fulfill the WHO recommendations regarding the prophylaxis and prevention of chronic illness. This level does not, however, significantly differ from that reported in the nationwide PolSenior study or in other European countries in the Eurobarometer study. The decline in PA with age highlights the need for its greater promotion among seniors by local authorities. Such initiatives will help maintain the physical fitness and independence of this age group and contribute to a greater quality of life.

Background

As in other countries, with varied societies and economies, both in Europe and beyond, physical activity (PA) remains at an unsatisfactory level among seniors in Poland. A study of participation in recreational activity and sport by the Polish Central Statistical Office (GUS) in 2008 found that 79.3% of the population aged 60 years and above was not physically active. The situation was little better in younger age groups: it was found that 73.4% of those aged 50–59 years were inactive, as well as 67.5% of those aged 40–49 years, and more than half of those (59.6%) aged 30–39 years [1]. Older people, aged over 65 years, were the least physically active of all the groups [2–3].

Participation in Leisure Time Physical Activity (LPTA) is influenced by a range of socio-demographic, personal, behavioral, and psychological factors, as well as various environmental influences [4–7]. In addition, a literature analysis suggests that age, sex, education, occupation and place of residence can also play a role. LPTA is more often engaged in by people with higher education, those living in large cities, and those working professionally, i.e. without the need for physical effort [8–15]. Such sociodemographic determinants should be taken into consideration by local government when forming physical activity policies aimed at including seniors.

It should be remembered that PA is necessary for the proper development and functioning of a person at all stages of life, particularly during old age. A low level of PA leads to a fall in physical fitness to below norms. It is accepted that physical fitness gradually decreases with age during adulthood [16]; however, physically-active people can maintain their physical fitness level within the age norm by undertaking regular activity at a level above their daily functional needs. Despite this, a decline in physical fitness above the norm, usually occurring in inactive people, can lead to the elderly experiencing great difficulties in coping with utilitarian domestic and self-care activities; this can hamper their
own ability to meet their needs and incur greater state expenditure on medical care and social assistance. For seniors, maintaining an appropriate level of physical fitness allows them to retain their independence and the possibility of self-fulfilment.

As they age, those who do not take part in regular physical activity demonstrate a greater decline in physical fitness than those who participate in regular physical activity at a higher level than normal daily activities. They also demonstrate a decline in physical efficiency, which is one of the features of the body’s motor skills, which reflects the ability of the human body to undertake long-term physical efforts without signs of rapidly increasing fatigue. Sedentary people demonstrate a faster rate of decline in physical capacity with age, amounting to about 10% per decade of life, compared to around 5% in the case of very physically-active people [17–18].

A similar trend can be seen for muscle mass, and hence muscle strength. It has been found that in 80-year-olds typically demonstrate 30–50% less muscle mass than 40-year-olds. [19–20]. This decline in muscle strength, particularly in the elderly, can also contribute to a loss of independence [21–22]. One reason for the decline in exercise capacity with age is, apart from chronic diseases, a sedentary lifestyle [23–24].

Although skeletal muscle mass accounts for about 45% of the body weight in young people, it decreases to about 27% in those over 70 years of age [25]. This decline in strength is also typically accompanied by a decrease in flexibility, as well as physical endurance, which determines exercise capacity. Agility and motor coordination also deteriorate. Regular PA may slow the loss of muscle strength, thus improving functional performance and reducing the risk of falls in the elderly [26–28].

The beneficial effects of regular PA among the elderly are manifested as reductions in the risk of premature death, coronary artery disease, stroke and arterial hypertension, as well as type II diabetes, metabolic syndrome, colon and breast cancer [29]. Systematic exercise also reduces body weight, improves cardiovascular, muscular and cognitive performance, and reduces the risk of depression [30–31].

The 2020 WHO guidelines indicate that PA plays an important role in the prevention of chronic diseases; however, people over 65 and those with disabilities or chronic diseases should be careful and consult a doctor before exercising. In the elderly, PA helps to maintain good bone health and overall body function. As part of their weekly physical activity, older people should engage in a variety of multi-component physical exercises emphasizing balance, and in strength training of moderate or greater intensity. These exercises should be performed three or more days a week to increase exercise capacity and prevent falls. The 2020 WHO guidelines, updating those issued in 2010, should be implemented into national health policies in line with the WHO Global Action Plan on Physical Activity 2018–2030 [30].

