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Physical Culture and Sport. Studies and Research, 2023, 101, 63–76
DOI: 10.2478/pcssr-2023-0025

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Participation and Reasons for Non-participation in Sport and Recreational Activities Before and After the Outbreak of COVID-19: Analysis of Data From the 2016 and 2021 Poland National Sports Participation Survey

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Authors' contribution:
A) conception and design of the study
B) acquisition of data
C) analysis and interpretation of data
D) manuscript preparation
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Received: 10.06.2023
Accepted: 13.09.2023

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Abstract

The ongoing study of factors that hinder physical activity (PA) supports the adaptation of intervention strategies to changing conditions and the creation of a more conducive environment for active lifestyles. The aim of the study was to analyze the barriers to Polish participation in sports and recreational activities (SRA) before and after the pandemic. Face-to-face interviews were conducted twice with a representative sample of Poles (in 2016 N=12183 household members, in 2021 N=8351). Descriptive statistical analysis was conducted using frequency and relative frequency (%). A Chi-square test of independence was used to analyze relationships between perceived barriers of non-participation in sports or physical recreation in 2016 and 2021 and the gender and age of respondents. In 2021, 38.8% (36.7% of women and 41.0% of men) declared participation in SRA (regularly or occasionally), with a 7.6 % point decrease in the number of those active compared to 2016. 20.6% of respondents participated in sports and recreation regularly in 2021. Compared to 2016, (21.7%) the difference was not statistically significant. Men declared regular participation more often than women (23.1% vs. 18.1% – 2021). Four main barriers were identified: (1) lack of free time – especially among 30 to 39-year-olds, 40 to 49-year-olds and men; (2) lack of interest, willingness or preference for passive leisure activities – especially among 15 to 19-year-olds; (3) having a medical condition and doctor's contraindications – among 50 to 59-year-olds and 60 and older; and (4) age – especially among 60-year-olds.

These barriers have not been overcome over time, and persisted or even gained in importance during the COVID-19 pandemic in addition to medical condition and doctor's contraindications. We therefore turn our attention to eliminating these barriers, taking into account their importance in specific populations. It is essential to motivate people to overcome internal barriers through social support, health care, and government actions.

Keywords: sport and recreational activities, barriers, COVID-19, Poland

Introduction

The COVID-19 pandemic affected the physical activity (PA) of people around the world, which has had detrimental consequences for the individual and the economy. Various barriers hindered people from taking up sport or recreational activities (SRA) both before and after the pandemic. Before the pandemic, one of the biggest constraints was lack of time (due to busy lifestyles, work or school) (Koh et al., 2022). Other barriers included lack of motivation, high costs of sports club memberships, lack of accessibility to gyms or other sports facilities

(CDCP, 2022), and concerns about injury and illness (Huebschmann et al., 2011).

The pandemic has disrupted daily routines and further increased barriers to PA. The closure of gyms and sports clubs, limited access to parks and outdoor recreation areas, the need for social distance (Chen et al., 2020; Sallis et al., 2021), and increased demands on time and resources (Chirico et al., 2020) caused many people to stop exercising. One of the biggest problems was lack of motivation, reluctance to exercise at home, and limited space and equipment (Farah et al., 2021; López-Bueno et al., 2020; Marashi et al., 2021). Not insignificant was the fear of contracting a virus (Roche et al., 2022), the lack of an exercise partner (Farah et al., 2021), and, of course, the lack of accessibility to outdoor sports venues (Honey-Roses et al., 2020). These barriers were particularly acute for those with limited opportunities to leave the house or difficult access to sports and recreation facilities, or for those less likely to benefit from healthy lifestyle information. Most affected were the elderly (Schmidt & Pawlowski, 2020; Strain et al., 2022; Wang et al., 2020), those with disabilities (Assaloni et al., 2020; Carvalho et al., 2021; Roberts-Lewis et al., 2021), those with low levels of education and low economic status (Boer el.al., 2021), and those from marginalized communities (James, 2020). The COVID-19 pandemic also influenced an increase in the number of people experiencing stress, anxiety and depression, resulting in less inclination (Ammar et al., 2020; Meyer et al., 2020) or lack of motivation to take up PA (Farah et al., 2021). Increased caregiving burdens (Roche et al., 2022) and household responsibilities during the pandemic resulted in a lack of time and motivation to participate in PA, particularly among women (Nienhuis & Lesser, 2020).

The COVID-19 pandemic highlighted existing differences in PA levels in different populations (Boer et al., 2021; Do et al., 2022; Roche et al., 2022) and contributed to the reduction of PA in people worldwide (Ammar et al., 2020; Duncan et al., 2020; Meyer et al., 2020; Rhodes et al., 2020; Stockwell et al., 2021), including Poland (Górnicka et al., 2020). According to a report by the National Institute of Public Health – National Institute of Hygiene (NIZP-PZH) (Wojtyniak & Goryński, 2020) in 2020, 70% of Poles and 64% of Polish women were not physically active at all, and 39% of men and 30% of women had decreased their PA. The largest decrease in activity during the COVID-19 pandemic occurred in the 20–44 year old group (63% of Poles and 60% of Polish women).

