



Factors influencing physical activity level of the inhabitants in Norway and Poland – the case of sports and recreation infrastructure

Anna Maria Urbaniak-Brekke^{ABCD} , Torkjel Solbraa^D

Western Norway Research Institute, Sogndal, Norway

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Abstract

Physical activity is of great importance for physical and mental health of the society. Both in Norway and in Poland, responsibility for actions in the field of physical activity largely rests at the lowest level of the administration structure - municipal governments. The aim of this study was to determine the declared level of physical activity of surveyed groups from two different countries and factors influencing it. Focus was put on local sports and recreation infrastructure in research regions. The research process was based on diagnostic survey method, but it also involved analysis of documents, subject literature and existing statistical data. The research was carried out in local municipalities in two regions: Inner Sogn in Norway (8 municipalities) and Kalisz county in Poland (11 municipalities) and included surveys collected from in total 760 adult respondents, as well as interviews with representants of all 19 local governments who work in the field of physical activity. Results show that among respondents from Norway the physical activity level is 2 times higher than among respondents from Poland. It is also proven that Norwegians use sports and recreation infrastructure more often and they evaluate it much better than Poles. What is more, in both groups, those persons who use infrastructure have significantly higher physical activity level. A conclusion can be presented that the local governments, especially in Poland, should pay more attention to the offer of sports and recreation infrastructure, because that will make inhabitants more satisfied with it and use it more. This in consequence, will positively influence their level of physical activity. It is important to note that there are also other factors strongly influencing people's physical activity, such as internal and external motivation and attractiveness of the area. That is why research on factors influencing physical activity needs to be continued.

Keywords: physical activity, sports and recreation infrastructure, local government, Poland, Norway

Address for correspondence: Anna Maria Urbaniak-Brekke, Western Norway Research Institute, Røyrgata 4 6856 Sogndal, Norway, email: amb@vestforsk.no

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INTRODUCTION

Physical activity is of great importance for the physical and mental health of the society. Hypokinesia (deficiency of movement) is considered by the WHO to be one of the three most important civilization diseases' risk factors, together with poor nutrition and smoking. It increases the probability of premature death by about 20-30% [1]. In turn, taking physical activity improves the quality of life, positively affecting individual human systems: circulatory, skeletal, muscular, respiratory and nervous [2, 3]. It has also been proven that physically active people suffer depression less frequently and cope better with stress [4].

Both in Norway and in Poland, the responsibility for actions in the field of physical activity largely rests at the lowest level of the territorial administration structure - municipal governments. According to the law in Poland, the responsibility is shifted from the governmental level to the level of local authorities [5]. It is up to them to develop appropriate sports and recreation infrastructure and take initiatives to encourage active leisure. 'Norwegian Public Health Law' (nor. Folkehelseloven) obliges municipalities to monitor the situation, because mobilization at the local level determines the activation of the society [6]. The Norwegian Directorate of Health refers to research, which says that the general development of the local environment, including activities in schools and workplaces, the offer of voluntary organizations, private companies and health services are central to increasing the level of physical activity of residents.

The development of physical activity through various forms of recreation and tourism needs constant institutional support. The institutions very often carry the responsibility of creating and managing the sports and recreational infrastructure, which includes equipment and tools to be used by inhabitants for active spending of their free time. This leads to increase of physical activity level and in consequence to improvement of physical condition and health [7]. Lacking sports and recreational infrastructure can on the other hand be a barrier for lifting the physical activity level of the society [8].