Podlasie, currently the Podlaskie voivodeship, is one of the green regions of Poland, with a forest cover of 30.9%: the mean afforestation for the whole of Poland being 30.34%. It is situated in the north-eastern part of the country, located at the geographical center of Europe. It is the voivodeship with the largest number of national parks, with four in the area: Białowieża National Park, Biebrza National Park, Narew National Park and Wigry National Park. This is far higher than the average for Poland, being 1.43 per voivodship [32]. Podlasie is also interesting because of its international neighbourhood: its position in the north-eastern corner of Poland borders ex-Soviet Belarus to the east, and Lithuania, a European Union member, to the north-east.

In 2011, the population of the voivodeship aged 65 and above comprised over 176,000 people: 108 thousand women and 67 thousand men. More than half of the women aged 65 and above (53%) live in cities, and 47% in villages; in
turn, 51% of men live in cities, and 49% in rural areas. Life expectancy in the voivodeship is 82.7 years for women and 73.9 years for men [31].

The aim of the study was to evaluate engagement in LTPA and investigate its determinants among seniors aged 65 and above living in Podlasie, based on the results of the nationwide PolSenior project. It also aims to formulate recommendations for health policies implemented by both national and local government. In the presented work, particular attention is paid to the formulation of health policy aimed at seniors living in the Podlaskie voivodeship, which is shaped by local government. However, to formulate effective programs for increasing participation in PA in any social groups, it is first necessary to know its determinants [33].

Material And Methods

The data presented in this study PolSenior project, whose aim was to assess various aspects of aging among people in Poland, including the health, social and economic situation of seniors over 65 years of age. PolSenior is the first multidisciplinary and multifaceted research project of such size to be performed on aging in Poland.

The project was coordinated by the International Institute of Molecular and Cell Biology in Warsaw. The ethical consent for the research was given by the Bioethics Committee at the Medical University of Silesia in Katowice. The participants for the nationwide study were selected randomly in a three-stage, tiered scheme; all participants received a clinical examination and demographic survey [34–35].

The selection scheme was performed as a three-stage draw to obtain a nationwide, representative group of respondents. In the first stage, random locations (districts) were chosen throughout the country. In the second stage, in the selected districts, streets were selected in the urban districts and urban-rural districts, or villages in the more rural parts. The urban areas of the centers were divided into five groups depending on the number of inhabitants: up to 20,000 inhabitants; from 20,001 to 50,000 inhabitants; from 50,001 to 200,000 inhabitants; from 20,0001 to 500,000 inhabitants; over 500,000 inhabitants. Finally, in the third stage, specific respondents were selected at random from the streets and villages in stage two; this was performed by the Ministry of the Interior and Administration on the basis of PESEL number: this being a unique number for each Polish citizen with an ID card [34–35].

In total, 5695 respondents took part in the PolSenior survey. Of these, 5516 respondents received a medical examination performed by an appropriately-trained nurse [34–35] and a social interview; this number constituted 35% of the randomly-selected addresses. By far the most common reason for non-participation was refusal to participate by the recipient (32% of all addresses) or by those living with them (6%). In total, the survey could not be completed at 49% (7681) of the valid randomly-selected addresses, and a further 14% of the addresses were invalid, i.e. the randomly-selected person could not be found, due to death, moving or absence for the duration of the study. In the Podlaskie voivodeship, the sample implementation effectiveness index, i.e. the relationship between the number of addresses where the survey was conducted to the number of all correct addresses, was 53%, compared to 42.58% for the nationwide sample [36].

Our findings present the physical activity of the inhabitants of Podlasie, the “green” region of Poland, broken down by age, sex, size of place of residence and socio-professional group. The respondents were asked about the level and form of their physical activity as part of moderate leisure time physical activity (LTPA) in the last 12 months; they were also asked about the frequency of their participation in LTPA and their motivation for taking part. The survey addressed the following points:
- What form of activity do the surveyed seniors take part in?
- Are there any differences in physical activity, and if so, do they depend on sex, age, socio-economic position and place of residence (size of city)?
- Why do the surveyed seniors undertake physical activity?