Barriers to undertaking PA before and after the COVID-19 pandemic vary according to each person's socioeconomic situation and individual circumstances. This study aims to analyze the most common reasons for Poles' non-participation in sports and physical recreation before (2016) and after the pandemic (2021), through the lens of their gender and age. Permanent study of the factors that hinder their participation in PA supports the adaptation of corrective strategies to changing conditions and the creation of a more favorable environment for an active lifestyle. It also makes it possible to identify which activities are effective and which need to be changed.

Material and Methods

Data Collection

The paper is based on data retrieved from two large-scale surveys used to collect information on participation in sport and recreational activities (GUS, 2017, 2022). All surveys were conducted by order of Statistics Poland – a government executive agency – and are available in an open database (https://stat.gov.pl/obszary-tematyczne/kultura-turystyka-sport/sport).

A two-stage stratified random sampling scheme was used. The basis of the first-stage unit draw operator was the list of districts developed for the National Census. The 2nd-stage sampling frame consisted of lists of housing units in the drawn 783 districts, developed based on the National Official Register of the Territorial Division of the Country (TERYT). The results of the survey were outweighed by data on the structure of households by number of persons in the household (six size groups) and place of residence (urban or rural) from the 2011 National Population and Housing Census. In order to obtain as many responses as possible, it was made possible to interview a surrogate person, i.e., a member of the household with full information about the person who is absent or otherwise unable to give an interview. In the case of children 10 years old and younger, the interview was conducted with the child's parents or guardians.

Participants

Face-to-face interviews were conducted with a representative sample of Polish households and their members in October 2016. (N=4653 households, N=12183 members of surveyed households) and October 2021. (N=3991 households, N=8351 members of surveyed households). The survey applies to individuals who were at least 5 years old at the time of the interview. The specifications of the survey are shown in Table 1.

Materials

The research tools were the questionnaires "Participation in sports and physical recreation – household questionnaire DS-52G" and "Participation in sports and physical recreation – individual questionnaire DS-52I" developed by the Statistics Poland. They included questions on the frequency of household members' participation in SRA, motives for engaging in this activity and

Table 1. Specification of research on participation in sports and physical recreation in 2016 and 2021.

Specification	2016	2021
Period of participation in sports and recreation covered by the survey	01.10.2015-30.09.2016	01.10.2020-30.09.2021
Number of households surveyed	4478	4339
Including the number of refusals	175	348
Percentage of responses (%)	96.2	92.0
Number of surveyed household members	12405	9790
Including number of refusals	175	1439
Percentage of responses (%)	98.2%	85.3
Including number of alternate respondents	3972	3800

sports skills possessed. They also collected information on households' provision of sports and recreational equipment, expenses incurred for this equipment and expenses related to participation in the activity itself. Participation in sports was understood as systematic training at sports clubs or other organizers (also in the form of sports camps, in organized groups or individually) based on prescribed training plans (GUS, 2017, 2022). Participation in physical recreation meant undertaking PA at different frequencies and in different forms (both individually, with colleagues, and in organized groups), depending on the specific form of exercise, the time available, or the ability to use sports equipment.

In view of the purpose of the study, this article analyzed only the responses regarding the frequency of taking up SRA (among those who are referred to as active in the rest of the paper) and the barriers to this activity (which make it difficult or impossible for inactive people to participate). Participation was analyzed on a regular basis (1–2 times a week) and overall, i.e. regularly or occasionally (regularly but with low frequency, such as once a month on average) in the last year.

The survey was conducted using the same questionnaires in two waves: wave I (2016) and wave II (2021). Due to the implementation of wave II of the survey during the COVID-19 pandemic, the frequency of participation in sports or physical recreation was analyzed in general, i.e. throughout 2021, as well as excluding the periods of COVID-19 pandemic restrictions (first lockdown in Poland 25.03-19.04.2020; second – 23.10–17.01.2021; third – 27.03–09.04.2021 (Politykazdrowotna.com, 2021; Wojtyniak & Goryński, 2022; ZPP, 2021). In addition, further reasons were added to the response cafeteria regarding barriers to SRA: restrictions related to the COVID-19 pandemic and fear of COVID-19 infection.

Statistical Analysis

The data were analysed in an Excel worksheet. Descriptive statistical analysis was conducted using frequency and relative frequency (%). A Chi-square (Chi^2) test of independence was used to analyse relationships between perceived barriers of non-participation in SRA in 2016 and 2021 and the gender and age of the respondents. The level of significance was set at 0.05

Results

In 2021, participation in SRA (overall, i.e., regularly or occasionally) was declared by 38.8% of people (36.7% of women and 41.0% of men – Chi^2=53.83; p<0.001), which represents a decrease in the number of physically active people by 7.6 percentage points compared to 2016 (Chi^2=116.65; p<0.001). On a regular basis, 20.6% of those surveyed in 2021 were engaging in such activity (regardless of the periods of COVID-19 pandemic restrictions). Compared to 2016 (21.7%), this difference was not statistically significant (Chi^2=1.54; p=0.21). Men declared regular participation more often than women (23.1% vs. 18.1% – 2021; Chi^2=9.99; p<0.01). Outside periods of COVID-19 pandemic restrictions, 8.5% of men and 7.0% of women exercised regularly (Chi^2=2.27; p=0.13).