The topic of sport and recreational infrastructure and its importance for the improvement of physical activity level of people of all ages has appeared in international research before but not based on comparison of the situation in two countries, like in the research presented in this article. The Norwegian Directorate of Health published, among others, results of mapping of the infrastructure while focusing on children's physical activity [9]. One of the conclusions was that ensuring better access to the sport and recreational infrastructure all year round will motivate to more physical activity. Andrew McCulloch, the director of British Mental Health Foundation, published an article on how the local government can improve wellbeing through physical activity, where he states that one of essential tasks of municipal governments should be to provide equal access to infrastructure for all residents [10]. Research on management and development of infrastructure and sports policy has also been carried out several times in Finland (in 1996, 1999, 2002 and 2006). The rapport 'Finnish Local Government: Sport Services' presents, among others, information about the scope of duties and responsibilities and what kind of sports facilities and infrastructure are located in the municipality and who manages them [11]. Australian scientists devote a lot of space to research on the importance of sport and recreational infrastructure. An article called 'The Role of Local Government in Physical Activity: Employee Perceptions' was published In the Journal of Health Promotion Practice. It presents the results of research carried out with representatives of local authorities from Rockhampton, Australia, asking to what extent, in their opinion, investments in sports and recreation infrastructure support promoting a healthy and active lifestyle among residents. This research has mainly an informative role, but it is also intended to establish and strengthen cooperation between residents and local government in the area of physical activity [12]. Another journal, Social Science & Medicine, published an article on the relative influence of individual, social and physical environment determinants of physical activity, also based on the work of Australian scientists. It is the result of a socio-ecological project (known as the SEID project). The results suggest that access to sport and recreational infrastructure is needed but may not be enough to achieve the recommended level of physical activity among residents [13].

This article is based on a PhD thesis written at the University School of Physical Education in Poznan, Poland [14]. The thesis focuses on the role of local government in influencing people's physical activity level and takes into consideration the situation in chosen regions in Poland and

Norway. Presented results has not been published before and are a part of the material which was gathered and analysed under the preparation of the mentioned doctoral dissertation.

The aim of this presented study was to determine the declared level of physical activity of the surveyed groups and to learn about the factors influencing it. The focus was put on the local sports and recreation infrastructure. This, in turn, gives the foundation to formulate guidelines for improving the situation.

MATERIAL AND METHOD

The research process was based on the diagnostic survey method, but it also involved the analysis of content, including documents and subject literature, as well as the analysis of existing statistical data (Central Statistical Office in Poland and Statistics Norway) [15].

For the diagnostic survey research, the technique of survey was used, and the following tools were used with it: - survey sheet (in paper), - survey in electronic form, that the respondent filled in using his / her own computer.

The survey was anonymous and consisted of 26 questions (including 8 about the respondent: gender, age, education, occupation, average monthly income in the household, subjective evaluation of economic situation in the household, length of residence in the municipality). The questions in the main part of the survey are divided into three parts:

- a. Awareness about physical activity - contains 3 questions about the goals and the meaning of physical activity for the respondent.
- b. Physical activity - consists of 7 questions about the frequency, duration of the exercises, the form and place of undertaking activities, opinion on the state and development of sports and recreational infrastructure in the municipality of residence and whether the respondent uses that infrastructure.
- c. The influence of local government on the level of physical activity of residents - contains 8 questions regarding the conditions for undertaking physical activity in the municipality's area, factors influencing its undertaking and local government's interest in increasing the level of physical activity of residents.

The interview with local municipalities' representants consisted of 31 questions (including 4 about the municipality: the name of the municipality, its size in km², population, and the respondents' name, function, previous work experience and level of education). The study was in the form of an open, in-depth interview in paper form, and one of the authors personally met with representatives of all 19 analysed municipalities. The interview sheet was divided into four parts:

- a. The attractiveness of the municipality for undertaking physical activity - in 2 sub-points, it was asked whether the area is considered attractive and what is the state of the local sports and recreation infrastructure.
- b. The influence of self-government on the level of physical activity of residents - 15 questions about whether there is a unit or commission for physical activity in the municipality, whether the municipality has a development strategy and publications taking into consideration the physical activity of the respondents. The questions regarding municipality's budget and its part devoted to physical activity and sport were also included, as well as those about extra-budgetary funds municipality gains, what investments, actions and events are organized and how the local government encourages investors and what role it plays in the process of raising the level of physical activity of residents.
- c. Cooperation with other local governments, non-governmental organizations, residents - 7 questions about the municipality's membership in partnerships and associations, cooperation and support for non-profit organizations existing in the municipality, and forms of communication with residents.
- d. Municipality's tools of impact on the level of physical activity of residents - 3 questions about at which level of government the greatest responsibility rests, as well as factors and barriers that determine the implementation or failure of activities in this area.

The research was carried out for 1 year, from March 2016 to March 2017.