In this particular voivodeship, a total of 186 elderly people aged 65 and above were examined: 94 men and 92 women. To be eligible for inclusion in the study, the participants had to take part in LTPA several times a week or more. Of these, 178 people, 89 men and 89 women, reported having a professional occupation; no data was available for five men and three women. The results were analyzed with regard to age group, divided into 65–74 years, 75–84 years and over 85 years, as well as the type of place of residence and the professional status of the respondents. The numbers of the respondents in each of these divisions are presented in Table 1.

The mean life expectancy in Podlasie in 2011 was representative of the rest of the country, i.e. 73.3 years for men and 81.8 years for women, compared to 72.4 years for men and 80.9 years for women in Poland as a whole. High male mortality can also be seen both in the Podlaskie voivodeship and throughout Poland. In the analyzed year, the life expectancy of men and women in Podlasie differed by 8.5 years, both nationwide and in Podlasie. Compared to the beginning of the 1990s, the life expectancy of men had increased by 6.2 years and that of women by 5.0 years in Podlasie, and by 6.2 and 5.7 years, respectively, nationwide [37].

The relationships between two of the studied nominal variables (age, sex, size of the place of residence, socio-occupational status) were evaluated using the chi-square test of independence, with a significance level of $p = 0.05$. 

## Results

Our results indicate that participation in long walks and hikes lasting a number of hours, gymnastics, cycling, working on an allotment or in the garden decreases with age (Table 1). Among women aged 75–84 and 85 and older, no participation in long walks was recorded. A visible trend of decreasing participation in physical activity with age was also observed among men, but it did not fall below 4% in those aged 85 and above. The exception are short walks around the house, where participation by men remains greater than 60%, regardless of age.

Although gymnastics is a form of LTPA with a high pro-health value, participation was lower than in other physical activities, such as short walks around the house, longer walks near the place of residence, cycling or working on the allotment or in the garden. Women reported slightly higher participation in gymnastics (15.2%) than men (12.1%).

Greater participation in physical activity, with the exception of cycling, was observed in towns with a population of over 20 000 than in those below 20 000 residents.

In general, former blue-collar workers have lower participation in physical activity than former white-collar and non-manual workers. The exception, however, is taking part in short walks around the house. Here, physical laborers demonstrate slightly higher participation (64.2%) compared to white-collar workers who do not typically undertake manual work (62.7%). In contrast, white-collar workers are more likely to take part in short walks (82%) than female blue-collar workers (53.7%; $X^2 = 5.73; \text{df} = 1; \ p < 0.05$).
The most commonly-cited reason for engaging in PA, regardless of age, sex, place of residence or socio-professional status, was health (Table 2), being given by 73.8% of men and 77.7% of women. Health was regarded as an important motivation for nearly 75% of respondents from towns of up to 20,000 inhabitants and manual laborers, as well as over 75% of respondents from towns with over 20,000 residents and white collar workers.

The next most frequent motivations for undertaking physical activity declared by the respondents were “to relax” and “to pass the time”. The former was declared by 25.2% of men and 31.7% of women, and the latter by 31.7% of men
and 28.7% of women. Only fewer than 20% of men and 5% of women, a significant difference (X² = 7.35; df = 1; p < 0.05), reported undertaking physical activity “on doctor’s advice”.

Table 2 Reasons for taking up physical activity (LTPA) by the respondents with regard to age, sex, place of residence and socio-professional status [in %]

