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Sedentary behaviour as a lifestyle risk factor in public health – Evidence of white-collar and blue-collar workers from Poland

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Abstract

Introduction and Objective. Relief from routine physical tasks leads to increasingly sedentary behaviour (SB) – a risk factor for non-communicable chronic diseases. It is necessary to gather interdisciplinary knowledge about the possibilities of its reduction. The aim of the study is to analyse SB and its conditions among Polish white-collar and blue-collar workers.

Materials and method. The study is based on data retrieved from a large-scale survey used to collect information on the physical activity of Polish society. The data were gathered on a representative sample of Poles at working age ≤69 years old in 2017 (n=2,131). The Polish long version of the International Physical Activity Questionnaire (IPAQ-LF) was used. Statistical inference was based on non-parametric (U-Mann Whitney and Kruskal-Wallis) tests.

Results. The total average sitting time of the respondents was 1,958.5 min./week. White-collar workers are more likely (p 7.5 h/day (20.2% vs 9%), and blue-collar – ≤4.5 h/day (56.5% vs 42.1%). On a weekday, white-collar workers are sitting significantly longer. The bigger the place of residence, the longer the time sitting in both groups (p=0.000). The time of sitting on a non-working day does not differ among white-collar (221.4 min./day) and blue-collar workers (230.4 min./day). White-collar workers sit longer in vehicles (p <0.0001): 482.4 vs blue-collar workers 326.8 min./week.

Conclusions. The results suggest a change in Polish recommendations regarding the SB. Blue-collar and white-collar workers need support from the State policy in this matter and need guidance from pro-health programmes. It is necessary to intensify coherent, interdisciplinary and intersectoral activities aimed at creating environments that effectively counteract SB in the place of work and residence, especially in the larger agglomerations.

Key words

sitting during weekdays, sitting during weekends, sitting in vehicles, workers

INTRODUCTION

The percentage of jobs with lower physical activity (PA) is increasing (in the EU in 1995–2014 from 55% – 67%) [1], the level of activity is also falling in areas of life such as recreation, housework and transport [2]. Relief from routine physical tasks leads to increasingly sedentary behaviour (SB).

As a rule, people who do not engage in physical activity are defined as sedentary society. However, the SB – described as activities with low energy expenditure (≤1.5 MET) while sitting, reclining or lying – is not the direct opposite of the PA [3]. There are people who, despite sitting for long periods, meet or even exceed the official PA guidelines for health. Moreover, the effects of lack of PA and prolonged sitting [4] are independent of each other and constitute separate risk factors for many health consequences and mortality. Sometimes, the consequences of sitting are more harmful than not exercising [4]. Sometimes they continue regardless of the duration of the PA [5]. However, in all cases, both insufficient PA and prolonged sitting are risk factors for non-communicable chronic diseases (NCD) that must be monitored. The SB, compared to the number of studies, recommendations and programmes on PA, is an under-explored area [6, 7]. Considering the fact that SB has grown significantly in recent decades in industrialised countries, and has become the main risk factor for the development of many chronic diseases and one of the most important causes of death [6], it is necessary to gather interdisciplinary knowledge about limitations.

The nature of professional work and accompanying socio-economic status (patterns of recreation, ways of mobility, etc.) are of great importance in terms of disseminating SB. Global meta-analyses [8] emphasise that the profession and age of leaving education are the strongest correlates of sitting time [9]. Typically, employees with higher education or income have longer periods of sitting at work [8] and in vehicles [10]. On the other hand, among people in lower socio-economic positions, longer periods of sitting in front of the television are recorded [8]. It should be mentioned that those who have a sedentary job are more likely than others to be at an increased risk of death [11].

Taking all of this into account, as well as the upcoming changes (i.e. further reduction of energy expenditure, increasing importance of work-related diseases, it seems justified to conduct systematic research to improve the global supervision of SB and the collection of data on this matter from various professional groups, and from different domains of life. As evidenced by Compernolle et al. [12],

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most SB typologies of men and women (including computer sitting, motorised transport, sedentary hobbies, dining, and reading) have at least one dominant SB that sets them apart from others. Monitoring such a variety of factors can help with the development of more accurate anti-NCD strategies. The current meta-analyses indicate the limited impact of the current state policies and interventions to combat the SB [6].

The aim of this study is therefore to analyse the SB of Polish white-collar and blue-collar workers and the factors that determine it. The study examined the time of sitting on a weekday, on a day off from work, and in vehicles.