As in the first wave of the survey, children and adolescents were the most physically active in the second wave, although a decline in their participation in SRA was generally evident. The percentage of those active in the 5–9 age group (regardless of frequency of participation) was 70.9% (2016) and 68.0% (2021; Chi^2=1.08; p=0.29); in the 10–14 age group – 82.2% and 69.3%, respectively (Chi^2=24.94; p<0.001); and in the 15–19 age group – 71.2% and 65.4%, respectively (Chi^2=4.01; p<0.05). Looking at the declarations of all respondents, participation in SRA decreased with age. Among 20 to 29-year-olds, the percentage active in this regard was in 59.3% in 2016 and 47.2% in 2021 (Chi^2=96.26; p<0.001); among 30 to 49-year-olds - 53.4% and 44.8%, respectively (Chi^2=47.25; p<0.001); and among 50 to 69-year-olds only about 30% (35.2% and 28.1%, respectively; Chi^2=16.94; p<0.001).

People aged 60 and older were the least likely to participate in sports or physical recreation (25.1% in 2016, 18.3% in 2021 (Chi^2=38.2; p<0.001).

Analysis of the most important factors hindering or preventing SRA showed that in 2021, as in 2016, the most serious barrier (for about 30% of respondents) was lack of free time (in 2021 – 29.9%, in 2016 – 30.3%; Chi^2=0.23; p=0.63) (Figure 1). This applied more often to men (2021 – 33.3%; 2016 – 34.7%; Chi^2=1.07; p=0.3) than to women (2021 – 26.9%; 2016 – 26.4%; Chi^2=0.21; p=0.64). The age of the respondents differentiated the occurrence of this barrier (Table 2). It was most frequently indicated by 30 to 39-year-olds (2016 – 58.0%; 2021 – 58.1%) and 40 to 49-year-olds (2016 and 2021 – 48.7%;). In 2021, the percentage reporting such a reason for inactivity (in addition to those aged 50–65) significantly decreased relative to 2016. Thus, in the group of 15 to 19-year-olds, it was 12.8% in 2021, and 24.5% in 2016 (Chi^2=6.8; p<0.01); in the group of 20 to 29-year-olds – 36.4% and 45.0%, respectively (Chi^2=9.24; p<0.01); while in the group of 50 to 59-year-olds it significantly increased (2016 – 33.7%; 2021 – 42.1% (Chi^2=13.71; p<0.001).

The second major barrier was a lack of interest or willingness, or a preference for passive leisure activities. In 2021, this barrier was significantly more frequently declared (22.9%; Chi^2=25.1; p<0.001) than in 2016 (19.1%; Figure 1). At the same time, it was indicated by both men – 23.2% and women – 22.7% (Chi^2=0.15; p=0.69). In 2016, these percentages were 19.9% and 18.4%, respectively (Chi^2=2.44; p=0.12; Table 2). In 2021, it was the main obstacle to taking up SRA among 15 to 19-year-olds (39.3%). It should be mentioned that those inactive for this reason in 2016 (in this age group) were far fewer – 28.4% (Chi^2=4.43; p<0.05).

In 2016, 18.2% of respondents did not engage in SRA due to a medical condition and doctor's advice. Meanwhile, in 2021, there were fewer such individuals – 10.8% (Chi^2=123.25; p<0.001; Figure 1). Moreover, while in 2016 men (17.4%) were less likely to report this reason than women (19.0%; Chi^2=2.85; p=0.09), in 2021 these percentages hardly differed (10.6% and 10.9%, respectively; Chi^2=0.12; p=0.73) (Table 2). Those aged 50–59 and over 60 were significantly more likely to report this barrier compared to other age groups – both in 2016 (20.4% and 32.4%, respectively) and 2021 (11.3% and 17.9%, respectively), although in 2021, in both groups compared to 2016, the percentage declaring this barrier significantly decreased (Chi^2=26.98; p<0.001 and (Chi^2=110,92; p<0,001).

The age of respondents was an equally significant obstacle. It was indicated by 17.1% in 2021 and 13.7% in 2016 (Chi^2=25.63; p<0.001) (Figure 1). At the same time, in 2021, women (19.6%) were more likely (Chi^2=25.15; p<0.001) than men (14.2%) to declare it as a reason for inactivity (Table 2). The same was true for people over 60, who indicated it significantly more often (than other age groups). It should be mentioned that in 2016 the percentage of those aged 60 and over who were inactive due to age was 36.4%, while in 2021 it significantly increased to 44.4% (Chi^2=26.97; p<0.001).

As a result of COVID-19, pandemic-related restrictions (4.2%) and fear of COVID-19 infection (1.2%; Figure 1) were added to the factors hindering or preventing participation in SRA. However, respondents cited these barriers significantly less frequently than those discussed earlier did. In the latter two cases, gender was not a differentiating factor (Table 2). That is, among men, restrictions related to the pandemic hindered or prevented participation in SRA for 4.0% of them, and fear of COVID-19 infection for 1.2% of them. Among women, the percentages were slightly higher – 4.5% and 1.3%, respectively.

Fear of being infected as a result of the pandemic was indicated significantly more often (compared to other age groups) by the youngest people, i.e. those aged 5–9 (20.6%) and 10–14 (22.2%). Overall, the fraction of those inactive for this reason ranged from 1.8% among those over 60 to 7.8% among 20–29 year olds. In contrast, fear of COVID-19 infection was a significantly more common barrier (compared to other age groups); among children, aged 5–9 (2.5%) and adolescents aged 10–14 (3.4%) and 15–19 (2.8%).