When determining the group of respondents, it was decided to select a random, layered sample, because it gives more representativeness than a simple random selection. For this purpose, demographic data of the Central Statistical Office in Poland and Statistisk Sentralbyrå in Norway (Statistics Norway) published in 2016 for the years 2014-2015 were used [16, 17]. On their basis, it was established that the population of the Kalisz county meeting the basic criterion of research (age 15 and over) is 70225 people, and for Inner Sogn region – 23456 people. Next, the demographic structure of the population in each of the surveyed units was determined, with the specification of age ranges and by gender. Using the appropriate formula, the size of the test sample was calculated assuming a confidence level of 95%, a maximum error of 5% and a fraction size of 0.5. The obtained result was divided proportionally, based on the statistical data, between individual municipalities (Table 1). On this basis, the size of research groups was established: 382 respondents from 11 municipalities of the Kalisz county and 378 respondents from 8 municipalities of the Inner Sogn region (Table 2).

In the Polish part of the research, municipalities of the Kalisz county, located in central Poland, were considered. The county consists of nine rural municipalities: Blizanow, Brzeziny, Cekow, Godziesze Wielkie, Kozminek, Liskow, Mycielin, Szczytniki, and Zelazkow, as well as two rural-urban municipalities: Opatowek and Stawiszyn. There are over 80000 people living on the area of 1160 square kilometres. Agricultural land constitutes about 71% of the area, which means that the vast majority of economic entities are individual farms. The landscape is lowland, with several elevations above 100 meters above sea level, quite densely wooded.

The Inner Sogn region in West Norway (Vestlandet) includes eight municipalities around the Sognefjord (the deepest and largest fjord of Europe and the second in these areas in the world) in its inland, eastern part. The Indre Sogn region includes the following municipalities: Aurland, Balestrand, Leikanger, Luster, Laerdal, Sogndal, Vik, Aardal. The area is 8682 square kilometres. It is inhabited by slightly over 28200 people. The average number of inhabitants of the municipality is about 3500 people. It is half as much as in the case of the Kalisz county. However, it should be emphasized here that the population of Norway is almost 8 times smaller than in Poland [18]. The majority of the developed area is agricultural (also used for tourism), with industry centres in larger towns (Sogndal, Gaupne) [19]. The landscape is mountainous, with fjords and lots of forests.

Table 1. Analysis of the group of respondents. Municipality of residence

Place of residence		n	%
Country	Poland	382	50.3
	Norway	378	49.7
Municipality in Poland	Blizanów	27	3.6
	Brzeziny	46	6.1
	Ceków Kol.	23	3.0
	Godziesze Wlk.	42	5.5
	Koźminek	34	4.5
	Lisków	23	3.0
	Mycielin	23	3.0
	Opatówek	50	6.6
	Stawiszyn	34	4.5
	Szczytniki	38	5.0
	Żelazków	42	5.5
Municipality in Norway	Aurland	23	3.0
	Balestrand	18	2.4
	Leikanger	30	3.9
	Luster	67	8.8
	Lærdal	29	3.8
	Sogndal	100	13.2
	Vik	36	4.7
	Årdal	75	9.9

Source: Own research results

Table 2. Analysis of the group of respondents. Gender and age

Variables		Poland		Norway	
		n	%	n	%
Gender	Woman	191	50.0	186	49.2
	Man	191	50.0	192	50.8
Age	15-19 years	32	8.4	31	8.2
	20-34 years	104	27.2	83	22.0
	35-49 years	96	25.1	87	23.0
	50-64 years	86	22.5	89	23.5
	65 and more years	64	16.8	88	23.3

Source: Own research results

The reason for choosing these two areas for research are, apart from useful differences, the similarities that connect them. In Norway the main responsibility for physical activity and health of the society has been placed on the local municipality level for many decades now while in Poland the transformation in that field occurred in 1990. There is a need in Poland for looking for 'the best practice' in other countries and that is why comparing to the situation in Norway can be useful. What is more, both Wielkopolska region, in which the Kalisz county is located, as well as the Sogn og Fjordane, which includes Inner Sogn, are areas of relatively low unemployment, assessed as having good conditions for life and development of residents, characterized by positively assessed recreational attractiveness. On the other hand, in both cases, the municipalities are struggling with problems related to the creation of physical activity habits, characteristic for local administrative units. These include in most cases too small budget, and in some cases too complicated and long-term procedures, or too much spending on activities in other areas¹. In addition, the nature of the two regions is agricultural, not industrial or of agglomeration type, which means similar possibilities and habits in the field of physical activity, most often taken in the form of walks or cycling and defined by residents as a form of free-time recreation (outdoor activity), preferably in an unorganized form². The nearest large cities are located at a considerable distance from the regions of focus (about 230 km from Sogndal to Bergen, about 150 km from Opatowek to Poznan). In both regions, as shown by surveys and participant observations, the field of development, improvement and adaptation of sports and recreation infrastructure to the needs of residents remains wide. They are two areas not yet covered by research of a similar degree of insight and comparative, international character. The results can be later used by other similar regions.