MATERIALS AND METHOD

Data collection. Data was used from a survey on the physical activity of Polish society ordered by the Polish Ministry of Sport and Tourism. The study was conducted on a representative sample of Poles at working age ≤69 years old in 2017 (n=2,131). The sampling random-quote procedure was based on the National Official Register of the Territorial Division of the Country's (TERYT) frame. The Computer-Assisted Personal Interviews (CAPI) were carried out by trained pollsters. The survey was based on the Polish long version of the International Physical Activity Questionnaire (IPAQ-LF) [13] in order to collect data on the volume of leisure time, domestic, occupational, and transportation PA, and assess an estimate of sitting on a typical weekday, weekend day and time spent sitting during travel (expressed in minutes) during the last seven days. For the purpose of this study only questions on sitting time were analysed.

Ethical approval. Obtained from the Ethics Committee of the Polish Academy of Sciences in Warsaw, in compliance with Declaration of Helsinki (Ethical Approval No. KEwN/60/2014).

Participants. IPAQ guidelines for data processing and analysis were followed [14]. From the initial sample (n=2,131), cases with missing data (n=4) were excluded from the study. For further analysis, a final sample (n=2,127) was used, from which two groups of employees were selected: white-collar workers (n=570) and blue-collar workers (n=729, Tab. 1). White-collar workers, according to the International Standard of Classification of Occupations, included directors/managers/owners, senior and other white-collar workers. The blue-collar workers included skilled and unskilled workers, farmers and housewives. Students and pupils as well as retirees and pensioners were not taken into account – a separate study will be devoted to them.

Data analysis. The total sitting time, including transport (during the weekdays and weekends) was calculated according to the formulae below [14]:

Total weekly sitting time including transport (min./week) = (sitting time in minutes during weekdays × 5 days) + (sitting time in minutes during weekend × 2 days) + (time spent on transportation in days × time spent on transportation in minutes).

On the basis of total weekly sitting time including transport (min./week) a daily variable was calculated. In addition, total sitting time including transport (min./day) was trichotomized into ≤4.5 h/day, between 4.5–7.5 h/day and ≥7.5 h/day. These cut-off points were based on a recent meta-analysis suggesting that from a public health perspective, it is essential to consider individuals already exceeding 4.5 h/day, as that is the accepted cut-off point resulting in a higher risk of death due to cardiovascular diseases [9].

Table 1. Characteristics of the sample

Factors		White-collar workers		Blue-collar workers		Total	
		n	%	n	%	n	%
Gender	Male	250	43.9	406	55.7	656	50.5
	Female	320	56.1	323	44.3	643	49.5
Age	≤29	123	21.6	154	21.1	277	21.3
	30-39	189	33.2	190	26.1	379	29.2
	40-49	120	21.1	176	24.1	296	22.8
	50-59	87	15.3	142	19.5	229	17.6
	60-69	51	8.9	67	9.2	118	9.1
Place of residence	Village	171	30.0	329	45.1	500	38.5
	Towns < 500,000 inhabitants	280	49.1	344	47.2	624	48.0
	Towns ≥ 500,000 inhabitants	119	20.9	56	7.7	175	13.5
Total		570	43.9	729	56.1	1299	100

Statistical analysis. The statistical analyses were carried out using IBM® SPSS® Statistics ver. 22. Means ($\bar{x}$), medians (me), standard deviations (±SD) and fractions (%) were used to describe the variables. Variables of sitting time were tested for normality using the Kolmogorov-Smirnov Test. Given the non-normal distributions of sitting time variables, non-parametric tests (U-Mann Whitney and Kruskal-Wallis) were used for further analysis. The level of statistical significance was set at $\alpha = 0.05$.

RESULTS

Total sitting time. On average, Poles of working age sit 1,958.5 min./week. (Me=1,710.0; SD ± 1,159.3) – men (p=0.001) significantly longer 2,042.0 min./week (Me=1800.0; SD ± 1157.8) than women 1,873.4 min./week (Me=1620.0; SD ± 1155.6). Whereby, 50.1% are sitting ≤4.5, 36% – between 4.5 and 7.5, and 13.9% – >7.5 h/day (Tab. 2). There are visible differences (p <0.001) in the total sitting time of blue-collar and white-collar workers. White-collar workers are more likely to sit >7.5 h/day (20.2% vs 9%), while blue-collar more often sit (56.5% vs. 42.1%) ≤4.5 h/day.