Other barriers, such as fatigue, lack of activity provider or suitable facilities close to place of residence, financial reasons, and lack of company concerned respondents much less frequently (Figure 1).

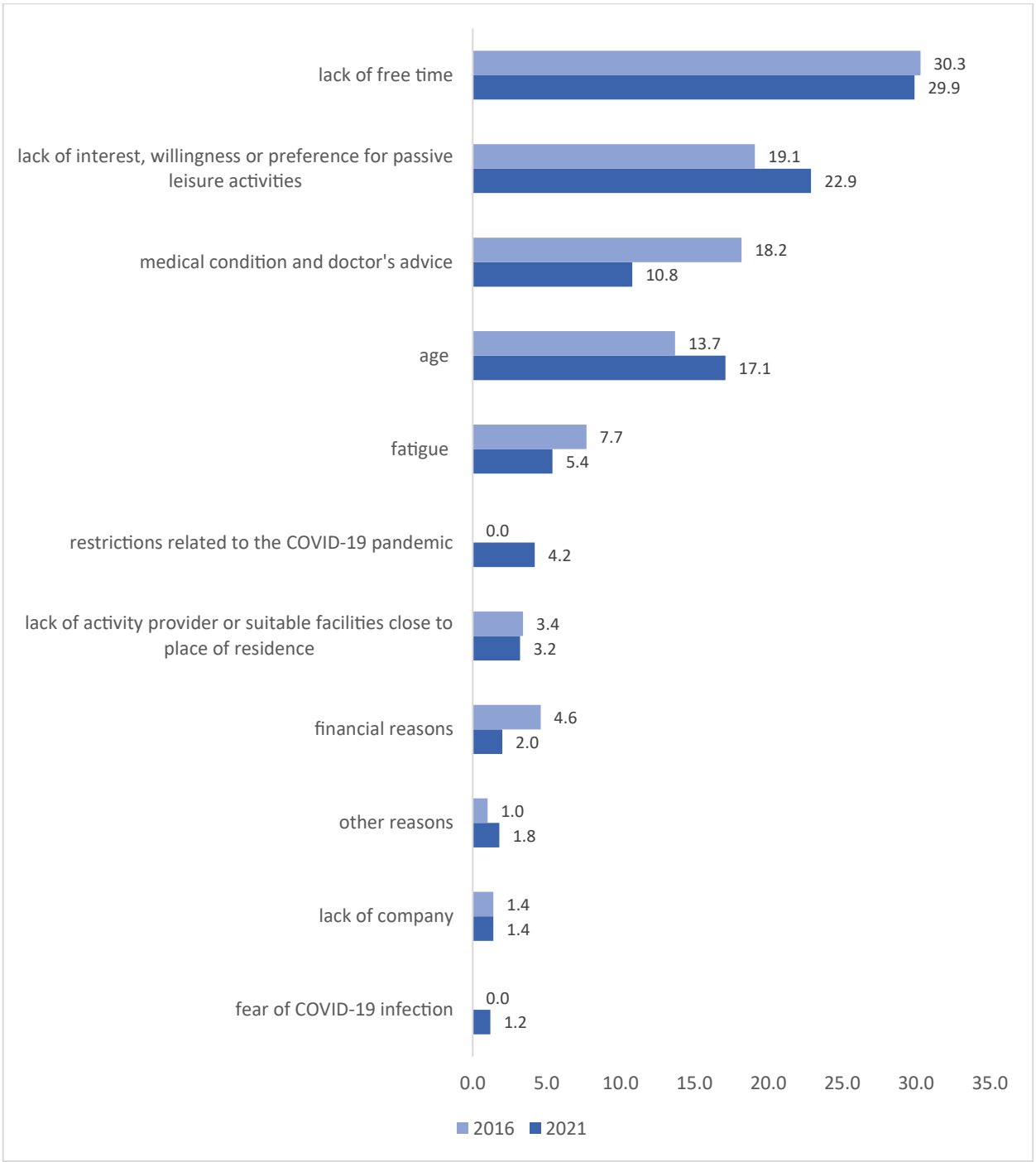


Figure 1. Reasons for non-participation in SRA in 2016 and 2021

Table 2. Reasons for non-participation in SRA according to the respondents' age in 2016 and 2021