RESULTS

Declared physical activity level

As mentioned, this article presents a part of larger research on physical activity in context of the actions of the local governments. That is why only the results concerning declared physical activity level and sports and recreation infrastructure are presented below. The whole research process with comprehensive use of methods and tools mentioned above, together with full range of results is presented in the doctoral thesis written at the University School of Physical Education in Poznan, Poland, with the title 'Physical activity of local communities in Poland and Norway in the context of the actions of local government' [14].

The declared level of physical activity (presented as MET (Metabolic Equivalent)- min. per week) was calculated by multiplication of 3 variables given by the answers to questions:

- how often in a week is the respondent physically active?
- how long time usually does the physical activity take?
- what form of physical activity is undertaken most often?

¹ The data comes from interviews with representatives of local administration units conducted in both areas for the purpose of doctoral research.

² It was established on the basis of the results of a survey conducted among residents of the analysed municipalities for the purpose of doctoral research.

Table 3. Measures of central tendency and dispersion for the MET-min./week coefficient of all respondents

	M	SD	Me	Max
Total of respondents	2554.7	3205.7	1440.0	22560.0
Poland	1739.0	2556.4	780.0	17640.0
Norway	3378.9	3568.0	2160.0	22560.0
U Mann-Whitney Test	Z = -8.79; p < 0.001			

M – average, SD – standard deviation, Me – median, Max. – maximum, Z – the value of the U Mann-Whitney test, p – level of significance, Source: Own research results.

Table 4. Factors influencing physical activity level x country of residence, 0 – not important, 5 – very important

Variables	Country				U Mann-Whitney test	
	Poland		Norway		Z	p
	M	SD	M	SD		
Attractive recreational areas in the municipality	3.0	1.9	3.4	1.8	-2.95	0.003
Age	2.5	1.7	2.3	1.3	-1.82	0.068
Gender	1.7	1.6	1.9	1.4	-2.52	0.012
Marital status	1.7	1.7	2.0	1.4	-4.00	<0.001
Level of education	1.8	1.7	2.2	1.4	-4.14	<0.001
Motivation in the family	3.0	1.7	2.8	1.6	-1.86	0.062
Motivation in a peer group, a group of friends	3.0	1.7	2.7	1.5	-2.77	0.006
Financial situation in the household	2.3	1.7	2.3	1.4	-0.47	0.635
Mass media	2.3	1.6	2.2	1.3	-0.63	0.529
Internal motivation, self-awareness	3.3	1.7	3.0	1.7	-2.28	0.023
Developed sports and recreation infrastructure in the municipality	2.9	1.7	2.8	1.5	-1.32	0.188
Promotion of physical activity and a healthy lifestyle by the municipal government	2.5	1.6	2.3	1.3	-0.94	0.349
Wide range of recreational activities organized in the municipality	2.6	1.7	2.7	1.5	-1.33	0.183
Organization of festivities and sports and recreation events by the municipal government	2.6	1.6	2.4	1.4	-1.49	0.137

M – average, SD – standard deviation, Z – the value of the U Mann-Whitney test, p – level of significance

MET coefficient values were given to individual forms of physical activity assuming that <3MET means low activity, 3-6 MET moderate activity (MVPA) and >6MET intensive activity (VPA) [20-24].

Among respondents from Norway the MET/week level is 2 times higher than among respondents from Poland. Average for Polish respondents is 1739 MET-min./week, while for Norwegians it is 3378.9 MET-min./week (Table 3). Moreover, measures of central tendency and dispersion for the physical activity level factor were determined. The standard deviation for each group was quite big (bigger for Polish respondents), the median was placed quite far away from the average and the maximum value was much higher than the average. This means that the answers were very

heterogeneous. The difference in MET-min./week level between research group from Poland and Norway was statistically significant (table content in red colour).