Table 2. Prevalence of sitting among white-collar and blue-collar workers

Total sitting time in categories	White-collar workers		Blue-collar workers		White-collar workers	
	n	%	n	%	n	%
≥4.5 hours per day	215	42.1	365	56.5	580	50.1
4.5-7.5 hours per day	193	37.8	223	34.5	416	26.0
≤7.5 hours per day	103	20.2	58	9.0	161	13.9
Total	511	100.0	646	100.0	1157	100.0

Weekday sitting time. Analysis of the sitting time among Poles during weekdays showed statistical differences (p=0.001) between white-collar and blue-collar workers. On average, white-collar workers sit 241.7 min./day (Me=180.0; SD ± 168.1), and blue-collar workers – 206.5 min./day (Me=180.0; SD ± 146.0). However, no differences depending on gender or age were found in this respect. It has been shown that the place of residence (p=0.000, Tab. 3) is of significant importance (within the groups studied). Therefore, among white-collar workers (p=0.024), the average weekday sitting time of those living in villages is 233.0 min./day (Me=180; SD ± 177.6), in towns <500,000 – 231.2 min./day (Me=180; SD ± 159.4), and in towns ≥500,000 – 275.9 min./day (Me=240; SD ± 170.9). A regularity was observed among blue-collar workers – the larger the place of residence, the longer the sitting time on weekdays (p=0.000). Among those living in villages, this is 183.6 minutes (Me=180; SD ± 126.4), in towns – <500,000 – 220.7 min./day (Me=180; SD ± 149.5), and in towns ≥500,000 – 253.3 min./day (Me=180; SD ± 202.2).

Weekend sitting time. In the case of sitting time on non-working days, no significant differences were found (p=0.402) between white-collar workers (221.4 min./day; Me=186.0; SD ± 130.6) and blue-collar workers (230.4 min./day; Me=180.0; SD ± 140.8). It was shown, however, that gender (p=0.001) and place of residence (p=0.020) differentiate the sitting time of blue-collar workers (Tab. 3). Men from this group sit longer (246.6 min./day; Me=225.0; SD ± 149.6) than women (210.1; Me=180.0; SD ± 126.1). The bigger the place of residence, the longer the sitting time for blue-collar workers (village – 233 min./day; Me=180.0; SD ± 177.6; town up to 500,000 residents – 231.2 min./day; Me=180.0; SD ± 159.4; towns with over 500,000 inhabitants – 275.9 min./day; Me=240.0; SD ± 170.9).

Sitting time in motor vehicles. The sitting time in motor vehicles significantly differed among the examined people (p <0.0001). White-collar workers sit longer (482.4 min./week; Me=300.0; SD ± 624.8) than blue-collar workers (326.8 min./week; Me=205.0; SD ± 526.1). At the same time, gender (p=0.000) and place of residence (p=0.000) were of significant importance in this respect (within the studied occupational groups). Thus, in both groups, men spent more time in vehicles. In the case of white-collar workers (p=0.004), the average time of sitting for men is 564.7 min./week (Me=360.0; SD ± 689.1), and women – 418.7 min./week (Me=300.0; SD ± 562.9) (Tab. 3). In the case of blue-collar workers (p=0.000), the sitting time for men was 428.2 min./week (Me=300.0; SD ± 628.0), and women 198.8 min./week (Me=102.5; SD ± 315.5).

The relationship between place of residence and the declared time of sitting in vehicles depended on the analysed group. Among the white-collar workers, a bigger place of residence was associated with a longer time of sitting in vehicles (p=0.022) (Tab. 3). People living in villages declared 413.6 min./week (Me=300; SD ± 527.0), in towns <500,000 – 503.6 min./week (Me=300; SD ± 717.5) and in towns ≥500,000 – 532.1 min./week (Me=400; SD ± 508.6). The situation was different among blue-collar workers (p=0.000). Among those who live in villages, the average time of sitting in vehicles was 358.6 min./week. (Me=240; SD ± 530.2), in towns <500,000 – 283.4 min./week (Me=140; SD ± 528.3), and in towns ≥500,000 – 409.6 min./week (Me=330; SD ± 471.4).