		Lack of free time	Financial reasons	Medical condition and doctor's adivce	Age	Fatigue	Lack of company	Lack of activity provider or suitable facilities close to place of residence	Lack of interest, willingness or preference for passive leisure activities	Restrictions related to the COVID-19 pandemic	COVID-19 fear of COVID-19 infection	Other reasons	Chi2; p
Wave													
	2016	30.3	4.6	18.2	13.7	7.7	1.4	3.4	19.1	-	-	1.0	234.02; <0.001
	2021	29.9	2.0	10.8	17.1	5.4	1.4	3.2	22.9	4.2	1.2	1.8	
Gender													
Male	2016	34.7	4.6	17.4	9.9	8.3	0.8	3.2	19.9	.	.	1.3	96.69; <0.001
	2021	33.3	2.2	10.6	14.2	5.9	0.9	3.2	23.2	4.0	1.2	1.4	
Female	2016	26.4	4.7	19.0	17.1	7.2	2.0	3.5	18.4	.	.	1.8	131.08; <0.001
	2021	26.9	1.9	10.9	19.6	5.0	2.0	3.3	22.7	4.5	1.3	2.1	
Age													
5–9	2016	9.0	12.3	3.9	14.2	0.5	1.9	21.8	25.1	-	-	11.3	20.81; <0.01
	2021	5.9	1.0	0.3	10.3	-	1.7	25.8	23.3	20.6	2.5	8.6	
10–14	2016	15.2	12.8	9.0	1.0	0.0	2.6	29.2	26.6	-	-	3.6	14.66; 0.07
	2021	8.3	4.7	4.0	0.6	-	7.6	14.4	30.0	22.2	3.4	4.9	
15–19	2016	24.5	12.0	6.3	0.0	2.4	2.3	19.1	28.4	-	-	5.1	18.88; <0.05
	2021	12.8	4.4	8.7	0.3	-	4.0	17.2	39.3	6.9	2.8	3.6	
20–29	2016	45.0	5.8	5.2	0.0	4.6	3.6	6.0	27.9	-	-	1.9	14.77; 0.06
	2021	36.4	4.2	5.9	0.1	2.3	1.7	5.0	31.9	7.8	0.7	4.1	
30–39	2016	58.0	5.3	9.0	0.2	6.6	1.1	2.3	15.9	-	-	1.5	50.91; <0.001
	2021	58.1	2.4	4.2	0.1	4.1	0.8	3.3	21.5	2.9	1.0	1.7	
40–49	2016	48.7	5.1	8.1	0.2	12.5	1.1	1.6	22.1	-	-	0.7	35.38; <0.001
	2021	48.7	3.3	6.7	0.7	10.9	1.6	1.2	21.4	3.5	1.3	0.6	
50–59	2016	33.7	4.9	20.4	4.2	13.2	1.2	0.9	20.8	-	-	0.7	82.4; <0.05
	2021	42.1	1.5	11.3	3.7	9.5	1.5	1.1	25.2	2.9	0.5	0.7	
60 lat i więcej	2016	6.6	1.9	32.4	36.4	5.7	1.0	0.9	14.0	-	-	1.0	178.48; <0.05
	2021	8.1	0.6	17.9	44.4	3.9	0.9	0.8	18.9	1.8	1.4	1.2	

Discussion

The purpose of this study was to analyze the barriers to participation in SRA of Poles before and after the pandemic. According to the Medline database as of 24.04.2023, this is the first such analysis in Polan. It is based on a representative sample, people aged 5 and older (in 2016 – 12183 household members; in 2021 – 8351).

The COVID-19 pandemic and the restrictions associated with it led to impeded access to sports and recreational facilities, suspension of group activities, restrictions on time spent outdoors, etc. (Stockwell et al., 2021; Wojtyn-

iak & Goryński, 2020) and had a significant impact on people's PA levels. The negative impact of the pandemic on the number of active people and on the duration of PA was noted worldwide (Rhodes et al., 2020; Stockwell et al., 2021). This was independent of the population studied (healthy adults, children and adults with disease) or the methods of assessment (Stockwell et al., 2021). In Poland, it was similar (Wojtyniak & Goryński, 2020) . According to our results, there was a decrease in the number of Poles who were physically active (regularly or occasionally) in 2021 compared to 2016 (38.8%) by 7.6 percentage points. The situation was different for those who regularly undertake PA (exclusively), as only a small difference was found, and it was insignificant (20.6% in 2021; 21.7% in 2016). We speculate that physically active individuals (for whom exercise was an indispensable part of their lifestyle) were more effective in coping with barriers resulting from the COVID-19 pandemic than inactive individuals – a finding confirmed by other researchers (Girgin & Okudan, 2021; van Veldhuijzen Zanten et al., 2015). This indicates the importance of forming active leisure habits. The psychological theory of health behavior maintenance says that the construct of human behavior – in addition to identity – is planning and habit (the power of habits). Researchers say that the relationship between habit and PA is bidirectional, although it is unclear whether habit influences PA or vice versa (Feil et al., 2021). Some studies show that PA is partly regulated by unconscious processes, such as habit formation (Rebar et al., 2016) and others show that PA has a positive relationship with habit (Feil et al., 2021). Considering this, we suggest that intervention strategies pay more attention to planning PA and developing the habit of participating in it. From an application point of view, reminders (Liu & Willoughby, 2018), joining an organized exercise group, or putting a PA date in one's calendar and that of a friend or family member can be particularly important here (Biernat & Piątkowska, 2018b). Active individuals can aid this process, since, according to Biernat et al. (Biernat et al., 2020), a "contagion" effect of PA is evident in households with active individuals.