Factors influencing physical activity level

The respondents had to use a 6-point scale to assess the impact of selected factors on their physical activity level. Rating 5 meant the greatest importance of a given factor, and rating 0 meant no importance. Table 2 shows the mean values and standard deviation of responses for individual factors as well as the U Mann-Whitney test result and the significance level of the differences. The division according to the country of residence revealed many statistically significant differences (Table 4).

In the Polish respondent group, the average values ranged from 1.7 (gender and marital status) to 3.3 (internal motivation). Motivation in the family, peer group, recreational attractiveness of the municipality's area and sports and recreational infrastructure were also important determinants. For Norwegians, the range of mean values is distributed between 1.9 for gender and 3.4 for attractive recreational areas. Other important factors for that group are: internal motivation, family motivation and developed sports and recreational infrastructure. Gender and marital status in both groups were indicated as the least significant.

The use and opinions on sports and recreation infrastructure

As part of the survey, the opinion of the respondents on different matters was checked. They were asked about the use of the sports and recreation infrastructure available in the municipality and its condition. The analysis by the chi-square independence test showed significant differences between answers from Poland and Norway (Table 5). The Norwegians (59.5% of them) used the infrastructure much more often than Poles (28%).

There were also statistically significant differences in terms of the average MET-min./week coefficient (physical activity level) between the respondents using the infrastructure and non-users. These differences were found for both compared groups - adults from Poland and Norway. As shown by measures of central tendency and dispersion, higher average values were obtained in both groups by those who used the infrastructure (Table 6).

The respondents were also asked about their opinion on the offer of local sports and recreation infrastructure (understood as its condition, diversity and stage of development). Most of the Norwegian respondents are satisfied (33.6%) or very satisfied (25.1%) with the offer of infrastructure provided in the municipality. Most of the Polish respondents, on the other hand, said it is not developed enough (33.6%). The difference is statistically important (Table 7).

Table 5. Use of the sports and recreation infrastructure of the municipality x country of residence

Variables		Country		Total
		Poland	Norway	
Yes	N	107	225	332
	n%	28	60	44
No	N	275	153	428
	n%	72	40	56
Independence test chi square		$\chi^2 = 76.70; p < 0.001$		

Table 6. Use of the sports and recreation infrastructure x the MET-min./week coefficient for both groups

Variables	Poland		Norway	
	M	SD	M	SD
Yes	3083.8	3550.2	4203.3	3933.3
No	1215.8	1797.2	2166.6	2508.0
U Mann-Whitney Test	Z = -6.58; p < 0.001		Z = -6.62; p < 0.001	

M - average, SD - standard deviation

Table 7. Assessment of the state of development of sports and recreation infrastructure in the municipality x country of residence

Variables		Country	
		Poland	Norway
Very good	N	11	94
	n%	2.9	25.1
Good	N	73	126
	n%	19.5	33.6
Good enough	N	124	91
	n%	33.1	24.3
Not good enough	N	126	55
	n%	33.6	14.7
Bad	N	33	7
	n%	8.8	1.9
Very bad	N	8	2
	n%	2.1	0.5
Independence test chi square		$\chi^2 = 133.14; p < 0.001$	

Limitations

Presented work has a few limitations, caused mainly by the fact that the author planned the research, carried it out, and analysed results alone. Cooperating with a team of researchers could improve and widen the perspective. Firstly, the research was carried out for a period of only 1 year. Repeating the tests in several years could give a more accurate picture of the situation and allow prognosing the future trends. Secondly, the tested samples included only people from relatively small area (in total 19 municipalities in two countries). Carrying out this type of research on a national basis could give even more interesting results. And finally, due to the fact that it was an individual work, the possibilities of discussion and testing of many research methods were limited.