DISCUSSION

Existing scientific evidence confirming the association of SB with many health effects [15] allows the formulation of qualitative recommendations, i.e. the need to limit sitting time. However, there is insufficient data necessary for defining quantitative recommendations [16]. This is largely due to the imprecision of research (differences in the method of measuring or reporting sitting time) and uncertainty as to the dose-response relationship between SB and many health effects. It is also problematic that SB quantitative norms may vary depending on health status, and moderate-to-vigorous physical activity level or subpopulation. There is still too little high-quality empirical data on various social groups that would support the creation of appropriate SB monitoring

Table 3. Sitting time during weekdays, weekends, and in vehicles, of white-collar and blue-collar workers

FACTORS		SITTING TIME							
		During weekdays (min) $\bar{x}$±SD	p	During weekends (min) $\bar{x}$±SD	p	In vehicles (min./week) $\bar{x}$±SD	p	Total (min./week) $\bar{x}$±SD	p
White-collar workers									
Gender	Male	234.0±163.0	NS	222.4±124.8	NS	564.7±689.1	0.004	2178.6±1179.4	NS
	Female	246.6±172.0		220.6±135.1		418.7±562.9		2092.9±1258.1	
Place of residence	Village	233.0±177.6	0.024	211.1±134.0	NS	413.6±527.0	0.022	2000.9±1165.8	0.007
	Towns < 500,000 inhabitants	231.2±159.4		220.8±131.4		503.6±717.5		2099.9±1264.8	
	Towns ≥ 500, 000 inhabitants	275.9±179.9		237.6±122.9		532.1±508.6		2386.7±1180.9	
Total		241.1±168.1a	0.001	221.4±130.6	NS	482.4±624.8a	0.000	2130.3±1224.0a	0.000
Blue-collar workers									
Gender	Male	206.8±141.4	NS	246.6±149.6	0.001	428.2±628.0	0.000	1958.4±1137.8	0.000
	Female	206.0±146.0		210.1±126.1		198.8±315.5		1654.7±998.3	
Place of residence	Village	183.6±126.4	0.000	218.8±129.2	0.02	358.6±530.2	0.000	1721.4±973.9	0.011
	Towns < 500, 000 inhabitants	220.7±149.4		240.8±135.8		283.4±528.3		1868.5±1141.5	
	Towns ≥ 500,000 inhabitants	253.3±202.5		235.4±215.3		409.6±471.4		2146.9±1299.5	
Total		206.5±146.0		230.4±140.8		326.8±526.1		1824.2±1958.5	

Note: statistically significant differences (p<0.05) a White-collar workers vs blue-collar; NS – non-statistically significant

and supervision systems [7, 16]. Additionally, there is also insufficient evidence to make specific recommendations on the threshold levels of the PA that would mitigate the negative effects of the SB.

The latest guidelines from Belgium [17], France [18], Germany [19], and the UK [20] advise adults to limit the time they spend sitting. At the same time, Belgians recommend breaking from sitting every 30 minutes [17], and the French, every 90 – 120 minutes [18]. Polish recommendations [21] only mention limiting sitting to a minimum. It is true that they suggest changing the static position at work every 10 minutes and changing the means of transport to work (from a motor vehicle to a bicycle / walking), but only for white-collar (office) workers. This shows that this area requires further evidence, especially regarding blue-collar workers.

The obtained results, based on the analysis of sitting time on weekdays, days off and in vehicles, show that in Poland the problem of SB concerns both blue-collar and white-collar workers. Approximately half of them declared the average total time of sitting >4.5 h/day – resulting in an increased risk of cardiovascular diseases or mortality due to cardiovascular diseases [6]. Of course, according to existing reports [8], those in professional roles have a higher SB level. It is more common for them to sit -4.5 – 7.5 h/day (37.8%), and even >7.5 h/day (20.2%) than blue-collar workers (34.5 and 9% respectively) [9]. Loyen et al. [9] claim that they are exposed to a five times greater risk of sitting >7.5 h/day in relation to the latter. Nevertheless, such a high proportion of blue-collar workers sitting for long periods of time is a serious problem for public health in Poland and requires changes to the existing recommendations. It is worth noting that compared to previous Polish studies [22] (conducted with the same tool), the sitting time for white-collar workers and blue-collar workers was lower than in 2014 with adequate education. This unexpected result may confirm the trend of decreasing the average sitting time (in Europe in 2002–2013 [23], in China by about one h/day in 2007–2014) [24]. This could also be the result of an underestimation. It should also be mentioned that in European countries the sitting time varies significantly (the fraction of sitting people >7.5 h/day is estimated at 8.9–32.1%; in the whole of Europe – 18.5%) [9].