Of course, the COVID-19 pandemic may have disrupted "automatic" behavioral patterns through "habit discontinuity" (Ding et al., 2019; Farah et al., 2021). Therefore, it was particularly important during this period to maintain motivation to participate in PA. This is confirmed by global reports showing that during the pandemic the biggest obstacles were lack of ability and motivation (Tallis et al., 2022). According to the wheel of behavioral change, three components are required for a specific behavior (e.g., PA or sedentary behavior) to occur: ability (mental and physical), opportunity (physical and social) and motivation (reflexive and automatic) (Michie et al., 2014). This is shown by the example of Canada, where most respondents were not motivated to exercise because they felt excessive anxiety (+8%), lack of social support (+6%) or had limited access to equipment (+23%) or space (+41%) (Marashi et al., 2021). Therefore, supporting people who motivated through: training (e.g., virtual or online), persuasion, education, advice on makeshift or inexpensive PA at home or in difficult circumstances (Hammami et al., 2022) may have been important here. Unfortunately, during this unprecedented public health crisis in the conduct of the Polish authorities, these activities were essentially absent – something that should change in the event of another crisis (and beyond).

Identifying opportunities and barriers to PA participation in different populations and situations is an important first step in preparing effective interventions (Skrok et al., 2019). In the event of another blockage resulting from a pandemic and/or a return to "normal life," ready-made action scenarios – targeting key determinants – can be vital to maintaining public health.

Our analysis shows that in both 2016 and 2021 men engaged in SRA significantly more often than women (48.4% vs. 44.6% and 41.0% vs. 36.7%, respectively). Previous studies from most European countries confirmed this fact before the pandemic period (Breuer et al., 2011; Hartmann-Tews, 2016; Orlandi et al., 2021). According to them, women were about 1.2 times less active (Scheerder & Vos, 2016). Although it should also be mentioned that there were dissenting opinions; namely that in terms of the level of participation in sports, women caught up with men and were even much more active (Grima et al., 2017). Some argued that women spent less time on recreational and sports activities than men but were more likely to participate in such activities at all stages of life (Grima et al., 2017).

During the lockdown period, a disappearance of gender differences in adherence to PA recommendations was noted (Orlandi et al., 2021), and even a lower tendency for women to reduce their PA levels (Orlandi et al., 2021; Smith et al., 2020). According to a Polish study by the National Institute of Public Health – National Institute of Hygiene (Wojtyniak & Goryński, 2020), men were less active during the pandemic period (29.6% vs. 35.6% of women), and this effect was exacerbated after accounting for differences in the age structure of the population of both sexes (women are older on average). The above findings may be surprising when compared with the literature from non-pandemic times (Christensen et al., 2022; Smith et al., 2020) and with our results. We suppose that our female respondents – like those studied by Nienhuis & Lesser (Nienhuis & Lesser, 2020) – were more affected by pandemic restrictions than men. The researchers pointed out that women during the COVID-19 pandemic had significantly higher rates of depression and fatigue (Nienhuis & Lesser, 2020), as well as lower vigor, than men (Roshanaei-Moghaddam et al., 2009). They were

also noted to have greater work-related changes (Nienhuis & Lesser, 2020) and less protection from loss of employment (Christensen et al., 2022).

Although it should also be mentioned that there were reports that spoke of greater PA in men (Abate Daga et al., 2021) or a similar decline in PA as in women (Christensen et al., 2022) and argued that family discouragement was a significant barrier for both men and women (Girgin & Okudan, 2021) – indicating the need for further analysis.

In the group of Poles we studied, participation in sports or physical recreation decreased with age (in both 2016 and 2021). The opposite phenomenon during the pandemic period was observed in the UK, where older people achieved higher levels of PA than other groups (Smith et al., 2020). However, analysis of global studies shows that the results are inconclusive in this regard (probably due to the lack of homogeneity of studies) (Christensen et al., 2022). In our group, people aged 60 and older were the least active (in 2016 – 25.1%, as well as in 2021 – 18.3%), which during the pandemic may have been due to the fact that COVID-19 was particularly dangerous for older populations (senior.gov.pl). According to a report by Poland's Senior Policy Institute (Wiśniewski, 2021), as much as 62.8% of people aged 60+ reduced PA during the COVID pandemic era. Therefore, in an effort to minimize the risk of infection, seniors complied with local and governmental recommended safety measures, kept their social distance, and were simply more cautious about taking PA (Rhodes et al., 2020). This finding underscores the potential value of helping the elderly maintain a physically active lifestyle. This assistance should focus not only on instruction on how to be safe, but also on how to safely participate in PA (Hammami et al., 2022; Jiménez-Pavón et al., 2020; Middleton et al., 2020), how to make available or restructure an environment in which exercise could be undertaken (Rhodes et al., 2020), and how to motivate people to exercise.

Analysis of the most important factors hindering or preventing SRA also showed that in both 2021 and 2016 two barriers were the most prevalent, namely lack of free time (29.9% and 30.3%, respectively) and lack of interest, willingness or preference for passive leisure activities (22.9% and 19.1%, respectively). These obstacles were, of course, identified before the COVID-19 pandemic in clinical (Barbosa et al., 2015; Cavalcante et al., 2015) and healthy populations (Herazo-Beltrán et al., 2017; Justine et al., 2013). What is surprising, however, is that during the period of social isolation, it was not the lack of activity provider or suitable facilities close to place of residence (in 2016 - 3.4%; in 2021 – 3.2%), but precisely the lack of free time and lack of desire/interest that were the most important personal obstacles. At the same time, this was not an isolated phenomenon, as exactly the same barriers during the pandemic were reported, for example, in Brazilians (Farah et al., 2021). This once again draws attention to the need to motivate people and raise awareness of the role of PA in maintaining health and reducing the risk of developing diseases (including COVID-19) (CDCP, 2022).