DISCUSSION

The research shows that Norwegian respondents have much higher physical activity level (MET-min./week) than the ones from Poland. This corresponds with the results presented by E. Biernat and M. Piątkowska in 'Comparative Leisure Physical Activity: A Comparison Between Polish and European Population'. The authors of that publication focused particularly on recreational physical activity, but the tendencies observed by them are similar to those shown in the results above: the median of MET-min./week of recreational physical activity of women in Poland is 661.8, and of men 732, while for Norwegian women it is 1024, and for men 891 [2]. Also, when the percentage of adults meeting World Health Organisation's criteria for undertaking daily physical activity in both countries is concerned, the Norwegians seems to be much more active. In Poland, 13.4% of adult women and 18.9% of adult men meet the WHO criteria [25], while in Norway it is respectively 34% of adult women and 29% of adult men [26].

The theory of Anthony J. Veal shows those differences from an interesting perspective. Veal concludes, referring to the theory of the Veblen effect (increase in the demand for luxury goods, despite the increase in prices), and suggests that the 'richer' society is, the higher the level of physical activity and greater interest in the topic [27]. That would explain the differences between Norwegians (being in better economic situation) and Poles. On the other hand, in 2012 an article titled Global physical activity levels was published in The Lancet Journal. Authors of that report prove that the level of general physical activity is lower in high income societies (in North America and eastern part of the Mediterranean 43% of population is physically inactive) than in low income ones (in Southeast Asia only 17% of population in physically inactive) [28]. The contradiction between presented results may come from the difference in understanding physical activity (as free-time active recreation only or as a two-element structure: free-time active recreation and physical activity for transportation purposes). There is a need for further research in that field in order to exclude inconsistencies.

What is more, the results presented above indicates that in both groups those persons who use sports and recreation infrastructure are more active than those who do not use sports and recreation infrastructure. It is proven that Norwegians use the infrastructure more and, as mentioned, they have significantly higher physical activity level. Norwegians also evaluate sports and recreation infrastructure better than Polish respondents. Inhabitants of Inner Sogn region were mostly satisfied or very satisfied with available infrastructure, while in Kalisz county most of the surveyed persons were dissatisfied or said infrastructure was only good enough. This is a strong indication that local governments in Poland can influence the level of physical activity of inhabitants by increasing the quality of sport and recreation infrastructure. If inhabitants are more satisfied with the infrastructure, they are probably more willing to use it, which in turn, observing the Norwegian case, should result in increase of physical activity level. Increasing the quality of infrastructure is a very concrete way local government can support the society in becoming more physically active. Though there is a need for deepening and concretization of the efforts each municipality should make in that field as there are significant differences between particular municipalities. Research by other authors shows however that physical activity is not considered a key element of local administration activities in other countries (e.g. Australia), despite the fact that the surveyed employees of municipal offices understand and support the idea of infrastructure development and the need for facilities for raising the residents' physical activity level [29].

The study shows that there are also many other factors influencing people's physical activity, such as internal and external motivation, attractiveness of the area and mass media. The results correspond with findings of S. Fimreite, writing that 'people characterized by a high level of internal motivation and support in the family and among friends are more likely to follow recommendations regarding the appropriate level of physical activity'. The cited studies took a step further than in this work and additionally it was established that support in the group of friends gives the greatest results in the group of people between 35 and 49 years of age. In turn, for the oldest respondents, support in the family played an important role, although here the differences were not statistically significant [30].

The evaluation of importance of the main factors influencing physical activity level among Polish and Norwegian respondents was quite similar, which indicates that there is resemblance in their needs and drivers for increase of physical activity. That in turn suggests that actions successfully accomplished in Norway, can give similar, positive results if carried out in Poland, and vice versa. However, further exploration, specification and priorities are needed as the preconditions in the regions differ and the research on factors influencing the level of physical activity among adults is comprehensive and differential.

The research presents physical activity habits of inhabitants in Norway and Poland and the factors influencing it. The study shows that self-perceived physical activity level of inhabitants in Norway is two times higher than in Poland. But despite differences between the countries the inhabitant's self-perception of physical activity is similarly influenced by a variety of factors. The study shows that respondents' satisfaction with sport and recreation infrastructure affects their self-perceived physical activity level in both countries, and that the differences in satisfaction between Poles and Norwegians are a statistical contribution to explain the Poles lower physical activity level. Hopefully, presented outcomes can be helpful for local governments, especially in Poland, to increase inhabitants' physical activity level by increasing their satisfaction with municipal sports and recreation infrastructure.

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