Analysis of the SB among Poles only on the weekdays shows that white-collar workers sit longer than blue-collar workers. At the same time, while the time of white-collar workers is almost the same as that recorded in previous Polish studies [22], the sitting time of blue-collar workers has decreased. This may indicate an increase in their awareness of the need to limit sitting time.

The longer working time of white-collar workers on the working day is related to the nature of their daily (office) work [25, 26]. Hadgraft et al. [26] prove that working in an office significantly increases the total sitting time. These results show that the place of residence is statistically significant in this respect – the bigger it is, the longer the sitting time, as confirmed by earlier reports by Loyen et al. [9]. Cities attract fast-growing companies and knowledgable workers. It should be mentioned that sitting work in office buildings is inevitable and difficult to eliminate [24, 25]. Rational conduct should rely on the use of measures that can compensate the SB, i.e. LTPA [27]. However, workplace interventions (such as the introduction of 'standing desks') may also result in a reduction in sitting time (on average by 2 h/day) [28]. A reduction of daily sitting time by two hours may have the benefit of a 2.3% reduction in mortality [29].

It is worth noting that the dependence on the place of residence is also indicated in the weekday sitting time of blue-collar workers (who sit about 40 minutes less than white-collar workers). There is evidence that physical work – as opposed to office work – is correlated with sitting outside work [8]. Especially in the cities, people sit in restaurants, cinemas and whenever they are waiting for something – in a bank, clinic, etc. Even when they think that they are resting (at home, in front of the TV or laptop), they also sit or recline. As Clark et al. [30] state living in a regional city significantly increases the probability of watching TV for two or more hours a day. And the more strenuous the profession, the more time spent in front of the TV/DVD on a working day [31]. The Polish population study Social Diagnosis [32], defines people with vocational or primary education as 'hard' viewers, sitting in front of the TV ≥3 h/day. Among people who reported watching TV/video ≥ 4 h/day at baseline were more likely to suffer a stroke than those who watched < 2 h/day, with a hazard ratio of 1.37 [33].

The time of sitting on a day off from work does not differ among white-collar workers and blue-collar workers. What is optimistic, is that this time is shorter than the time in a previous Polish research from 2014 [22]. However, while the surveyed white-collar workers spend less time sitting on their days off than on a working day, the opposite is true for blue-collar. This is confirmed by French researchers who claim that the weekend sitting time decreases with the increase in the level of education [31].

Analysis of the factors determining the sitting time on a day off in individual occupational groups shows that only among blue-collar workers there is a dependence on gender and place of residence. However, it should be mentioned that such relations were also noticed in the sitting time of the entire surveyed group of Poles. It follows that both in the latter case (men – 2042.0 ± 1157.8; women – 1873.4 ± 1155.6 min./week), and in the case of only blue-collar workers sitting on non-working days (men – 246.6 ± 149. 6; women – 210.1 ± 126.1 min./day), men sit longer. The explanation may be in the SB pattern described by Bellettiere et al. [34], according to which women more often accumulate their sitting time with shorter periods of sitting, and therefore break from long periods of sitting more often than men. Multivariate analysis by Loyen et al. [9] indicates that women in Europe have a lower OR of sitting for >7.5 h/day than men. On the other hand, a systematic review by Rhodes et al. [35] proves that there is no relationship between gender and SB in most of the analysed studies (although, in two studies men sit longer). This would indicate cultural differences depending on nationality.

In the case of blue-collar workers, dependence on the place of residence is once again confirmed – the bigger it is, the longer the sitting time on days off. Researchers suggest that this may be related to the preference for passive rest [8, 36]. Despite the high availability of sports and recreation infrastructure in urban agglomerations, blue-collar workers mainly spend their free time interacting with modern technologies, such as the Internet, video games, mobile phones, and television [37]. Unfortunately, the mere availability of sports facilities has no direct relationship to taking the LTPA. It can only facilitate the participation in PA, mainly for those who are already active [38]. Solving this problem requires promoting LTPA

as a form that does not require extensive participation in organised sports, and which, with the volume recommended for health, may increase efficiency and physical fitness and thus bring significant health benefits [8]. It is necessary to increase the awareness of blue-collar workers that high physical load in the workplace (static, heavy load, involving small muscle groups in a repetitive manner, often in a forced body position) [39] does not mean improvement in physical fitness, and usually has adversely effects on the musculoskeletal and circulatory systems.