On the other hand, looking at it, both the first and the second barriers revealed in the Polish population may have been the result of increased household duties during the pandemic (resulting, for example, from the presence of all family members, doing professional work at home and helping with children's school assignments), which, of course, in our group requires more extensive analysis. This is indirectly confirmed by the fact that working-age Poles, especially 30 to 49-year-olds (58.1%), who have families and perform parental roles, significantly more often declared lack of time. In order to meet the needs of this group of people, it seems necessary to relieve their burden, for example, through the implementation of PA programs for their children at various socio-educational centers, and, of course, motivational programs. This becomes all the more important because, in light of our results, the most serious obstacle to sports/exercise recreation in 2021 among 15 to 19-year-olds was precisely the lack of interest, willingness to engage in physical activity or preference for passive recreation (in 2021 – 39.3%; in 2016 – 28.4%). This constitutes an alarming social problem. It can be seen that this phenomenon is growing and, for those at the stage of forming leisure habits, may have further consequences.

Also noteworthy is the fact that among Polish respondents, men (33.3% vs. women 26.9%) more often declared lack of time. Meanwhile, in Polish reality, culturally defined patterns of what is "masculine" and "feminine" mean that it is women who are more often burdened with household duties, and taking care of children (Biernat & Piątkowska, 2018a). This raises the assumption that it may not be a lack of time, but rather men's passivity, "dozing off" at home when they lose touch with their professional work, a point previously made by Biernat et al. (Biernat et al., 2019). On the other hand, perhaps the problem is that a person working remotely spends more time on responsibilities than on-site. A survey conducted by PAP (Jarco, 2020) shows that this applies to 45% of Poles. Nevertheless, we find evidence in the literature that time constraints strongly affect men's propensity to take PA (Biernat et al., 2020).

As already mentioned, lack of interest, willingness to engage in physical activity or preference for passive recreation is a major barrier for 15 to 19-year-olds. Across the Polish population, men (23.2%) and women (22.7%) declared this reason equally (in 2021). In 2016, these percentages were smaller, respectively (19.9% and 18.4%), which again (and perhaps even more so) draws attention to the increasing importance of this barrier over the years, as well as insufficient motivational measures on the part of government recommendations.

Other significant obstacles were a medical condition and doctor's advice and the age of respondents. Thus, in the case of the first of these barriers, the fraction of inactive Poles decreased in successive waves of the survey (2016 – 18.2%; in 2021 – 10.8%). It should be mentioned that in both 2016 and 2021, medical condition and doctor's advice were more common among those aged 50–59 (20.4% and 11.3%, respectively) and over 60 (32.4% and 17.9%, respectively), which is confirmed in the literature (Rhodes et al., 2020). No significant differences were shown in this regard depending on the gender of the subjects. An example from the UK shows that a different phenomenon was noted in that country, namely that middle-aged women (45–55 years) more often reported greater health complaints and less social support as a barrier to PA (Lum & Simpson, 2021). Nevertheless, our results indicate a positive change in the perception of this barrier during the COVID-19 pandemic. Could it be that, as Girgin and Okudan (2021) argue, there was an increase in the perception of PA's role in disease prevention and treatment? This would indicate that Polish doctors are more effective at raising awareness and promoting regular PA among their patients. Alternatively, has COVID-19 pushed other diseases into the background? Maybe many elderly people avoided visits to health centers for fear of infection, or could not get to one, and simply didn't receive medical help with their diseases? A report by Poland's Senior Policy Institute confirms that more than 60% of seniors declared limited access to health care during the outbreak. However, this requires a broader analysis.

In the second case – the age of respondents as an obstacle to undertaking PA – the opposite phenomenon was observed, i.e. an increase in its importance (in 2016 – 13.7%; in 2021 – 17.1%). In 2021, this was particularly true for women (19.6%) and those over 60 years of age (44.4%). With that said, an analysis of the latter group showed that it was the most serious barrier for them, and that perceptions had increased significantly compared to 2016 (36,4%). In comparison, in Australia, older people reported the closure of exercise facilities, cancellation of group activities and unavailability of equipment as the biggest barrier (Ng et al., 2009). We presume that in our case this is due to a decrease in the functional fitness of respondents – something that other researchers have also pointed out (Richardson et al., 2022). Low fitness even before the pandemic was a common barrier in this age group (Gray et al., 2016; Yarmohammadi et al., 2019). Lockdown further compounded this effect (Richardson et al., 2022). By limiting mobility, it lowered PA and thus negatively affected the fitness of seniors (Richardson et al., 2022; Tallis et al., 2022). Given that perceptions of barriers increase as PA decreases (Girgin & Okudan, 2021), intervention strategies should focus on overcoming barriers in this age group and enhancing seniors' independence. Raising awareness and developing intrinsic motivation – based on emphasizing the benefits of PA and its role in maintaining health and preventing disease – is essential for this (Biernat, 2015). This issue seems crucial, as researchers believe that convincing one to take regular PA, to program it into one's daily schedule, requires (1) knowledge of the subject, (2) experience of the benefits. Knowledge alone is not convincing enough to get people (especially inactive people) to exercise (Biernat et al., 2019). A belief that PA will meet seniors' various needs (e.g., health or emotional) – and therefore that it is "mandatory" or "nice to do" will make it more likely to be prioritized. Creating new behaviors and then sustaining this change, however, requires support from the health service. Ongoing efforts by physicians, including instruction on how to undertake PA safely and effectively, collecting feedback on engaging in PA, can improve the existing status quo (Bethancourt et al., 2014). However, this requires careful consideration of how to monitor the effectiveness of interventions.