| Factor                  | Categories | Sex     | “for health reasons” [%] | “to relax” [%] | “to kill time” [%] | “Out of habit - I exercised when I was young” [%] | “On doctor’s advice” [%] |
|-------------------------|------------|---------|--------------------------|----------------|-------------------|------------------------------------------------|-------------------------|
| Age [years]             | 65-74      | Male    | 66.3*                    | 18.1*          | 34.9              | 24.8                                          | 20.1                    |
|                         |            | Female  | 90.8                     | 27.0           | 18.9              | 25.0                                          | 7.9                     |
|                         | 75-84      | Male    | 100.0*                   | 49.7           | 23.5*             | 9.6                                           | 12.5                    |
|                         |            | Female  | 50.6                     | 43.5           | 52.8              | 11.8                                          | 0.0                     |
|                         | > 85       | Male    | 72.3                     | 25.3           | 21.8              | 24.0*                                         | 7.8                     |
|                         |            | Female  | 52.0                     | 29.7           | 26.7              | 0.0                                           | 0.0                     |
|                         | **Total**  | Male    | 73.8                     | 25.2           | 31.7              | 21.5                                          | 17.7*                   |
|                         |            | Female  | 77.7                     | 31.7           | 28.7              | 20.1                                          | 5.3                     |
| Size of place of residence [number of residents] | < 20 000 | Male    | 67.1                     | 38.6           | 31.8              | 12.6                                          | 18.6                    |
|                         |            | Female  | 76.5                     | 45.9           | 48.6              | 21.5                                          | 8.6                     |
|                         | **Total**  |         | 72.5                     | 42.8           | 41.5              | 17.7                                          | 12.8                    |
|                         | > 20 000   | Male    | 84.0                     | 4.6*           | 31.6              | 35.3                                          | 16.5*                   |
|                         |            | Female  | 78.5                     | 21.3           | 14.1              | 19.1                                          | 2.9                     |
|                         | **Total**  |         | 79.9                     | 17.0           | 18.6              | 23.2                                          | 6.4                     |
| Professional/social status | manual labourer, farmer | Male    | 64.9                     | 26.1           | 36.2              | 18.9*                                         | 19.5                    |
|                         |            | Female  | 77.9                     | 39.1           | 37.4              | 4.6                                           | 7.7                     |
|                         | **Total**  |         | 72.2                     | 33.4           | 36.9              | 10.9                                          | 12.9                    |
|                         | white collar worker | Male    | 97.7                     | 23.3           | 20.1              | 28.1                                          | 13.3                    |
|                         |            | Female  | 84.2                     | 26.4           | 17.6              | 35.5                                          | 3.3                     |
|                         | **Total**  |         | 78.9                     | 25.8           | 18.1              | 33.9                                          | 5.4                     |

Legend: * -statistically significant difference; p<0.05

Discussion

The level of LTPA reported by seniors aged 65 and over from the Podlaskie Voivodeship is insufficient, and does not fulfil the WHO recommendations regarding the prophylaxis and prevention of chronic diseases [38]. This negative situation is also typical of other voivodships in Poland, including Wielkopolskie, Pomorskie and Małopolskie [39–40].
Furthermore, low levels of physical activity (PA) have also been reported by seniors throughout Poland [1, 42–43], as well as in other European Union countries [44–46].

Furthermore, the participants indicate decreasing participation with age. This trend can be attributed to the natural aging process. Older age groups are more prone to disability and fewer people can participate in physical activity. However, men tend to remain physically active longer, a trend that can be seen in all age groups. These results are consistent with those of Eurobarometer study of physical activity among Europeans [44–46], and the Polish Central Statistical Office (GUS) [1, 42–43].

Our finding that long walks are the dominant form of activity among seniors is consistent with the results of previous studies obtained for the Małopolskie, Wielkopolskie, Dolnośląskie and Pomorskie voivodeships [39–41], and in the PolSenior study for the whole of Poland [47–48]. Walking is the most common form of physical activity among older people. It is recommended for all age groups [48–49].

Considering that the Podlaskie voivodeship is a “green” region of Poland, with an above average afforestation compared to Poland as a whole, it is possible that participation in long walks may be associated with the forest cover of a given voivodeship: in greener areas, the residents can easily reach a natural area, or forests and parks with tree stands. A similar trend was observed in older men living in towns with more than 20 000 inhabitants in the Podlaskie, Dolnośląskie and Małopolskie voivodeships. In the Podlaskie Voivodeship, which is 30.9% afforested, 20.4% of older men report taking part in long walks, while in the Dolnośląskie Voivodeship, which is 29.8% afforested, 16.5% take part in long walks, and in the Małopolskie voivodeship, 28.7% afforested, 11.1% of men take part in long walks [40–41, 52]. These findings strongly suggest that among older men, participation in long walks increases with an increase in forest cover.

Otherwise, compared to the PolSenior findings [47–49], the seniors from Podlasie indicate similar levels of participation in other forms of LTPA, e.g. cycling or gymnastics, and a large number report working on the allotment or garden.

The observation that greater physical activity was observed among city dwellers than residents of small towns is also generally confirmed in the GUS study [1, 42–43], with cycling being the exception. This difference may result from differences in the role played by a bicycle between villages, small towns and larger towns. In smaller towns, bicycles are more often used for short-distance transport, rather than a piece of equipment for LTPA, as is the tendency in larger towns [48].