Analysis of the time spent sitting in vehicles shows that this is longer among white-collar workers, which most likely results from the fact that the car is used for both private and business purposes, and from having greater financial possibilities. A comparison with previous Polish studies shows that both in the case of blue-collar and white-collar workers, the time of sitting in vehicles has decreased quite significantly [22]. Presumably this is due to the increasing popularity of using the bicycle as a means of transport [22]. Although according to the ING Financial Barometer [40], 60% of Poles still indicate the car as the main mean of transportation, 23% use public transport, and 14% travel on foot or by bike.

The results obtained in the current study show that the time spent by Poles sitting in vehicles depends on their gender and their place of residence. Regardless of the analysed occupational group, men stayed in them longer – which is consistent with previous results [12]. The difference between Polish men and women is smaller in the group of white-collar workers than in the group of blue-collar workers. Presumably, the reason is that in developing societies it is the more educated, working and urban women who have moved ahead to achieve a status equal to men. However, the image of the uneducated, rural and poor women still reflects subjugation [41]. It is worth mentioning that Australian researchers have noted an increase in the trend of long sitting time in vehicles among women [10]. Moreover, they indicate that this phenomenon concerns especially people employed full-time, with a higher income, and living in the suburbs. According to The Lancet Commissions [42], 16–18% of men and 10–12% of women living in cities sit in cars ≥2 h/day. It should be noted that the time spent in the car is adversely related to the health outcomes of the cardio-metabolic system [12].

In the current study, the relation between the place of residence and the time of sitting in vehicles was recorded in both analysed professional groups. The white-collar workers with longer sitting times were associated with a bigger place of residence. Traffic jams (especially during rush hours) and greater dispersion of points of interest consistently extend the travel time [22]. Among blue-collar workers, the longest time of sitting in vehicles was recorded among people living in large cities and in villages. The first effect confirms the earlier discussed phenomenon. The second effect points to the inequalities in the rural environment that force people to travel longer distances, e.g. to work [43]. This was noted by O'Donoghue et al. [8], proving the positive relationship between living in villages and the extended time spent on transportation.

Strengths and limitations of the study. The strength of this study is that the diagnosis was made on large, representative samples of Poles of working age (a group of white-collar and blue-collar workers). Thanks to the use of IPAQ-LF, it was possible to analyse various types of sitting (on a weekday, on a day off, in motor vehicles), and to compare the obtained results with previous Polish studies. Despite the limitations of IPAQ, such as: subjectivity, the effect of burdening with social expectations or the diverse ability of respondents to report past events, it allows the performance of a population study. The limitation of the analyses is the use of isolated variables which affect the sitting time. In future research, it is planned to use the multi-disciplinary approach suggested by Urie Bronfenbrenner's socio-ecological model [38]. Understanding individual human behavior requires looking not only at individual or socio-demographic features, but also at the entire environment, including individual, micro, meso, exo and macro layers.

CONCLUSIONS

The results obtained in this suggest a change in the Polish recommendations for the SB. The recommendation to limit sitting to a minimum, the suggestion to change the static position at work every 10 minutes and to change the means of transport to work only for white-collar workers, is insufficient. Both blue-collar and white-collar workers, need support from State policy in this matter, and guidance from pro-health programmes. It is necessary to intensify coherent, interdisciplinary and intersectoral efforts aimed at creating environments that effectively counteract the SB at work and at home, especially in larger agglomerations (e.g. planning more effective strategies for engaging local communities in active recreation, creating stronger partnerships with communities, health care, employers, business and government, transport and the industrial sector). The so-called urban advantage – a term that encapsulates the health benefits of living in urban as opposed to rural areas – has to be actively created and maintained through policy interventions. Moreover, the efforts to reduce SB will need to go beyond short-term implementation and go more towards achieving a sustainable system, additional benefits, and large-scale translation into policy and practice.

The results of this study are only a starting point for further research and more targeted interventions in various professional groups. It is advisable to further identify the environmental determinants as broadly as possible, and focus on different sub-populations and different types of sitting. The SB problem requires a deeper understanding of the complexity of this phenomenon (e.g. mutual relations with the environment or State policy). Without such knowledge, all activities will have a limited impact on changing the behaviour of Polish society.

Declarations
The study did not receive any financial support and the authors declare there are no conflicts of interests, nor were any studies with declared conflicts of interests taken into consideration.

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