As a result of COVID-19, pandemic-related restrictions (4.2%) and fear of COVID-19 contagion (1.2%) were added to the factors hindering or preventing participation in sports or physical recreation (in 2021). However, Polish respondents cited these barriers less frequently than the ones discussed earlier, which may come as a bit of a surprise when analyzing results from other countries. In Brazil, the barrier most strongly associated with changing PA levels during the pandemic was lack of adequate facilities/space/equipment (Farah et al., 2021). In Ireland, the main barriers were the inability to undertake PA in the usual way and the recommendation not to leave the place of residence (Barrett et al., 2022). We speculate that the low perception of this barrier in the adult Polish population is because they do not associate participation in sports/exercise recreation with indoor activities (many of which were indoor). Euromonitor (EC, 2018) confirms that Poles are fans of taking PA outdoors. As many as 40% of those who practice sports like to do so outdoors, including in parks or city gyms. The second most preferred location is the home/apartment, where more than one third of active Poles train. Local sports centers are chosen by 15% of exercisers, followed by fitness clubs (11%) and sports clubs (7%). The situation is different for children/young people, for whom the main place to exercise is preschool and school facilities, and social proximity is an important factor in the activity. Therefore, respondents aged 5–9 (20.6%) and 10–14 (22.2%) indicated pandemic-related strictures significantly more often. This result reveals the need to maintain the social aspect of exercise, including support from peers and teammates, where possible, as previously pointed out by McGrath et al. (McGrath et al., 2021). This is an important consideration during periods of restriction.

Fear of COVID-19 infection was a significantly more common barrier among children aged 5–9 (2.5%) and adolescents aged 10–14 (3.4%) and 15–19 (2.8%) than among other age groups. We suppose this was a consequence of preventive measures such as school closures and remote education, which produced negative social, emotional, and behavioral effects. Idoiaga et al. (Idoiaga et al., 2020)) claimed that Spanish children experienced conflicting emotions during the lockdown. On the one hand, they felt scared, upset, lonely, sad, bored, and angry, while on the other hand, they experienced a sense of security, calm, and happiness. However, numerous publications from around the world have highlighted children's increasing psychosocial problems, such as fear, anxiety, nervousness and excessive attachment to the caregiver, as well as negative changes in previous lifestyles (including, PA and diet) (Pfefferbaum, 2021). They noted a decrease in PA and an increase in screen time (Francisco et al., 2020). Guan et al. (2020) Kliknij lub naciśnij tutaj, aby wprowadzić tekst.argued that children are less physically active when they do not go to school, as much of this activity involves getting from home to school, physical education classes, and playing during recess. The closure of schools and the reduction of interpersonal contacts have definitely reduced the possibility of undertaking PA, especially for children living in cramped apartments (Rundle et al., 2020). In addition, the fact that parks and playgrounds were visited less frequently increased sedentary lifestyles. The consequences of this may be particularly significant for obese children.

Conclusion

What can make it easier to understand the nature of the problem of low PA, and thus counteract it more effectively, is to explain why people do not exercise during a pandemic and what can motivate them to exercise. The presented results identified four main barriers: (1) lack of free time, (2) lack of interest or willingness, or a preference for passive leisure activities, (3) a medical condition and doctor's advice, and (4) age of respondents. This indicates that these barriers were not overcome over time, and during the COVID-19 pandemic they persisted or even increased in importance (in addition to poor health or medical advice). This reveals specific areas that exercise and health professionals should address. First, it is necessary to address these barriers with an eye to their importance in specific populations. For the first barrier, interventions should focus on 30 to 49-year-olds (especially men), for the second on 15 to 19-year-olds, for the third on people 50 and older, and for the fourth on 60-year-olds (especially women). Second, it is essential to motivate people to overcome internal barriers (fatigue, reluctance to exercise, lack of time, age) in times of limited socialization. Active promotion of PA as a means of supporting treatment and maintaining health (especially among seniors) and as an important and attractive form of leisure time (especially among young people) can help this process. It is also necessary to emphasize systematic planning of PA to create a habit (writing in your own calendar and that of a loved one), creating targeted, attractive programs (e.g., online training or virtual classes), and providing advice on safe, impromptu or inexpensive PA at home.

Motivating people should have the support of the public, health services, and the government. We recommend that efforts to promote PA be prioritized and integrated into routine medical care. The goal should not be to return PA levels to "normal," but to establish sustainable mechanisms to promote healthy behavior, and to prevent potential further declines in PA with additional waves of COVID-19

Limitations

Our study has some limitations. First, it is cross-sectional and no causality can be inferred. Also, we used a limited set of social variables as predictors. However, the large sample size of our study and its timely assessment of health behaviors make our findings valid and quite relevant.

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