In addition, higher levels of LTPA were reported by white collar workers than manual laborers, similarly to the national PolSenior findings [53–54].

Similarly to the seniors from Podlasie, health was also found to be the predominant motivation for LTPA in the Eurobarometer [44–46] and GUS studies [1, 42–43], as well as various others [47–48, 55–56]. Interestingly, our observation that seniors rarely undertake physical activity at the advice of a doctor has also been confirmed in previous studies [39–41]. Medical doctors should recommend physical activity more often to the elderly in order to consolidate their belief that physical activity is an essential part of a healthy human lifestyle and an important component in providing support to seniors. The positive role played by the physician as a specific authority in recommending, recommending and promoting PA has been highlighted previously [57]. In Poland, doctors tend to be highly regarded in society. As such, their recommendation that PA is an important component of a healthy lifestyle may serve to reverse the undesirable tendency toward a low participation in PA observed in Polish society.
Of course, among experts, professionals and researchers, physical activity is regarded as an essential part of a healthy lifestyle. They recommend that it should be undertaken regularly, at all stages of human development. It should be emphasized that, in accordance with the latest WHO recommendations, the greater recognition of the importance of PA has required the reshaping of the 2009 Human Nutrition Pyramid. In 2016, this was developed into the Pyramid of Healthy Nutrition and Physical Activity, with PA at its base; hence, it should be undertaken regularly, preferably for a minimum of 30–45 minutes a day. The changes described above reflect progress in medical science, and take into account both recent scientific findings and the recommendations of recognized global expert centers [58].

As the level of PA is known to decline among seniors, it is extremely important to promote its value among this group. Other studies show that regular PA, also undertaken in “old age”, has a positive effect on the quality of human life [59], extends life expectancy [60] and contributes to a reduction in the risk of premature death in the elderly [61].

The issue of senior participation in PA is of particular interest to the local authorities in Podlasie; it formed part of the Program for the elderly in Podlaskie voivodeship for the years 2016–2020, which was based on the Social Policy Strategy of the Podlaskie voivodeship until 2020. The health component of the Program makes specific reference to the weak social situation of seniors from Podlasie, which is related to, inter alia, their low participation in PA. The Program details activities intended to increase the awareness of seniors and their families about the role of PA in supporting human health, as well as initiatives involving preventive health care based on promoting PA [62].

Conclusions

PA is known to have a significant influence on human health, and LTPA has been found to play a significant role in the prevention of chronic and civilization disease. The level of LTPA reported by seniors aged 65 and over from the Podlaskie Voivodeship is insufficient, and does not fulfil the WHO recommendations regarding the prophylaxis and prevention of chronic diseases. In view of the low level of PA reported by seniors from Podlasie, as well as its decline with age, it seems advisable for local authorities to not only to promote PA for this age group but also to organize various forms of LTPA for seniors. Such an initiative will not only be beneficial for maintaining the physical fitness and health of seniors, it will also ensure their independence, and improve the comfort and quality of their lives. There should be a greater effort by local authorities, doctors and experts to promote forms of LTPA that can be performed daily, and independently at home by seniors, such as gymnastics, with the aim of improving health.

By involving successive groups of older people in regular AF, their physical fitness and health can be improved. Such activity can slow the disability that progresses with age, thus reducing the burden on state healthcare caused by expenditure on social and medical care for the elderly.

Abbreviations

PA: Physical activity; LTPA: leisure time physical activity; WHO: World Health Organization; GUS: Polish Central Statistical Office

Declarations

Ethics approval and consent to participate

Not applicable.
Consent for publication

Not applicable.

Availability of data and materials

All data generated or analysed during this study are included in this published article.

Competing interests

The authors declare that they have no competing interests.

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Authors’ contributions

Conceptualization: RR, KR, GK. Methodology: RR, MK. Software: RR, MK. Validation: RR, MK, G.K. Formal analysis: RR. Investigation: RR. Resources: MK. Data curation: KK, JH. Writing—original draft preparation: RR. Writing—review and editing: GK. Visualization: KK, MK, J.H. Supervision: MK. Project administration: RR, MK. Funding acquisition: RR, MK. All authors have read and agreed to the published version of the manuscript.

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